



AWADHESH PRATAP SINGH UNIVERSITY
REWA

(ACCREDITED GRADE "B" BY NAAC)

FACULTY OF SCIENCES

Syllabus for

Ph. D. (PHYSICS) Entrance

With Effect From 2022-23 Onwards

Time: 03 Hours

Note: The paper setter is required to set in all 100 objective type questions, from both sections A and B(50 questions from each sections). Each question carries one mark.

Part A
RESEARCH METHODOLOGY

Unit - I

Concepts in Research: Definition and Objective, Research Approach & Types of Research, Criteria of Good Research, Defining Research Problems. Research Design: Features of Good Research Design, Research Design with reference to Physics, Basic Principles of Experimental Research Designs. Structure and components of scientific presentations, Research reports/ paper etc

Unit - II

Nature and Purpose of Mathematical Statistics, Tabulation and Statistical Inference, Tabular and Graphical Representation of Data, Mean, Median, Mode & Variance, Co-relation and Regression, Random Sampling, χ^2 - Test, Method of Least squares curve, Fitting of Straight Lines & Polynomials, Data analysis using Fourier Techniques and applications.

Unit - III

Theoretical Modelling Methods: Bisection Method, General Idea of Mathematical Modelling and Simulation - Random Walk Problem, Newton Raphson Method, Least Square Fitting of Linear and Exponential Functions, Numerical Differentiations & Integration. Simpson's Rule, Runga Kutta Method.

Unit - IV

General Idea of Preparation of Materials: Solid State Reaction Method and Wet Chemical Method, Electro-Deposition Methods (Basics only), Elementary Idea of Vacuum Coating Methods, Basic Principles & Applications of XRD, SEM, and NMR. Methodology of Space Research - Ground Based & Satellite Observations, Nuclear Detectors, Methods of Extracting Scientific Information from Space Data.

Unit V

Anatomy of Digital computer, Brief overview of input and output devices, CPU-evolution of microprocessors, Semiconductor memories (RAM and ROM) : organisation and their characteristics, Cache memory, CDROM, Magnetic disk, Software Concept : types of software and their features. System utility software. Role of software in information technology. Computer language : Features of low level and high level programming languages. Mathematical and logical ability.

Reference Books:

1. Research Methodology: Methods & Techniques: C.R. Kothari, New Age International Publisher, N. Delhi (2009).
2. How to Write and Publish: R.A. Dayand, B. Gastel, Cambridge University Press.
3. How to Research: L. Blaxter, C. Hughes and M. Tight Viva Books.
4. A Student Guide to Methodology: P. Clough &, C. Mutbrown, Sage Publications.
5. Fundamentals to Computers: V. Rajaraman (PHI)
6. Probability & Statistical For Engineers & Scientists: Shelder Ren Elsevier Academic Press.
7. Principles of Instrumental Analysis: Skoog & Leary.
8. Astronomy: Baker

Dr. 13.06.2022

Dr. 13-06-2022