

*Department of Electronics & Communication Engineering
School of Engineering & Technology*

Baba Ghulam Shah Badshah University, Rajouri

SYLLABUS for Ph.D. ENTRANCE Test

PART A

Research Methodology

- i) Components of Research, Types of Research, Sampling Methods
- ii) Probability and Statistics: theories of Probability, Joint and Conditional Probability, probability distribution functions- Binomial, Poisson, Exponential, Normal, Gaussian Distributions Calculations of Mean, Median, Mode, Standard Deviation, Variance, Chi-Square Test, Two-Sample Tests.
- iii) Correlation and Regression Analysis, Data fitting and Mathematical Modeling (Interpolation and extrapolation, Empirical formulation)
- iv) Report Writing: Structure and Components of Research Report, Art of writing Research papers (Standard Formats i.e. IEEE, Springer, IET etc.)

PART B

Signals Processing

Signal Processing: Fourier series and Fourier transform representations, sampling theorem and applications; Discrete-time signals: discrete-time Fourier transform (DTFT), DFT, FFT, Z-transform, LTI systems: definition and properties, causality, stability, impulse response, convolution, poles and zeros, parallel and cascade structure.

Electronics-I

Semiconductors and conductivity, Charge neutrality, Minority carrier injection, Graded semiconductors, Diode and applications, Bipolar Junction Transistor, Carrier Physics and Eber's Moll Model, JFET-operation and characteristics, MOSFET-structure, types, operation and characteristics, Threshold voltage roll-off, Drain Induced Barrier Lowering.

Electronics-II

Small-signal and Large-signal amplifiers, Cascading-need and advantages, Darlington configuration, Transistor h-parameter model, Power Amplifiers- Class A, B, AB, C, D, E, F, Positive and negative feedback, Oscillators and Feedback amplifiers, operational amplifiers, Wave shaping circuits. Basics of LED, LASER, p-I-n photo diode, Optoelectronic materials. Solar cells.

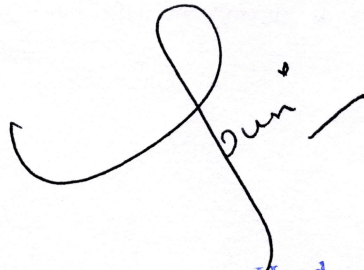
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Communication

Analog communications: amplitude modulation and demodulation, angle modulation and demodulation, spectra of AM and FM, super heterodyne receivers, circuits for analog communications; signal-to-noise ratio (SNR) calculations.

Digital communications: PCM, DPCM, ASK, PSK, FSK, QPSK, calculation of bandwidth, SNR and BER.

Antennas: Radiation Fundamentals, Radiation from a quarter wave monopole and half wave dipole. Basic ideas of reciprocity properties of antennas, Radiation resistance, Radiation patterns, directional properties of dipole antennas, Antenna gain, Broadside and end fire arrays, pattern multiplication, Binomial array, V and Rhombic antennas, Yagi antenna, horn antennas, microstrip antennas.

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