

RESEARCH METHODOLOGY

RM-10000

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Total Hours: 40

Maximum Marks: 100

Note: Total nine questions are to be set. First question shall consist of short answer type questions and shall contain 5-10 parts covering the entire syllabus. Remaining eight questions are to be set taking two from each unit. A candidate is required to attempt five questions taking one from each unit and Question No. 1 is compulsory.

UNIT-1 (10 Hours)

INTRODUCTION:

Research and scholarship; difference between undergraduate and research education: skills habits and attitudes for research; status of research in India;

Psychological phases of Ph.D process; stress point; aims of supervisors; mismatches and problems

Managing self; empathy; managing relations with your supervisor, colleagues, and supporting staff, listening; assertiveness; teamwork; sense of humor

Duration and stages of a Ph.D Process; long term and short goals; time tabling and dead lines;

Profession; integrity, objectivity, fairness and consistency; loyalty; plagiarism and research ethics; safety.

Problem finding and literature survey

UNIT-2 (10 Hours)

SURVEY BASED RESEARCH

Scope of survey based research, Types of surveys – specific, periodic and transaction-driven, Identification of research problem, analysis of research problem, customer identification, categorisation and sampling, planning a survey project – resources, budget and schedule, preparation of questionnaire – elements of questionnaire, sequencing questions, question formats; methods of conducting survey, data collection, analysis, and compilation of survey report.

UNIT-3 (10 Hours)

PUBLISHING- PATENTING AND COMMUNICATION:

Difference between publishing and patenting; Relative Importance of various form of publications; choice of Journal and reviewing process, stages in the realization of Paper or a patent and how to handle these

Importance of communication; Stages and dimensions of Communications process, Oral communication-Verbal, Non Verbal, casual, formal and informal Communications, Interactive Communications; Listening form; Content and delivery, various context for speaking – Conference, Seminars , etc., Visual aids. Written Communication – form, Content and Language –layout, Typography and illustration, Contexts for writing –paper, Thesis, reports etc. Prescription for developing communication skills

UNIT-4 (10 Hours)

PROBLEM SOLVING AND CREATIVITY

(a)Thinking processes problem solving and creativity

Level and styles of thinking; common-sense and scientific thinking; examples.

Problem solving strategies - reformulation or rephrasing. Techniques of representation, Logical thinking, division into sub-problems, verbalization. awareness of scale; importance of graphical representation ; examples.

Creativity - Some definitions, illustrations from day to day life; gift or skill; creative process; requirement of creativity- role of motivation and open vs closed minds; multiple approaches to a problem analytical vs analogical reasoning, puzzle solving; example; prepared mind

Creative problem solving using Triz

Prescriptions for developing creativity and problem solving

(b) Experimental and modeling skills

Introduction, selection of variables, design matrix, 2-level factorial design, 3-level factorial design, fractional factorial design, analysis of variance, Taguchi methods – orthogonal arrays, signal to noise ratio; Response Surface Methodology, Latest trends in experimental designs.

References:

1. E.M. Phillips and D.S. Pugh,” How to get a Ph.D-a handbook for Ph.D students and their supervisors”, Viva books Pvt. Ltd for all scholars irrespective of their disciplines.
2. Hand book of Science Communication, compiled by Antony Wilson. Jane Gregory, Steve Miller, Shirely Earl. Overseas Press India Pvt. Ltd, New Delhi. First edition 2005
3. G.L Squires,” Practical physics”, Cambridge University Press, for all scholars except those from Humanities and management Sciences.
4. Peter b Medewar,” Advice to a Young Scientist”, Pan Books. LONDON. 1979.
5. D C Montgomery, Design and Analysis of Experiments
6. Fred Van Bennekom, Survey Guidebook