Guru Kashi University
Talwandi Sabo
Doctor of Philosophy

Subject: Research Methodology (180101)

Course Contents: (Common for Ph.D in Engineering, Education, Applied Science, Management, Computer Application, Commerce,Economics)

Credit: 4

L T P
4 0 0

1) Research
Objectives of Research, Research Types, Research Methodology, Research Process – Flow chart, description of various steps, Selection of research problem.

2) Research Design
Meaning, Objectives and Strategies of research, different research designs, important experimental designs, Completely randomized, Randomized block, Latin Square, Factorial Experimental Design.

3) Methods of Data Collection
Types of data collection and classification, Observation method, Interview Method, Collection of data through Questionnaires, Schedules.

4) Processing and Analysis of Data:
Editing, Coding, Classification of data
Statistical measures and their significance: Central tendencies, Variation, Skewness, Kurtosis.
Correlation and Regression , Multiple Regression, Time Series Analysis,
Parametric tests (t, z and F) , Chi Square test.
Analysis of Variance, One - way ANOVA
Factor Analysis, Centroid Method .
Computer simulations using MATLAB/SPSS

5) Probability Distributions
 Binomial , Poisson , Exponential , Normal distributions,Frequency distribution,   Cumulative Frequency distribution, Relative Frequency distribution.

6) Sampling Methods:
Different methods of Sampling : Probability Sampling methods , Random Sampling, Systematic Sampling, Stratified Sampling, Cluster Sampling and Multistage Sampling.
Non Probability Sampling methods, Sample size.

7) Testing of Hypotheses:
Testing of Hypotheses concerning Mean(s), Testing of Hypotheses concerning Proportion (s), Testing of Hypotheses concerning Variance(s)

8) Report Writing and Presentation:

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Types of reports, Report Format – Cover page, Introductory page, Text, Bibliography, Appendices, Typing instructions, Oral Presentation.

References:
1. Montgomery, Douglas C. (2007), 'Design and Analysis of Experiments', (Wiley India)
2. Montgomery, Douglas C. & Runger, George C. , 'Applied Statistics & Probability for Engineers' (Wiley India)
3. Kothari C.K. (2004), 'Research Methodology- Methods and Techniques' (New Age International, New Delhi)
4. Krishnaswamy, K.N., Sivakumar, Appa Iyer and Mathiranjan M. , 'Management Research Methodology; Integration of Principles, Methods and Techniques' (Pearson Education, New Delhi)
5. Chawla ,Deepak ,Sondhi ,Neena, 'Research Methodology Concepts and Cases', Vikas Publishing House Pvt Ltd ,New Delhi.

6.Panneerselvam, R , 'Research Methodology', PHI, New Delhi.

7. Cooper, D.R., Schindler,P.S., 'Business Research Methods,' Tata McGraw Hill

8.Gupta S P,' Statistical Methods', Sultan Chand & Sons, Delhi

9. Ronald E Walpole, 'Probability and Statistics for Engineers and Scientists' (International Edition) , Pearson Education.

10. Pulak Chakravarty: "Quantitative Techniques for Management and Economics", Himalaya Publishing House.

11. P.C.Tripathi, "A Text Book of Research Methodology in Social Sciences, Sultan Chand & Sons".

12. Bhattacharyya D.K., 'Research Methods', Sage Publications.

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Computer Applications in Research (180102)

Credit: 2   **L T P**
                                                                       1 0 2

Common for all branches except Hindi, Punjabi, English, History and Religious Study.

Unit 1

Generating Charts/Graphs in Microsoft Excel, Power Point Presentation, Web search, Use of Internet and www. Using search like Google etc.

Unit 2:

SPSS concepts and its use for Statistical Analysis.

Unit 3:

MatLab and its use for Statistical Analysis.

Unit 4:

Introduction to the use of LaTeX, Mendeley, Anti-Plagiarism Softwares .

References:-

1) Office 2007 in Simple Steps, Kogent Solutions, (Wiley Publishers).
2) MS-Office 2007 Training Guide, S. Jain (BPB Publications).
3) Bansal , R. K. and others 'MATLAB and its applications in Engg. Second Edition, Pearson Education, Delhi.
4) Sabine handan & Brian S. Everitt, "A Handbook of Statistical Analysis using SPSS'', Chapman & Hall / CRC Publication, USA.

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Guru Gobind Singh College of Engineering & Technology

Course: Computer Science & Engineering   **Subject Code: 181101**

Subject: Recent Advances in Computer Science & Engineering

Credit: 4   **L T P**

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Group I: Research Principles of Computer Science
- Introduction of Computer Science Research, Scientific Methods of Computer Science
- How to Perform Research, The Art of Literature Review, Research Process Steps, Process of Writing a good Research Paper, Evaluating Research, Ethical Issues
- Emerging areas of research in Computer Science

Group II: Human Computer Interaction
- Usability Engineering, Modeling of Understanding Process
- Spoken Dialogue System
- Advanced Visualization Methods
- Ambient Intelligence: The New Dimension Of Human–Computer Interaction

Group III: Computer Networks and Networks Security
- Wireless Networks and Mobile IP
- Network Management, Network Security
- Multimedia and Quality of Service
- Security at the Application Layer: PGP and S/MIME
- Security at the Transport Layer: SSL and TLS, Security at the Network Layer: IPSec

Group IV: Databases
- Database System Architecture, Distributed Databases, Date's twelve rules for a DDBMS.
- Decision-Support Systems, Data Warehousing, Data Mining, Classification, Association Rules, Clustering, Spatial and Temporal Data and Mobility

Group V: Software Engineering
- Value of a Good SRS, Role of Software Architecture, Architecture Views, Component and Connector View, Architecture Styles for C&C View, Documenting Architecture Design, Evaluating Architectures
- Programming Principles and Guidelines, Incrementally Developing Code, Managing Evolving Code, Unit Testing, Code Inspection, Metrics
- Testing Concepts, Testing Process, Black-Box Testing, White-Box Testing

Suggested Readings:

1) Human-Computer Interaction, Sivakumar, R., Meena (PHI, 2015)
2) Computer Networks: A Top-Down Approach, Behrouz A. Forouzan Firouz Mosharraf, (MGH, 2011)
3) Cryptography and Network Security, Behrouz A. Forouzan, (MGH, 2007)

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4) Database System Concepts, Sixth Edition, Avi Silberschatz, Henry F. Korth, S. Sudarshan, (MGH, 2010)
5) Software Engineering: A Precise Approach, Pankaj Jalote, (Wiley India, 2010)