

TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
MSc in ENERGY FOR SUSTAINABLE SOCIAL DEVELOPMENT  
PULCHOWK

MANUAL  
of  
Core Course IV  
RESEARCH METHODOLOGY  
(Credits: 4)

JANUARY 2016

Course Tutors  
Prof. Sudarshan Raj Tiwari  
Lecturer Sanjay Uprety

## Acknowledgements

I would like to appreciate the assistance of my co-tutor Asst. Prof. Sanjaya Uprety in the development and delivery of the course on Research Methodology to MScESSD class of 072. He has responsible for most of the tutorial and review classes and also the mini-research using Questionnaire Methods that was undertaken by the class as an exercise in social research.

The generous help of Assistant Dean and Associate Professor Nagendra Bahadur Amatya in holding tutorials in statistical methods and use of SPSS is also acknowledged.

Sudarshan Raj Tiwari

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Mini-research Assignment - Student's work: Assessment of Travel choice of Bachelor students of Pulchowk Campus (Class of 072/MESSD) -sample primary output	

## Course Syllabus for M.Sc. Engineering in Energy for Sustainable Social Development

### Research Methodology (EG804AR)

Lecture: 2 hrs  
Tutorial: 2 hrs

Year: I  
Part: I

#### Objective:

The objectives of the course are to:

- Increase awareness of the role of research design and methodology in any enquiry process particularly for disciplines and postures that have both technological and social aspects;
- Introduce a range of research design and methodology options that span between the subjective and the objective, the natural and the social, the mathematical, the cultural or such like polarized capsules;
- Foster an appreciation of the strengths and weaknesses of the different options for particular research objectives;
- enable application of Ethnography, Questionnaire Survey and Case Study methodologies in field situation
- Analyze, critique and write a research report

After attending the course, the students will be able to bring a more critical reading to the literature and have acquired a basic knowledge of research design and methodology as a contribution to their project and thesis works on renewable energy solutions in collaboration with stakeholders. The student should be able to research design suitable to inform or solve the problem of his choosing and also execute it in credible and dependable ways on the socio-technical situation.

The student will develop the ability to collect, structure, analyze and present information in logical form in order to make convincing arguments and well referenced and reasoned findings from research.

#### Teaching and Examination Schedule:

S.N.	Teaching Schedule							Examination Scheme			Total	Remarks
	Course Code	Course Title	Credit	L	T	P	Total	Theory				
								Assessment Marks	Final			
									Fieldworks	Duration, h		
4	EG804AR	Research Methodology	4	2	2	0	4	40	3	60	100	

The course will be delivered basically in a lectures mode supplemented by field based tutorial and practice sessions - both with two contact hours weekly for a total of 15 weeks. Field work may be scheduled in consolidated block of one week. The lectures/discussions will be largely centered on

research as a tool for and subject of conscious pursuit for knowledge building (in theory and application) and skill on research areas of disciplines and interests represented in the class and the course.

Evaluation: Cumulative assessments will be made of interactions, presentations and reports of assigned activities in tutorial classes. In addition, outcomes (written report and presentation) of field works will form important basis for internal evaluation. Attendance requirements will be as per TU regulations (minimum 75% of contact hours have to be attended for eligibility to sit for examination).

1. Introduction, nature and types of research, Qualitative and Quantitative approaches, language of research. Structure and processes of research (basic and applied research).Field research (2)
2. Building blocks of research (ontology, epistemology, methodology, methods, sources). Paradigms in social research (4)
3. Research and criticism, the research process (applied and basic research). Inductive and deductive logic. (2)
4. Literature Survey, Building theory for research. Referencing formats and standards. (2)
5. Research methodology and methods. Basics of Questionnaire Survey, Ethnography, Experiments, Case Study, Modeling and Simulations. Details, concentrated tutorials and fieldworks for Questionnaire survey, Ethnography and Case Studies(6).
6. Data analysis, interpretation and discussions. Tools in statistical analysis (SPSS software use). Methods of Inference and conclusions drawing.(4)
7. Research Proposals, Research reports: contents, formats and components, writing approaches.(4).

