COURSE OUTLINE

- Research Using IMRaD

PRELIM

- Presentation of Title and Oral Defense
- Submission of Introduction and Methodology
- Submission of Gantt Chart

MIDTERM

- Submission of Results and Discussion
- Initial System Development Presentation

FINALS

- Include abstract, bibliography, reference and appendices of the study
- Defense of the system output
- Softbound of the study

The IMRaD structure is a common format for scientific papers, especially in the fields of empirical research. It stands for **Introduction**, **Methods**, **Results**, and **Discussion**. Below is a detailed breakdown of each section:

1. Introduction

The introduction sets the context for the research and outlines its purpose. It includes:

- **Background**: Presents the general field of study and why it is important.
- **Problem statement**: Describes the specific problem the research aims to address.
- **Research question or hypothesis**: Clearly states the main question or hypothesis guiding the research.
- **Rationale/Justification**: Explains why this research is necessary and how it contributes to the existing body of knowledge.
- **Objectives**: Describes the specific aims and scope of the study.

Example: In a study about a new drug, the introduction would explain the disease, existing treatments, gaps in current knowledge, and why investigating the new drug is relevant.

2. Methods (or Methodology)

The methods section explains how the research was conducted, allowing others to replicate the study if needed. It covers:

- **Study design**: Describes the overall approach (e.g., experimental, observational).
- **Participants/Sample**: Defines who was studied, how many participants were included, and the criteria for inclusion/exclusion.
- **Procedures**: Outlines the specific steps taken during the study, including how variables were manipulated or measured.
- **Materials/Instruments**: Details the tools, surveys, or equipment used for data collection.
- **Data analysis**: Describes the statistical or analytical techniques used to interpret the data.

Example: For a clinical trial, this section would explain how participants were selected, the treatment protocol, and the statistical tests used to analyze the results.

3. Results

The results section presents the findings of the study without interpretation or bias. This includes:

- **Data presentation**: Uses figures, tables, and graphs to display the data in an organized manner.
- **Key outcomes**: Reports the main findings, including statistical significance, confidence intervals, or other relevant metrics.
- **Subgroup analysis**: Sometimes specific analyses on different segments of the sample are presented, depending on the study design.

Example: In the new drug trial, this section would show the efficacy results, side effects, and any statistically significant differences between the drug and control groups.

4. Discussion

The discussion interprets the findings in the context of the research question and broader field. It includes:

- **Interpretation of results**: Discusses what the findings mean in relation to the original hypothesis or question.
- **Comparison with previous research**: Compares results with other studies and explains any similarities or differences.
- **Limitations**: Acknowledges the study's limitations, such as sample size or methodology, which might impact the validity of the findings.
- **Implications**: Explains the practical, theoretical, or clinical significance of the results.
- **Future research**: Suggests areas for further investigation based on the study's findings.

Example: In the drug study, this section would explain how the drug's effectiveness compares to current treatments, discuss the potential for broader clinical application, and propose further studies to confirm the results.

- **Conclusion**: While sometimes included within the Discussion, a separate conclusion may summarize the key points and restate the importance of the findings.
- **Acknowledgments**: Mention those who contributed to the research but are not listed as authors, as well as funding sources.
- **References**: List the scholarly works that were cited in the paper.

This IMRaD structure provides a clear and logical framework for presenting research findings in a consistent and reproducible way.

Abstract (in the context of IMRaD)

The **abstract** is a concise summary of the entire research paper, typically found at the beginning of the article. Although it appears first, it is written last after completing the rest of the paper. The abstract provides a brief overview of each section in the IMRaD structure (Introduction, Methods, Results, and Discussion). It serves to give readers a quick understanding of the study's purpose, methods, main findings, and implications. Abstracts are usually between 150–300 words.

An abstract in the IMRaD format typically includes:

1. **Introduction**: A sentence or two describing the research problem or question.
2. **Methods**: A brief description of the research design, participants, procedures, and analysis.
3. **Results**: A summary of the key findings, including any significant data points or outcomes.
4. **Discussion/Conclusion**: A brief statement on the significance of the findings, implications, and potential for future research.

Example Abstract: *"This study investigates the effects of a new drug on blood pressure in adults with hypertension. A randomized controlled trial was conducted with 100 participants who received either the drug or a placebo over 12 weeks. Results showed a significant reduction in systolic blood pressure among participants taking the drug compared to the placebo group ($p < 0.05$). These findings suggest that the drug may be a viable treatment for hypertension, though further research is necessary to assess long-term effects."*

Recommendation (in the Discussion section of IMRaD)

In the **Discussion** section, after interpreting the results and comparing them to previous studies, researchers often provide **recommendations**. These are suggestions for:

1. **Practical applications**: How the research findings can be used in real-world settings (e.g., clinical practice, industry, education).

    - Example: "Based on the study’s findings, the new drug should be considered as a treatment option for patients with mild to moderate hypertension."
2. **Policy or Decision-making**: Proposals for changes in policy or practice based on the findings.
    - Example: "Healthcare providers may consider revising guidelines to incorporate this drug as a first-line treatment for certain patients."
3. **Future Research**: Suggestions for additional studies to address limitations of the current research or to explore new questions that arose.
    - Example: "Further research is recommended to assess the long-term safety of the drug and its effects in diverse populations."

The **recommendation** part in the Discussion emphasizes how the findings can influence future work, either through practical application or by encouraging further investigation.

These recommendations provide a bridge between the current study and the ongoing research or practical implications in the field.