HOW TO WRITE A RESEARCH PAPER

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RESEARCH PAPER WRITING PROCESS

At the end of this workshop, students will be able to :

1. <u>Identify</u> and <u>conceptualize</u> the essential steps in the research paper writing process;

2. Access valuable campus resources to help at various stages of the writing process;

3. Use time management strategies to plan for the successful and timely completion of a research paper project.

SELECTION OF RESEARCH AREAS IN CSE

- **Robotics**
- **Artificial Intelligence, ML and DL**
- **Data Science, Bigdata Analytics**
- **Cyber security and cryptography, Network security**
- **Computer Networks, Wireless sensor networks, Mobile Networks, Wireless Networks/Communications**
- **Quantum Computing**
- **Virtual reality, Augmented reality, Cognitive Computing, Game**
- **Internet of Things**

- **APP development**
- **High-performance computing.**
- **Data Mining, Natural Language Processing**
- **Blockchain**
- Future of 5G wireless systems.
- Cyber-physical systems
- **Cloud Computing**
- **Image Processing**
- Role of human-computer interaction
- **Cognitive Radio Networks**

Research Areas

Algorithms and complexity theory
Dr. Nalini N
Mrs. Sujata Joshi
Mrs. Ramyashree B R
Mrs. Kavya B S
Mr. Vinay

Information and System Security
Dr.Nalini N
Dr. Thippeswamy M N
Mr. Muthuraju V
Ms.Ushashree P
Ms.Sharmila Sequeira
Mr .Chethan D Chavan

Computer Vision & Image Processing /Virtual Reality/Robotics
Dr. Jharna Majumdar
Dr. Vijaya Shetty S
Ms.Ramya Srikanteswara
Ms Nirmala Saunshimath
Ms. Shilpa A
Mr.Muthuraj

Data Science
Dr. Thippeswamy M N
Ms.Archana Naik
Ms.Sujata Joshi
Dr. Vasanthakumar G U
Ms.Deepthi Shetty
Ms.Ramyashree BR
Ms.Jagadevi N Kalshetty
Ms.Ramya. Srikanteswara
Ms.Kavya BS
Ms.Asha H V
Ms.Sowmya M R
Ms.Ushashree.P
Ms.Sharmila Sequeira
Ms.Mamatha Bai B G
Ms.Supriya P

Artificial Intelligence/ Machine Learning/Deep learning
Dr.Nalini.N
Dr. Vijaya Shetty S
Dr. Mohan B.A
Dr Chaithra H V
Ms. Sujatha Joshi
Dr. Vasanthakumar G U
Ms.Deepthi Shetty
Ms.Jagadevi N Kalshetty
Ms.Ramyashree B R
Ms.Ramya Srikanteswara
Ms Nirmala Saunshimath
Ms.Kavya, Ms.Asha H V
Ms.Meenakshi, Ms.Sowmya M R
Ms.P. Shobha, Ms.P.Ushashree
Ms.Sharmila Sequeira
Ms.Shilpa A. Ms.Mamatha Bai B G
Mr.Chethan D Chavan
Ms.Supriya P, Ms.Bhuvaneshwari

Natural language Processing
Dr. Nalini N
Dr. Vijaya Shetty S
Dr. Mohan B.A
Dr. Vasanthakumar G U
Ms. Deepthi Shetty
Ms. Sowmya M R
Ms. Shobha
Ms. Impana
Dr . Shiva Darshan SL

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Dr.Venkatesh K
Dr. Thippeswamy M N
Dr. Mohan B A
Mrs. Uma R
Dr. SreenivasaN
Mrs. Jagadevi
Mrs. Shruthi B V
Mrs. Ramyashree B R
Mr. E G satish
Mr. Chethan
Mr. Vinav T R

Software Engineering and Applications
Dr. Thippeswamy M N
Mrs. Aasha
Mr. Vinay T R

Computer Networks and Distributed Systems
Dr. Thippeswamy M N
Dr.Nalini N
Dr. Mohan B.A
Ms.Archana Naik
Dr.Chaitra H V
Ms.Deepthi Shetty
Ms.Uma.R
Ms.Ramyashree B R
Mr.E G Satish
Ms.Sowmya.M.R
Ms.P.Ushashree
Ms.Sharmila Sequeira
Mr.Ramesh Naidu
Mr.Muthuraju V
Mr.Chethan D Chavan
Dr. Shiva Darshan SL

HOW DOES A RESEARCH PAPER DIFFER FROM A RESEARCH PROPOSAL?