#### References and Texts:

- \*Rossi, P.H., Wright, J.D. & Anderson, A.B. 1983, *Handbook of Survey Research*, Academic Press Inc., London.
- \*McQueen, R. & Knussen, C. 2002, *Research Methods for Social Science*, Prentice Hall.
- \*Jonker, J. & Pennik, B. 2002, *The Essence of Research Methodology*, Springer.
- \* Polonsky, M.J. & Waller, D.S. 2005, *Designing and Managing a Research Project*, SAGE Publications, Thousand Oaks.
- \*\*Yin, R.K. 1994, *Case Study Research*, SAGE Publications, Thousand Oaks.
- \*\*Groat, L. & Wang, D. 2002, *Architectural Research Methods*, John Wiley & Sons, Inc., New York.
- Alasuutari, P., Bickman, L., Brannan, J. & Brannen, J. 2008, *The SAGE Handbook of Social Research Methods*, SAGE Publications, London.
- Field, A. 2009, *Discovering Statistics using SPSS*, 3<sup>rd</sup> edn, SAGE Publications, London.
- Miles, M.B. & Huberman, A.M. 1990, *Qualitative Data Analysis*, SAGE Publications, Beverly Hills.
- Creswell, J.W. 1994, *Research Design: Qualitative and Quantitative Approaches*, SAGE Publications, Thousand Oaks.
- McGarth, R.E. 1997, *Understanding Statistics: A Research Perspective*, Longman, New York.

**Tribhuvan University**  
**Institute of Engineering**  
**Pulchowk Campus**

**Department of Architecture and Urban Planning**

**Master of Science (M.Sc.)**

in

**Energy and Sustainable Social Development (ESSD)**

LESSON PLAN

(EG804AR)

Research Methodology

(4 Credits)

Sudarshan Raj Tiwari

Professor, Department of Architecture

- 20 July 2015 -

COURSE DELIVERY PLANNING MATRIX/LESSON PLAN

WEEK 1

Day	Session	TOPIC	DETAILS of INPUTS/ OUTPUTS READINGS/ASSIGNMENTS/DISCUSSION QUESTIONS
Dec 28 Mon	Lecture 1 12-2pm	Language of Research (SRT/SU)	Introduction, Faculty, Students, Course content, Evaluation Introduction to Research, Language of Research Handout of Slide/Text Book - e copy
	Lecture 2 3-5pm	Contents and format of research proposal and research reports (SRT/SU)	Short Presentations followed by discussions. Handout - Format of Research Proposal (IOE - Msc,PhD)
Dec 29 Tues	Lecture 3 12-2pm	Philosophy of Research (SRT/SU)	Basic Structure of Research - Philosophy of Research - Paradigms, Logic Systems, Quality in Research -Validity, Credibility, Eroding Ignorance) Building Blocks of Research - Ontology, Epistemology and Methodology, methods, sources of data
	Tutorial 1 3-5 pm	Review of Lecture 1 and 2 Tutorial (SU/SRT)	Identification of a research topic, Develop research topic, writing a research proposal Short review presentations, discussions and on-desk work
Dec 31 Thurs	Lecture 4 12-2 pm	Philosophy of Research (SRT/SU)	Paradigms in Social Research - Positivist, Post-Positivist, Constructivist, Transformative Handout of lecture slides.
	Tutorial 2 3-5pm	Review of Lecture 3 Writing research proposal (SU/SRT)	Writing Introductory Portion - Home Assignment to Complete (HW-1) Introduction, Background, Importance, Need, Rationale
Jan 1 Fri	Lecture 5 12-2pm	Philosophy of Research (SRT/SU)	Use of Logic in Research, Different types of Logics. Inductive and Deductive Logic Handout of lecture slides
	Tutorial 3 3-5pm	Review of Lecture 4 Writing research proposal (SU/SRT)	Identify literature/assign literature study (HW-2) Writing Problem statement, Research Question/Objectives/Hypothesis
Jan 3 Sun	Lecture 6 12-2pm	Process of Research (SRT/SU)	Theoretical and Empirical Research - Building Theory - Literature Survey. Referencing Formats. Standards. Ethics in Research. Handouts - lecture slides, APA/Harvard Anglia Standard
	Tutorial 4	Review of Lecture 5 Writing literature review (SU/SRT)	Short review presentations, discussions and on-desk work Write literature review/use of Standard Styles (MSWord) Complete Research Proposal (HW-1/HW-2-+)

