
SYLLABUS: Research Methodology

Date/ Revision	September 28, 2016
Faculty	University Compulsory Subject
Approval	Dean Faculty of Engineering

1 Identification of Subject:

Name of Subject	: Research Methodology
Code of Subject	: U-02-RESEARCH-METHODOLOGY.docx
SKS	: 2
Semester	: 2
Study Program	: University Compulsory Subject
Lecturer	: Dr Tutuko

2 Competency (Learning Outcome)

- At the end of the course students will have an overview of the most important methodological approaches qualitative and quantitative research for engineering applications.
- After completing the course, students will be able to describe the core aspects of engineering statistics and able to illustrate, contrast, and apply the main concepts and theories of statistics
- Through the successful participation in this course students are able to recognize and to implement statistics into their daily engineering activities, especially for analysis objectives
- Through this course, students are able to use necessary software statistics tools/applications.

3 Description of Subject:

This course is providing students with mathematical and software tools for data analysis. The theory of statistics and its implementation to engineering and scientific field are introduced and explored. Software application using R language is used to provide a hands-on experience for implementing theory into data analysis. Practical sessions using R language are provided, and small project is introduced to test student capabilities.

4 Learning Approach

Approach : Combination of Expository - inquiry and collaborative
 Method : Discussions, Questions/answers, Sample problems/cases, Group works
 Student Task : Home work, Presentation
 Media : LCD projector

5 Evaluation

Maximum absences : 25%
 Paper (Personal) : 20 points
 Presentation (Group) : 20 points
 Quizzes (Personal) : 20 points
 Final Examination : 40 points
 Total : 100 poin

6. Contents/ Topics of Lecturing:

Week	Topics	Content	Remark
1	Introduction : research a way of thinking and process	<ul style="list-style-type: none"> • An integral part of your practice • a way to gather evidence for your practice • Applications of research • what does it mean with research • types of research • Paradigms of research 	Chapter 1

1,2	The research process	<ul style="list-style-type: none"> An eight-step model Phase 1: deciding what to research Phase 2: planning a research study Phase 3: conducting a research proposal 	Chapter 2
2,3	Reviewing the literature	<ul style="list-style-type: none"> The place of the literature review in research How to review literature Writing about the literature review 	Chapter 3
4	Formulating a research problem	<ul style="list-style-type: none"> The research problem The importance of formulating a research problem Sources of research problems Consideration of selecting a research problem The formulation of research objectives The study population Establishing operational definitions Formulating a research problem in qualitative research 	Chapter 4
5,6	Identifying variables	<ul style="list-style-type: none"> What is a variable ? The difference between a concept and a variables Converting concepts into variables Type of variable Type of measurement scale 	Chapter 5
6	Constructing hypotheses	<ul style="list-style-type: none"> The definition of a hypothes The function of a hypothesis The testing of a hypotheses The characteristics of a hypotheses 	Chapter 6
Week	Topics	Content	Remark
		<ul style="list-style-type: none"> Type of hypothesis Errors in testing a hypothesis Hypotheses in qualitative research 	
7	The research design	<ul style="list-style-type: none"> What is research design The function of research design The theory of causality and the research design 	Chapter 7
8	Semester Break	•	
9	Selecting a study design	<ul style="list-style-type: none"> Differences between quantitative and qualitative study design Study design in quantitative research Other design commonly used in quantitative research Study design in qualitative research Other commonly used philosophy-guided design 	Chapter 8

10	Selecting a method of data collection	<ul style="list-style-type: none"> • Differences in the methods of data collection in quantitative and qualitative research • Major approaches to information gathering • Collecting data using primary sources • Method of data collection in qualitative research • Collecting data using secondary sources 	Chapter 9
10,11	Collecting data using attitudinal scales	<ul style="list-style-type: none"> • Measurement of attitudes in quantitative and qualitative research • Attitudinal scales in qualitative research • Functions of attitudinal scales • Difficulties in developing an attitudinal scale • Type of attitudinal scale • Attitudinal scales and measurement scale • Attitudes and qualitative research 	Chapter 10
12	Establishing the validity and reliability of a research instrument	<ul style="list-style-type: none"> • The concept of validity • Types of validity in quantitative research • The concept of reliability of a research instrument • Method of determining the reliability of an instrument in quantitative research 	Chapter 11
12	Selecting a sample	<ul style="list-style-type: none"> • The differences between sampling in 	Chapter 12

Week	Topics	Content	Remark
		quantitative and qualitative research <ul style="list-style-type: none"> • Sampling in quantitative research • Sampling in qualitative research 	
13	How to write a research proposal	<ul style="list-style-type: none"> • The research proposal in quantitative and qualitative research • Content of a research proposal • Work Schedule 	Chapter 13
13	Considering ethical issues in data collection	<ul style="list-style-type: none"> • Ethics – the concept • Stakeholders in research • Ethical issues to consider concerning research participants • Ethical issues to consider relating to the researchers • Ethical issues regarding the sponsoring organisation 	Chapter 14
14	Processing data	<ul style="list-style-type: none"> • Data processing in qualitative studies • Data processing in quantitative studies • The role of statistics in research 	Chapter 15
14	Displaying data	<ul style="list-style-type: none"> • Method of communicating and displaying analysed data 	Chapter 16
15	Writing a research report	<ul style="list-style-type: none"> • Writing a research report • Developing an outline • Writing about a variable • Referencing • Writing a bibliography 	Chapter 17
15	Research methodology and practice evaluation	<ul style="list-style-type: none"> • What is evaluation ? • Why evaluation ? • Intervention – development – evaluation process • Perspective in the classification of evaluation studies • Type of evaluation from a focus perspective • Type of evaluation from a philosophical perspective • Undertaking an evaluation : the process 	Chapter 18
16	Silent Week: make-up classes only		
17	Final Examination		

Reference:

Main Reference:

- a) Kumar, Ranjit, *Research Methodology: a step by step guide for beginners*, SAGE, London, 2011, ISBN 978-1-84920-300-5