- A research paper is different from a research proposal (also known as a prospectus), although the writing process is similar.

- Research papers are intended to demonstrate a student's academic knowledge of a subject.

- A proposal is a persuasive piece meant to convince its audience of the value of a research project.

- Think of the proposal as the pitch and the paper as the finished product.

THE RESEARCH PROCESS

Research will help you in several ways:

- Understanding your subject

- Formulating ideas for your paper

- Developing a thesis statement

- Speaking about your topic with authority

WRITING THE RESEARCH PAPER

- The good news is, once you reach this point in the process you're likely to feel energized by all the ideas and thoughts you've uncovered in your research, and you'll have a clear direction because you've taken the time to create a thesis statement and organize your presentation with an outline.

https://www.grammarly.com/blog/how-to-write-a-research-paper/

FINDING, SELECTING, AND READING SOURCES

- You will need to look at the following types of sources:

- library catalog, periodical indexes, bibliographies, suggestions from your instructor

- primary vs. secondary sources

- journals, books, other documents

WRITING AN OUTLINE AND A PROSPECTUS FOR YOURSELF
Consider the following questions:
- What is the topic?
- Why is it significant?
- What background material is relevant?
- What is my thesis or purpose statement?
- What organizational plan will best support my purpose?

THE BEST ELEMENTS TO A RESEARCH PAPER

1. **Title of paper, Authors information**

2. **Abstract:**

3. **Keywords**

4. The Introduction

5. **The Body/Materials:**
   i. **Literature survey**
   ii. **Methodology**
   iii. **Implementation**
   iv. **Results**
   v. **Discussion**

6. **Conclusion**

7. **References**

Research Questions/Hypotheses
Literature Review/Theory
Methods & Data Collection
Data Presentation/Findings

Basic Structure of a Research Paper

Introduction	General statement of the topic
Body	Literature review · Methodology · Results · Discussion
Ending	Summary of the main points

https://cse.buffalo.edu/~rapaport/howtowrite.html

TITLE :

- Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines

Artificial Intelligence and COVID-19: Deep Learning Approaches for Diagnosis and Treatment

MOHAMMAD (BEHDAD) JAMSHIDI[ID][1], ALI LALBAKHSH[ID][2], (Member, IEEE), JAKUB TALLA[ID][1], ZDENĚK PEROUTKA[3], (Member, IEEE), FARIMAH HADJILOOEI[ID][4], PEDRAM LALBAKHSH[5], MORTEZA JAMSHIDI[6], LUIGI LA SPADA[7], MIRHAMED MIRMOZAFARI[ID][8], (Member, IEEE), MOJGAN DEHGHANI[9], ASAL SABET[10], SAEED ROSHANI[11], (Member, IEEE), SOBHAN ROSHANI[11], NIMA BAYAT-MAKOU[ID][12], (Member, IEEE), BAHARE MOHAMADZADE[2], (Student Member, IEEE), ZAHRA MALEK[ID][13], ALIREZA JAMSHIDI[14], SARAH KIANI[15], HAMED HASHEMI-DEZAKI[ID][3], AND WAHAB MOHYUDDIN[ID][16], (Member, IEEE)

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[2]School of Engineering, Macquarie University, Sydney, NSW 2109, Australia

DEFINITION AND PURPOSE OF ABSTRACTS

- **An abstract is a short summary of your (published or unpublished) research paper, usually about a paragraph (c. 6-7 sentences, 150-250 words) long. A well-written abstract serves multiple purposes:**

  ➢ **an abstract lets readers get the gist or essence of your paper or article quickly, in order to decide whether to read the full paper;**

  ➢ **an abstract prepares readers to follow the detailed information, analyses, and arguments in your full paper;**

  ➢ **and, later, an abstract helps readers remember key points from your paper.**

HERE ARE THE TYPICAL KINDS OF INFORMATION FOUND IN MOST ABSTRACTS:

1. The context or background information for your research; the general topic under study; the specific topic of your research

2. The central questions or statement of the problem your research addresses

3. What's already known about this question, what previous research has done or shown

4. The main reason(s), the exigency, the rationale, the goals for your research—Why is it important to address these questions? Are you, for example, examining a new topic? Why is that topic worth examining? Are you filling a gap in previous research? Applying new methods to take a fresh look at existing ideas or data? Resolving a dispute within the literature in your field? . . .

