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DIGIMAT - The No.1 Autonomous Learning Platform for Creative Learning

NPTEL : Advanced VLSI Design (Electronics and Communication Engineering)

Co-ordinators : Prof. A.N. Chandorkar, Prof. D.K. Sharma, Prof. Sachin Patkar, Prof. Virendra Singh

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Co-ordinators : Dr. Debabrata Sikdar, Dr. Debabrata Sikdar

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- Lecture 10 - Matrix theory of dielectric layered media
- Lecture 11 - 1D Photonic crystals
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- Lecture 13 - Real and reciprocal lattices
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- Lecture 15 - Emerging Applications of Photonic Crystals
- Lecture 16 - Optical properties of metals
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- Lecture 18 - Applications of SPPs
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- Lecture 20 - Plasmonic nanoparticles: Antenna and Waveguides
- Lecture 21 - Applications of LSPR
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- Lecture 23 - Effective medium theories
- Lecture 24 - Single and Double-Negative Metamaterials
- Lecture 25 - Metamaterial Perfect absorbers
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Lecture 3 - Rayleigh Fading and BER of Wired Communication

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Lecture 24 - SVD Based Optimal MIMO Transmission and Capacity

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- Lecture 25 - Impact of Doppler Effect on Wireless Channel
- Lecture 26 - Introduction to Code Division Multiple Access (CDMA)
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NPTEL : NOC:Estimation for Wireless Communications, MIMO, OFDM Cellular and Sensor Networks (Electronics and Communication Engineering)

Co-ordinators : Prof. Aditya K. Jagannatham

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Lecture 15 - Convergence of Turbo Codes

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Lecture 5 - Syndrome, Error Correction and Error Detection

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Lecture 2 - Electrical circuit elements: Voltage and current sources; R, C, L; Voltage sources in series; Example of superposition

Lecture 3 - Elements in series and parallel; Superposition in linear circuits

Lecture 4 - Controlled sources; Determining the characteristics of a two terminal element; Realizing a resistor using a VCCS or a CCVS

Lecture 5 - Nodal analysis of a network with conductances and current sources; Setting up the equations; Conductance matrix; Superposition

Lecture 6 - Circuit analysis; Number of KCL and KVL equations in a circuit; Nodal analysis of a network with conductances and current sources; Setting up the equations; Conductance matrix;

Lecture 7 - Nodal analysis with voltage sources and controlled sources; Brief introduction to modified nodal analysis; Use of supernode to solve circuits with voltage sources; Superposition theorem

Lecture 8 - Mesh analysis of a circuit with resistors and voltage sources; Comparison with nodal analysis; Mesh analysis of circuits with current sources-supermesh

Lecture 9 - Choice of nodal versus mesh analysis; Circuit theorems: Pushing a voltage source through a node, splitting a current source, substitution theorem, superposition

Lecture 10 - Thevenin and Norton (theorem and) equivalent circuits; Power conservation in a circuit

Lecture 11 - Tellegen's theorem; Reciprocity theorem

Lecture 12 - Compensation Theorem; Two ports

Lecture 13 - Two port parameters-y parameters

Lecture 14 - Two port parameters(z, h, and g); Reciprocal two ports

Lecture 15 - Opamp, ideal opamp circuits, non-inverting and inverting amplifiers; Ensuring that the opamp has negative feedback

Lecture 16 - RC circuit natural response; First order differential equation

Lecture 17 - RC (first-order) circuit, complete response with step inputs; Transient(natural) and steady state(forced) responses; Zero-state and zero-input responses

Lecture 18 - Step response of RC circuit with loops of voltage sources and capacitors; RL circuits; RLC circuits

Lecture 19 - Second order(RLC circuit) natural response; Series and parallel RLC circuits; Differential equation-characteristic equation and solutions; Forced response of a second order circuit

Lecture 20 - General formulation of second order(RLC circuit) natural response; Natural frequency and damping/quality factor; Series/parallel RLC circuits; R, L, C in sinusoidal steady state

Lecture 21 - Sinusoidal steady state response of RC and RLC circuits

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Lecture 11 - Inductor

Lecture 12 - Mutual Inductor

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Lecture 16 - Series connection of R, L, C, current source

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Lecture 26 - Scaling an element's value using controlled sources

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Lecture 30 - Power and energy in a resistor

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Lecture 2 - Embedded System Software and Hardware, stack implementation in ARM, Endianness, condition codes

Lecture 3 - Processor core VS CPU core, ARM7TDMI Interface signals, Memory Interface, Bus Cycle types, Register set, Operational Modes

Lecture 4 - Instruction Format, ARM Core Data Flow Model, ARM 3 stage Pipeline, ARM family attribute comparison

Lecture 5 - ARM 5 stage Pipeline, Pipeline Hazards, Data forwarding - a hardware solution

Lecture 6 - ARM ISA and Processor Variants, Different Types of Instructions, ARM Instruction set, data processing instructions

Lecture 7 - Shift Operations, shift Operations using RS lower byte, Immediate value encoding

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Lecture 15 - Aborts, software Interrupt Instruction, undefined instruction exception

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Lecture 17 - Thumb state, Thumb Programmers model, Thumb Implementation, Thumb Applications

Lecture 18 - Thumb Instructions, Interrupt processing

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Lecture 25 - Cache Memory, Mapping Functions

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Lecture 27 - Processes, Memory Map, Protected Systems, ARM systems with MPU, memory Protection Unit (MPU)

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Lecture 35 - DMA:Direct Memory Access

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NPTEL : Nanoelectronics: Devices and Materials (Electronics and Communication Engineering)

Co-ordinators : Dr. Navakanta Bhat, Prof. K.N. Bhat, Dr. S.A. Shivashankar

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