

# GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Declared as Deemed to be University u/s 3 of UGC Act, 1956)

Visakhapatnam | Hyderabad | Bengaluru

Accredited by NAAC with A++ Grade

Website: [www.gitam.edu](http://www.gitam.edu)

## GITAM SCHOOL OF SCIENCE

Department of Physics

PhD in Science: Electronics

PhD Entrance Test Syllabus - 2024-2025

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### PhD in Science: Electronics

#### Unit-I: Basic Circuit Theory

Superposition, Thevenin, Norton and Maximum Power Transfer Theorems, Network elements, Network graphs, Nodal and Mesh analysis. Laplace Transform, Fourier Transform and Z-transform. Time and frequency domain response, Passive filters, Two-port Network Parameters: Z, Y, ABCD and h parameters, Transfer functions, Signal representation, State variable method of circuit analysis, AC circuit analysis, Transient analysis, Zero, and Poles, Bode Plots

#### Unit-II: Electronic devices

Introduction to Semiconductor, PN Junction, Diode equation, Breakdown in diodes, Zener diode,

Three configurations of transistor, Biasing, BJT as an amplifier, BJT characteristics, Applications of Transistor.

FET- Construction and characteristics, Biasing, FET as an amplifier, Applications of FET. MOSFET: Introduction, Depletion and Enhancement type MOSFETs. Feedback concepts: Practical feedback circuits, Feedback amplifiers, Oscillator operation, types of oscillators

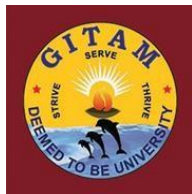
#### Unit-III:

Rectifiers, Voltage regulated ICs and regulated power supply. Amplifiers, Classification of amplifiers.

#### Operational Amplifiers

Op-amp Basics, parameters, Practical op-amp circuits – Integrator, Differentiator and Summing amplifier.

Op-amp Applications-Constant gain multiplier, Voltage to Current Converter, Current to Voltage Converter and filters.



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### Unit-IV : Combinatorial and Sequential Logic Circuits

#### Combinatorial logic circuits

Simplification of Boolean expressions, Karnaugh map method, Logic gates, Encoders and Decoders, Multiplexers and Demultiplexers Binary addition, subtraction, multiplication and division.

#### Sequential logic circuits

Flip-Flops, Counters: Asynchronous (ripple) counters, Down counter, Synchronous counters, Up-down counter, Ringcounter, Johnson counter.

### Unit-V: Electronic Communications & Microprocessors

#### Electronic Communications

Amplitude Modulation: Modulation Index, Frequency spectrum, Average Power. A.M

Broadcast Transmitter and Superheterodyne receiver Output S/N ratio.

FM Modulation-Direct and Indirect methods. Detection methods - Slope detector, balanced slope detector, Amplitudelimiter, Pre-emphasis and De-emphasis.

PAM,PWM, ASK, FSK,PCM.

#### Microprocessors

Evolution of Microprocessors, Architecture and Pin Description of 8086, Instruction set.

Memory organization- Register structure, Interfacing devices: 8255-I/O Ports and

Programming, 8251-Serial communication interface and Programmable Interval Timer 8253

and Programmable Interrupt Controller 8259