5. Your research and/or analytical methods

6. Your main findings, results, or arguments

"The growing economic resemblance of spouses has contributed to rising inequality by increasing the number of couples in which there are two high- or two low-earning partners. The dominant explanation for this trend is increased assortative mating. Previous research has primarily relied on cross-sectional data and thus has been unable to disentangle changes in assortative mating from changes in the division of spouses' paid labor—a potentially key mechanism given the dramatic rise in wives' labor supply. We use data from the Panel Study of Income Dynamics (PSID) to decompose the increase in the correlation between spouses' earnings and its contribution to inequality between 1970 and 2013 into parts due to (a) changes in assortative mating, and (b) changes in the division of paid labor. Contrary to what has often been assumed, the rise of economic homogamy and its contribution to inequality is largely attributable to changes in the division of paid labor rather than changes in sorting on earnings or earnings potential. Our findings indicate that the rise of economic homogamy cannot be explained by hypotheses centered on meeting and matching opportunities, and they show where in this process inequality is generated and where it is not." (p. 985)

The first sentence introduces the **topic** under study (the "economic resemblance of spouses"). This sentence also implies the **question** underlying this research study: what are the various causes—and the interrelationships among them—for this trend?

These next two sentences explain what **previous research** has demonstrated. By pointing out the limitations in the methods that were used in previous studies, they also provide a **rationale** for new research.

The data, research and analytical **methods** used in this new study.

The major **findings** from and **implications** and **significance** of this study.

"From the mid-1970s through the mid-1980s, a network of young urban migrant men created an underground pulp fiction publishing industry in the city of Dar es Salaam. As texts that were produced in the underground economy of a city whose trajectory was increasingly charted outside of formalized planning and investment, these novellas reveal more than their narrative content alone. These texts were active components in the urban social worlds of the young men who produced them. They reveal a mode of urbanism otherwise obscured by narratives of decolonization, in which urban belonging was constituted less by national citizenship than by the construction of social networks, economic connections, and the crafting of reputations. This article argues that pulp fiction novellas of socialist era Dar es Salaam are artifacts of emergent forms of male sociability and mobility. In printing fictional stories about urban life on pilfered paper and ink, and distributing their texts through informal channels, these writers not only described urban communities, reputations, and networks, but also actually created them." (p. 210)

The first sentence introduces the **context** for this research and announces the **topic** under study.

The remaining sentences in this abstract interweave other essential information for an abstract for this article. The implied **research questions**: What do these texts mean? What is their historical and cultural significance, produced at this time, in this location, by these authors? The **argument** and the **significance** of this analysis in microcosm: these texts "reveal a mode or urbanism otherwise obscured . . ."; and "This article argues that pulp fiction novellas. . . ." This section also implies what **previous historical research** has obscured. And through the details in its argumentative claims, this section of the abstract implies the kinds of **methods** the author has used to interpret the novellas and the concepts under study (e.g., male sociability and mobility, urban communities, reputations, network. . .).

https://writing.wisc.edu/handbook/assignments/writing-an-abstract-for-your-research-paper/

"Several studies have reported reprogramming of fibroblasts into induced cardiomyocytes; however, reprogramming into proliferative induced cardiac progenitor cells (iCPCs) remains to be accomplished. Here we report that a combination of 11 or 5 cardiac factors along with canonical Wnt and JAK/STAT signaling reprogrammed adult mouse cardiac, lung, and tail tip fibroblasts into iCPCs. The iCPCs were cardiac mesoderm-restricted progenitors that could be expanded extensively while maintaining multipo-tency to differentiate into cardiomyocytes, smooth muscle cells, and endothelial cells in vitro. Moreover, iCPCs injected into the cardiac crescent of mouse embryos differentiated into cardiomyocytes. iCPCs transplanted into the post-myocardial infarction mouse heart improved survival and differentiated into cardiomyocytes, smooth muscle cells, and endothelial cells. Lineage reprogramming of adult somatic cells into iCPCs provides a scalable cell source for drug discovery, disease modeling, and cardiac regenerative therapy." (p. 354)

The first sentence announces the **topic** under study, summarizes what's **already known** or been accomplished in **previous research**, and signals the **rationale and goals are for the new research and the problem** that the new research solves: How can researchers reprogram fibroblasts into iCPCs?

