

**Dr D Y Patil Vidyapeeth, Pune ( DPU)**

**Ph.D. COURSE WORK SYLLABUS**

**Research Methodology**

**Syllabus - Common to all the streams :**

**Science, Applied Science, Medical, Dental, Biotechnology, Physiotherapy, Nursing**

**Unit 1 – Science and Research:**

1. Definition – History – Evolution of Scientific Inquiry, Scientific Research: Definition, Characteristics, types, need of research. Identification of the problem, assessing the status of the problem, formulating the objectives, preparing design (experimental or otherwise), Actual investigation.

**Unit 2 - Introduction to Research Methodology**

Meaning and importance of Research – Types of Research – Selection and formulation of Research Problem

Research Design – Need – Features – Inductive, Deductive and Development of models

Developing a Research Plan – Exploration, Description, Diagnosis, Experimentation, Determining Experimental and Sample Designs.

Analysis of Literature Review – Primary and Secondary Sources, Web sources –critical Literature Review

Hypothesis – Different Types – Significance – Development of Working Hypothesis, Null hypothesis

Research Methods: Scientific method vs Arbitrary Method, Logical Scientific Methods: Deductive, Inductive, Deductive-Inductive, pattern of Deductive – Inductive logical process – Different types of inductive logical methods.

**Unit 3 - Data Collection and Analysis**

Sources of Data – Primary, Secondary and Tertiary – Types of Data – Categorical, nominal & Ordinal.

Methods of Collecting Data : Observation, field investigations, Direct studies – Reports, Records or Experimental observations.

Sampling methods – Data Processing and Analysis strategies- Graphical representation – Descriptive Analysis – Inferential Analysis- Correlation analysis – Least square method - Data Analysis using statistical package – Hypothesis – testing – Generalization and Interpretation – Modeling.

#### **Unit 4 – Scientific Writing**

Structure and components of Scientific Reports – types of Report – Technical Reports and Thesis – Significance – Different steps in the preparation – Layout, structure and Language of typical reports - Illustrations and tables – Bibliography, Referencing and foot notes –Importance of Effective Communication.

Preparing Research papers for journals, Seminars and Conferences – Design of paper using TEMPLATE, Calculations of Impact factor of a journal, citation Index, ISBN & ISSN.

Preparation of Project Proposal - Title, Abstract, Introduction – Rationale, Objectives, Methodology – Time frame and work plan – Budget and Justification – References

Documentation and scientific writing Results and Conclusions, Preparation of manuscript for Publication of Research paper, Presenting a paper in scientific seminar, Thesis writing. Structure and Components of Research Report, Types of Report: research papers, thesis, Research Project Reports, Pictures and Graphs, citation styles, writing a review of paper, Bibliography

#### **Unit 5 – Ethics**

Ethical Issues – Ethical Committees – Commercialization – copy right – royalty – Intellectual Property rights and patent law – Track Related aspects of intellectual property Rights – Reproduction of published material – Plagiarism – Citation and Acknowledgement – Reproducibility and accountability.

#### **Unit 6 Computer applications and Statistics**

Use of word processing, spread sheet and database software. Plotting of graphs. Internet and its application: E-mail, WWW, Web browsing, acquiring technical skills, drawing inferences from data, Introduction to Statistics – Probability Theories - Conditional Probability, Poisson distribution, Binomial Distribution and Properties of Normal Distributions, Estimates of Means and Proportions; Chi Square Test, Association of Attributes t Test –Anova, Standard deviation Coefficient of variations. Co relation and Regression Analysis.

References:

1. Garg.B.L., Karadia, R., Agarwal,F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R.(2008). Research Methodology: Methods and Techniques. Second Edition. New Age International Publishers, New Delhi.
3. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.
4. Gupta S.P. (2008). Statistical Methods. 37<sup>th</sup> ed. (Rev)Sultan Chand and Sons. New Delhi. 1470 p.
5. Leon & Leon (2202). Internet for everyone, Vikas Publishing House.
6. Wadehra, B.L.2000. Law relating to patents, trade marks, copyright designs and geographical indications. Universal Law Publishing.
7. Research Methodology Dr P M Bulakh,Dr P. S. Patki and Dr A S Chodhary 2010 Published by Expert Trading Corporation Dahisar West, Mumbai 400068