Universal Paper Outline

1. **Abstract**
    The abstract summarizes the entire study. It should answer the following questions:
    a) What system are you studying?
    b) Why is it important?
    c) What is your research approach?
    d) (optional) How does your approach differ from previous work?
    e) What are the results of your research?
    f) What conclusions can we draw from these results?

    It is helpful to structure the abstract into Background, Methods, Results, Conclusions, in this order.

2. **Introduction**
    The introduction sets the stage. It should answer the following questions:
    a) What is the general field of study?
    b) What is the specific question of this research?
    c) Why is (a) or (b) important?
    d) What has previously been done in this area?
    e) How does your research differ?

    It is often good to end with:
    f) a summary of the research described in this paper (at most one paragraph).

3. **Methods**
    Give a detailed protocol for every experiment or analysis carried out. List reagents or software used, origin of samples, etc. Methods cannot be too specific. An independent party should be able to repeat your research after reading the Methods.

4. **Results**
    For each independent analysis or experiment, give:
    a) a brief (one sentence to one paragraph) summary of what you did and why. For example:
        "To determine whether lions can thrive on a vegetarian diet, we raised 10 captive-bred lion cubs on tofu burgers. As control, we raised a second group of 10 cubs on raw beef. We monitored body weight and size, activity level, fur shininess, and health of each cub for a time period of three months."
    b) a description of what you found carrying out this experiment:
        "We found that vegetarian-raised cubs grew slower and had a lower overall weight increase over three months (t-test, P=0.002). Surprisingly, diet did not affect fur shininess (t-test, P=0.15). ..."

5. **Discussion**
    a) Start with a brief (one paragraph or less) summary of your research. What did you do and what did you find.
    b) Put your results into perspective, discussing (i) what they imply and (ii) how they compare to the existing literature. (one or several paragraphs)
    c) Address potential shortcomings. What could have gone wrong, which parts of the research might be misleading? Are there any other caveats? (one or several paragraphs)
    d) (optional) Describe the implications of this study for future research. Are there some obvious extensions to your research? (one paragraph)
    e) (optional) End with a paragraph that summarizes your research once more and highlights the most important findings.

Remember: Most readers read first the Abstract, then Introduction, then Discussion, then Results, then Methods, and may stop at any time if they get bored or confused. Your paper should make sense if read in this order.