DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Punjabi University, Patiala 147002
(Established under Punjab Act No. 35 of 1961)

Syllabus for Ph. D. Entrance Test for Session 2024-25
Section-A
(Research Methodology)

Nature and objectives of research. Methods of Research: historical, descriptive and experimental
Alternative approaches to the study of the research problem and problem formulation. Formulation of hypotheses, Feasibility, preparation and presentation of research proposal.
Introduction to statistical analysis: Probability and probability distributions; binomial, Poisson, exponential and normal distributions and their applications.
Sampling: Primary and secondary data, their collection and validation, methods of sampling: Simple random sampling, stratified random sampling and systematic sampling, Attitude Measurement Land Scales: Issues, Scaling of attitude, deterministic attitudes, measurement models, summative models, multidimensional scaling. Regression and correlation analysis. Tests of significance based on normal., t and chi-square distributions. Analysis of variance. Basic Principles of design of experiments, completely randomized and randomized block designs.

Section-B
(Subject)

i.   Wireless Communication: Cellular concept, Frequency reuse, Co-channel and adjacent channel interference, Cell splitting, Handover, Call processing. GSM digital cellular standard: GSM services, GSM architecture, GSM Radio aspects, Security aspects, Handover, Call flow sequence in GSM, Evolutionary directions.

ii. Optical fibers, SI, GI fibers, modes, Dispersion in fibers, Limitations due to dispersions. Dispersion shifted and dispersion flattened fibers. Optical transmitters and fibers: Basic concepts, LED structures spectral distribution, semiconductor lasers, Transmitter design, Receiver PIN and APD diodes design.

iii. Behavioral, Dataflow and Structural style of modeling. Assignment statements, Sequential statements, Conditional statements, Concurrent statements, Case statements, Array and Records, Functions, Packages & Libraries. VHDL modeling of combinational circuits such as Adders, Subtractors, Multiplexers, Encoders and Decoders.

iv. Architecture of 8051 Microcontroller, Addressing Modes. Instruction Set: Arithmetic, Logic and Single Bit Instructions, I/O instructions, etc. Assembly Language Programming: I/O Programming, Timer/Counter Programming.

v.   Fourier and Z Transforms: Properties of Fourier and Z transform. Frequency analysis of discrete time signals and LTI Systems. Discrete Fourier Transform: Definition and properties of DFT, Linear filtering methods using DFT, Frequency analysis of signals using the DFT. Fast Fourier Transform: FFT algorithms and their applications, linear filtering approach to computation of the DFT.

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