**Postgraduate Lecture Course on Research Methods and Writing Journal Papers**

**Subjects**

1. **Research 1h**
   1. Basis research – theories, mathematic models, hypothesis, new methodology, new materials, new medicines
   2. Applied research – practical technologies, existing analytical techniques and surveys, standards, existing models,
   3. Journals
2. **Literature search 1h**

2.1 internet search: Google search, Bing etc

2.2 Library search: SCI database, journal database, Science Direct database etc

1. **Research methods 2h**

### The purpose

### Objectives

* 1. Analytical methods and data
  2. Statistics and significance
  3. Standards and past references

1. **Output publications 1h**

### Why publish findings and objectives

### Quality, applicability, impact values, interest, relevance and acceptability to the publisher

### Publication ethics

1. **Preparation and drafting of the paper 1h**

### Getting ready – check methodology, check data, tables and figures, references

### Structure of a journal paper – assign subtitles to divide tasks

5.3. Putting ideas on paper and first drafting of paper and revision and revision and further revision…..

1. **Keywords, Title and Abstract – why do we need an Abstract? 1h**

6.1 Keywords for literature search

6.2 Impression of a good title to the readers

6.3 Abstract – The purpose, objectives, findings, conclusion and inference and implications.

1. **Introduction – telling the story of relevance, needs and of scientific value and interest 1h**
   1. Purpose – why is this research/study is needed - what is new?
   2. Background – what is importance (scientific or application value) of the subject? what is the problem/issue? What is known? What has been done before including methodologies – previous research and findings?
   3. Objectives – what are you trying to achieve?
2. **Hypothesis and modelling 2h**
   1. What are you trying to proof? Hypothesis testing
   2. Assumptions
   3. Modelling based on existing valid theory and scientific laws, for prediction by applying deductive reasoning usually via mathematical analysis or representative experimental scale models
   4. Validation - all models would need validation for their application - by experimentation, observation or probability analysis of significance from data obtained.
3. **Methodology 2h**
   1. Method – justification (including previous studies) and objectives;
   2. Materials (including people used in a survey study)
   3. Standards for sampling, testing, analysis and survey and any deviation (justification for modification)
   4. Sampling (depending on objectives, relevance and representativeness)
   5. Statistics software package (name, version or release number);
   6. Analytical equipment description, quality assurance (accuracy, sensitivity, measurement range)
   7. Questionnaire
   8. Sample size and statistical significance
4. **Results 1h**
   1. What results – are these relevant to your research objectives?
   2. Data treatment – tables or figures
   3. Statistics
   4. Narrative description of results to present the general findings
5. **Discussion 2h**
   1. Interpretation of results based on valid scientific reasoning and standards
   2. What are the evidences?
   3. Statistical significance
   4. Discussion of abnormality
   5. Comparison with what has been done before – previous findings to give context
   6. Do the findings resolve the issues posed in the objectives of your research?
   7. Illustrate uniqueness (originality) and importance of the research
   8. Limits of current research and future studies (optional)
6. **Conclusion and Acknowledgement 1h**
   1. Brief and concise statements of major findings and implications
   2. Conclusion to issues posed in the Introduction of the paper – have you solved the problem? What have you achieved in relation to the objectives?
   3. Acknowledgement
   4. Declarations