**RESEARCH METHODOLOGY (UANP0013)**

**GUIDELINE ON WRITING A RESEARCH PROPOSAL**

Student’s Task:

The students need to identify one project from the proposed a topic. Write the research proposal according to the content describe below.

Submission:

The proposal needs to be submitted on **25 May 2018** via email (softcopy) and hardcopy. If the students fails to submit on the given date, their proposal will be rejected.

Formatting:

The proposal should be written **maximum of 30 pages** including the list of references. Additional pages will contribute marks to be penalized by 1 mark for each of the additional pages. The proposal should be written with the Font type **Times New Roman**, font size **11** and **1.5 paragraph spacing**.

Proposal Content:

The content of the proposal should follow based on the below section/chapter described:

1. **TITLE**: The title should be specific and brief. Avoid long titles that begin with useless words like "Studies on…”, “Investigations on….”, and “Observations on…”. Also, "A, An, or The" as title openers are also unnecessary.
2. **INTRODUCTION**: Describe current state of the art. Why this research project is needed? Outline previous work in this field (i.e. literature search). How would the results of the proposed research fill this need and be beneficial? 1 – 2 pages of introduction is applicable to briefly introduced about your research project.
3. **PROBLEM STATEMENT**: Summarize the problem you need to solve. The problem statement can be identified based on the following guideline:
4. Initial problem statement (WHAT IT IS CURRENTLY)
5. Stakeholders who are most affected by the problem (WHO, WHERE)
6. Type of problem(skills, resources, methodology, algorithm, framework, model, attitudes)
7. Suspected causes of the problem (WHY)
8. Goal for improvement and long-term impact (WHAT IT SHOULD BE)
9. Proposal for addressing the problem(HOW)
10. **RESEARCH QUESTIONS & RESEARCH OBJECTIVES**: Student need to indicate only ONE research questions which as the main question for the study. For the objectives, beginning with the word "to", and list the objective(s) or your research. An example is as below:
    1. to develop a new theory or principle
    2. to show practical applications of known principles
    3. to develop a solution for an engineering problem in a device, material, system or process
    4. to design a new structural system
    5. to develop a new or improved method
    6. to establish a set of standards
11. **RESEARCH SCOPE**: Students need to identify scope or boundaries of their proposed study.
12. **MOTIVATION OF THE STUDY**: Research motivation simply means, "What is the result of obtaining my research objective?" List two kinds of motivations: (a) one that emphasizes the specific result of obtaining your objective (preferably stated in quantitative terms) and (b) another that stresses the general contribution of this research. Consider this example:

*Engineering objective: (to show practical applications of a known principle) "to apply computer simulation for cycle time control to the semi-conductor industry".*

*Engineering motivation: (specific) "to reduce the weakness of static analysis by 15%) and (general) "to satisfy customer's requirements by shortening wafer production cycle time."*

1. **LITERATURE REVIEW/TECHNICAL STUDIES**: Students need to identify relevant literature with the study. An approach of systematic literature review may follow as the guideline to identify relevant literature for the study. A maximum number of **10 pages** is applicable for this section.
2. **RESEARCH METHODOLOGY**: Describe the research methodology that you will use in different parts of your project to be able to answer the research questions and produce the expected outcomes and thus fulfill the objectives and the main aim. In this section, students need to describe the process which they followed to carry out the study. The description should include the approaches/processes:
   1. to conduct literature review study
   2. to gather requirements
   3. to design or develop the software or prototype
   4. to evaluate the study (either include the testing of the application)
3. **CONCLUSION**: Write the Conclusion for your research by adhering to the following guidelines:

* Restate your Engineering/Scientific objective
* Briefly summarize your methodology employed to attain the objective.
* Interpret your results by asking some of the following questions:
  1. Were your results expected? If not, why not?
  2. What generalizations or claims are you making about your results?
  3. Do your results contradict or support other experimental results?
  4. Do they suggest other observations or experiments which could be done to confirm, refute, or extend your results?
  5. Do your results support or contradict existing theory?
  6. Do your results suggest that modifications or extensions need to be made to existing theory? What are they?
  7. Could your results lead to any practical applications?
* Stress how the results in this study confirm your engineering/Scientific motivations (specific and general) and, ultimately, your reader's interests (i.e. Engineering/ Scientific need).

1. **REFERENCES**: Provide list of references that have been cited in your proposal.