

**Pre Ph.D(ECE)**

**Department of EECE  
DIT University Dehradun**



**Course Structure & Syllabus  
for  
Pre Ph.D. (ECE) Course Work  
Session: 2019-20**

## Pre Ph.D(ECE)

Course Category	Course Code	Course Name	Periods			Credits
			L	T	P	
UC	MB901	Research Methodology	4	0	0	4
DE		Elective 1	4	0	0	4
DE		Elective 2	4	0	0	4
DC	DS001	Seminar	0	0	2	1

### List of Electives

S.No.	Subject Code	Course
1	EC601	Advanced Digital Modulation
2	EC702	Optical Communication Networks
3	EC643	Embedded System Design

**Note :** *Apart from above listed Elective courses, Research Scholar may choose any course across departments being offered at PG level, if it is required/suggested by the Research Committee.*

# Pre Ph.D(ECE)

<b>Subject Code</b>	<b>MB901</b>	<b>Subject Title</b>	<b>Research Methodology</b>						
<b>LTP</b>	4 0 0	<b>Credit</b>	4	<b>Subject Category</b>	UC	<b>Year</b>	1 <sup>st</sup>	<b>Semester</b>	I / II

## UNIT – I

**Fundamentals of Research:** Defining research, Objectives of research, types, research process, deductive and inductive reasoning;

Identifying and formulating a research problem, Literature review: Search for existing literature (World Wide Web, Online data bases), Review the literature selected (Case studies, review articles and Meta-analysis), Develop a theoretical and conceptual framework, Writing up the review,

Definition of variables: Concepts, indicators and variables, Types of variables, Types of measurement scales, Constructing the Hypothesis- Null(Research) and alternative, one-tailed and two-tailed testing, errors in testing. Ethical and Moral Issues in Research, Plagiarism, tools to avoid plagiarism – Intellectual Property Rights – Copy right laws – Patent rights

## UNIT – II

**Research Design:** Design of Experiments: Research Designs -Exploratory, Descriptive and Experimental, Experimental designs- Types of Experimental Designs

## UNIT – III

**Sampling, Sampling distribution, and Data Collection:** Sampling distribution, Normal and binomial distribution, Reasons for sampling, sampling technique, sampling errors.Sources of Data-Primary Data, Secondary Data, Data Collection methods

## UNIT – IV

**Statistical Data Analysis:** Descriptive and inferential statistical analysis. Testing of hypothesis with Z-test, T-test and its variants, Chi-square test, ANOVA, Correlation, Regression Analysis, Introduction to data analysis data using SPSS20.0

## UNIT – V

**Research Report:** Writing a research report- Developing an outline, Formats of Report writing, Key elements-Objective, Introduction, Design or Rationale of work, Experimental Methods, Procedures, Measurements, Results, Discussion, Conclusion, Referencing and various formats for reference writing of books and research papers, Writing a Research Proposal.

## Books Recommended:

1. Ganesan R, Research Methodology for Engineers , MJP Publishers, Chennai. 2011
2. C.R.Kothari, "Research Methodology", 5<sup>th</sup> edition, New Age Publication,
3. Cooper, "Business Research Methods", 9<sup>th</sup> edition, Tata McGraw hills publication
4. Walpole R.A., Myers R.H., Myers S.L. and Ye, King: Probability & Statistics for Engineers and Scientists, Pearson Prentice Hall, Pearson Education, Inc. 2007.
5. Anderson B.H., Dursaton, and Poole M.: Thesis and assignment writing, Wiley Eastern 1997.
6. Bordens K.S. and Abbott, B.b.: Research Design and Methods, McGraw Hill, 2008.
7. Morris R Cohen: An Introduction to logic and Scientific Method (Allied Publishers) – P 197-222; 391–403