The **methods** the researchers developed to achieve their goal and a description of the **results**.

The **significance** or **implications**—for drug discovery, disease modeling, and therapy—of this reprogramming of adult somatic cells into iCPCs.

https://writing.wisc.edu/handbook/assignments/writing-an-abstract-for-your-research-paper/

WRITING THE INTRODUCTION

- In the introduction you will need to do the following things:

- present relevant background or contextual material

- define terms or concepts when necessary

- explain the focus of the paper and your specific purpose
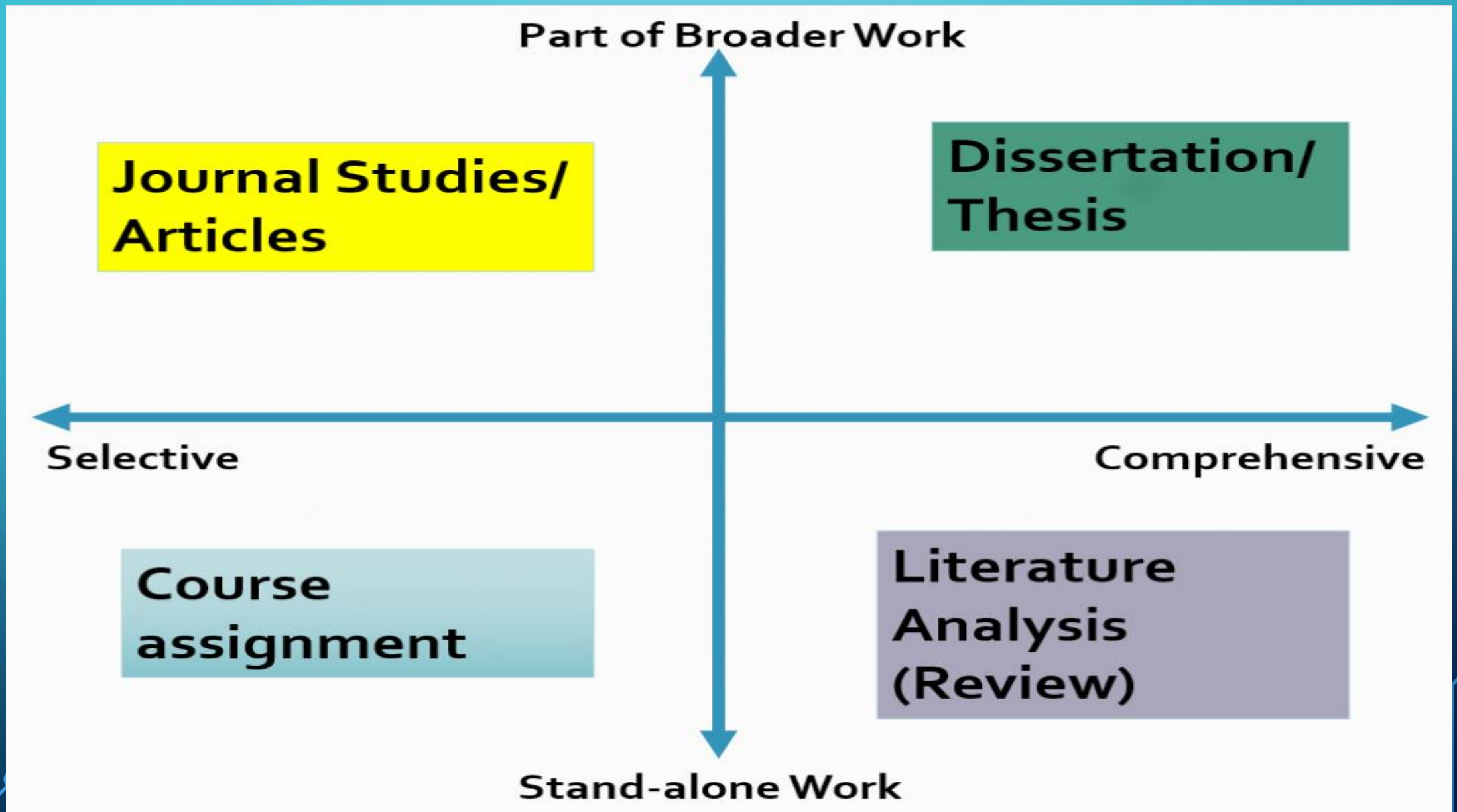
- reveal your plan of organization