COURSE DELIVERY PLANNING MATRIX/LESSON PLAN

WEEK 2

Day	Session	TOPIC	DETAILS of INPUTS/ OUTPUTS READINGS/ASSIGNMENTS/DISCUSSION QUESTIONS
Jan 4 Mon	Lecture 7 12-2pm	Methodology - Interpretive -Historical Research (SRT/SU)	Strategies and Choice. IHR - Features, Strategic aspects - Ontological/Epistemological basis, Methods, Techniques and Tools (Data Collection, Data Analysis and Drawing Conclusions), Strengths and Weaknesses. - Handout of lecture Slides.
	Presentation 3-5pm	Review of Research Proposal (SU/SRT)	Four presentations (10x4=40), Twelve Discussants (12x5=60) -
Jan 5 Tues	Lecture 8 12-2pm	Methodology - Co-relational Research (SRT/SU)	Features, Strategic aspects - Ontological/Epistemological basis, Variables, Measurements, Scales, Descriptive and Co-relational statistics. Handout of lecture Slides.
	Tutorial 5 3-5 pm	Descriptive Statistics (SU/SRT)	Use of SPSS/EXCEL, Data Collection, Data entry and Descriptive statistics, Display of Data: Tables, Graphs, Bar charts, Pie Charts. Frequency distribution, histograms
Jan 6 Wednes	Lecture 9 12-2 pm	Methodology- Co-relational Research - Questionnaire Research (SRT/SU)	Survey Method, Sampling, Question Design and Interviews. Errors in measurement, Reliability and Validity. Handout of lecture slides.
	Tutorial 6 3-5pm	Co-relational Statistics (SU/SRT)	Scatter graphs, Regression, Co-relations. Statistical significance, probability, standard deviation, confidence levels and range, sampling error.
Jan 7 Thurs	Lecture 10 12-2pm	Methodology - Causal Research - Experiments and Quasi-Experiments (SRT/SU)	Ontological and Epistemological position. Independent and Dependent variables. Causation and manipulation of variables. Controls. Validity- External, Internal, construct validity. Advantages and Weaknesses. Handout of lecture slides
	Tutorial 7 3-5pm	Review of Lecture 10 Field Research - Quasi-Experiments (SU/SRT)	Treatment (IV), unit of assignment, comparison unit, cross-sectional, Longitudinal settings. Ethics. True-, Quasi-, Non-experiments. Random assignment.
Jan 8 Fri	Lecture 11 12-2pm	Case Study (SRT/SU)	Definition, Design of case studies. Validity and reliability. single and multiple case designs, holistic and embedded units of analysis. Data collection. Case Study Protocol.
	Tutorial 8 3-5pm	Mini Research Assignment (SU/SRT)	Quasi-experiments/cross-sectional study/Field Research in Campus
Jan 10 Sun	Lecture 13 12-2pm	Case Study (SRT/SU)	Data Sources, Analytical strategies and Analysis, Case Study Report
	Tutorial 9 3-5pm	Mini Research Assignment (SU/SRT)	Continuing field and desk works



Week 3 & 4.

Jan 11 Mon	Lecture 14 12-2pm	Qualitative Research Methods - Field Research (Grounded Theory) (SRT/SU)	
	Tutorial 10 3-5pm	Mini Research Assignment (SU/SRT)	
Jan 12 Tue	Lecture 15 12-2pm	Qualitative Research Methods - Field Research (Ethnography)	
	Tutorial 11 3-5pm	Mini Research Assignment (SU/SRT)	
Jan 13 Wednes	Lecture 16 12-2pm	Qualitative Research Methods - Field Research (Phenomenology) (SRT/SU)	
	Tutorial 12\3-5pm	Mini Research Assignment (SU/SRT)	
Jan 14 Thurs	Lecture 17 12-2pm	Writing Research Report (SRT/SU)	
	Tutorial 12 3-5pm	Mini Research Assignment	
Jan 17 Sun	Seminar 1-4pm	Seminar Gr 1 Seminar Gr 2	SU and External (1)
Jan 18 Mon	Seminar 1-4pm	Seminar Gr 3 Seminar Gr 4	SU and External (2)
Jan 19 Tues	Open day	Student Feedback/Closing (SU)	
Jan 20 Wednes	Assessment 3-4pm	Written Test/ Internal Assessment (SU)	

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