Introduction

RELATED WORK/LITERATURE SURVEY

- A good literature review WILL:

- Present a brief typology that orders articles and books into groups to help readers focus on unresolved debates, inconsistencies, tensions, and new questions about this research

- Summarize the most relevant and important aspects of the scientific literature related to your area of research

- Synthesize what has been done in this area of research and by whom, highlight what previous research indicates about a topic, and identify potential gaps and areas of disagreement in the field

- Give the reader an understanding of the background of the field and show which studies are important—and perhaps highlight previous studies that contain errors.

https://youtu.be/-ny_EUJXHHs?t=54

[Video]

TYPES OF LITERATURE REVIEWS

Part of Broader Work

Journal Studies/ Articles

Dissertation/ Thesis

Selective ← → Comprehensive

Course assignment

Literature Analysis (Review)

Stand-alone Work

WRITING THE BODY

- Use your outline and prospectus as flexible guides

- Build your essay around points you want to make (i.e., don't let your sources organize your paper)

- Integrate your sources into your discussion

- Summarize, analyze, explain, and evaluate published work rather than merely reporting it

- Move up and down the "ladder of abstraction" from generalization to varying levels of detail back to generalization

WRITING THE CONCLUSION

- If the argument or point of your paper is complex, you may need to summarize the argument for your reader.

- If prior to your conclusion you have not yet explained the significance of your findings or if you are proceeding inductively, use the end of your paper to add your points up, to explain their significance.

- Move from a detailed to a general level of consideration that returns the topic to the context provided by the introduction.

- Perhaps suggest what about this topic needs further research.

REFERENCES

- IEEE Referencing [Style](#) Sheet

https://libraryguides.vu.edu.au/ieeereferencing/gettingstarted

https://libraryguides.vu.edu.au/ieeereferencing/gettingstarted#s-lg-box-wrapper-9930413

SINGLE CITATION IN THE TEXT

- **IEEE in-text citations consist of numbers provided in square brackets, which correspond to the appropriate sources in the reference list at the end of the paper.**

The in-text citations numbers start at [1] and continue in **ascending order** throughout the paper – unless you are referring to a source you have already cited in your text, in which case you can use the previously assigned number.

The in-text citations numbers start at [1] and continue in ascending order throughout the paper – unless you are referring to a source you have al in your text, in which case you can use the previously assigned number.

Each in-text citation number should be enclosed by square brackets and appear on the text line, inside sentence punctuation, with a space before bracket, e.g.

Thevenin's and Norton's theorems are widely used for circuit analysis simplification [13].

Citations of references may be given simply as "in [1]...", rather than as "in reference [1] ...".

Furthermore, citations may be grammatically treated either as if they were:

- footnote numbers, e.g.

As shown by Jones [4] ...

For more details, see [1], [3], [7].

as mentioned earlier [3], [4]–[6], [8] ...

Taylor et al. [5] have noted ...

- or nouns:

As seen in [2] ...

According to [4] and [6]–[8] ...

In contrast to [5, p. 7], it is evident that...

MULTIPLE CITATIONS IN THE TEXT

- The preferred method of citing more than one source at a time is listing each citation number separately with a comma or dash between each citation:

- [1], [3], [7]

- [6]–[8]

- It is noted that multiple sources can also be provided in the following way as seen in some literature:

- Considerable body of work on electrical circuits [1, 3, 7], [6–8], [10, 14–16] defines ...

ACKNOWLEDGMENTS

1. Common professional courtesy (distinct from authorship, although this can be contentious).

2. Indicate source(s) of financial support.

3. People who contributed with help in the field and/or lab, with ideas, statistic analysis, etc., (those whose contributions were less than those expected for co-authorship.

4. Only professional, not emotional help (find other ways to thank your mother or your boyfriend).

- Thank you