NPTEL Video Course - Electrical Engineering - Nonlinear Dynamical Systems

Subject Co-ordinator - Prof. Harish K. Pillai, Prof. Madhu N. Belur

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Describing functions
Lecture 31 - Describing functions
Lecture 32 - Describing functions for nonlinearities
Lecture 33 - Ideal relay with Hysteresis and dead zone
Lecture 34 - Dynamical systems on manifolds-1
Lecture 35 - Dynamical systems on manifolds-2

NPTEL Video Course - Electrical Engineering - Power System Dynamics and Control

Subject Co-ordinator - Dr. A.M. Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Excitation System Modeling. Automatic Voltage Regulator. Linearized Analysis
Lecture 31 - Load Modeling
Lecture 32 - Induction Machines, Transmission Lines
Lecture 33 - Transmission Lines. Prime Mover Systems
Lecture 34 - Transmission Lines (Continued.) Prime Mover Systems
Lecture 35 - Prime Mover Systems. Stability in Integrated Power System
Lecture 36 - Stability in Integrated Power System
Lecture 37 - Two Machine System (Continued.)
Lecture 38 - Stability in Integrated Power System
Lecture 39 - Frequency/Angular Stability Programs. Stability Phenomena
Lecture 40 - Voltage Stability Example (Continued.). Fast Transients
Lecture 41 - Torsional Transients
Lecture 42 - Sub-Synchronous Resonance. Stability Improvement
Lecture 43 - Stability Improvement
Lecture 44 - Stability Improvement. Power System Stabilizers
Lecture 45 - Stability Improvement (Large Disturbance Stability)

NPTEL Video Course - Electrical Engineering - Control Engineering (Prof. S.D. Agashe)

Subject Co-ordinator - Prof. S.D. Agashe

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Power Electronics

Subject Co-ordinator - Prof. Kishore Chatterjee, Prof. B.G. Fernandes

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Power Electronics
Lecture 31 - Power Electronics
Lecture 32 - Power Electronics
Lecture 33 - Power Electronics
Lecture 34 - Power Electronics
Lecture 35 - Power Electronics
Lecture 36 - Power Electronics
Lecture 37 - Power Electronics
Lecture 38 - Power Electronics
Lecture 39 - Power Electronics
Lecture 40 - Power Electronics
Lecture 41 - Power Electronics
Lecture 42 - Power Electronics
Lecture 43 - Power Electronics

NPTEL Video Course - Electrical Engineering - Fabrication of Silicon VLSI Circuits using the MOS technology

Subject Co-ordinator - Prof. A.N. Chandorkar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Computational Electromagnetics and Applications

Subject Co-ordinator - Prof.Krish Sankaran

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Lecture 15
Lecture 31 - Lecture 16
Lecture 32 - Lecture 17
Lecture 33 - Lecture 18
Lecture 34 - Exercise 10
Lecture 35 - Summary week 5
Lecture 36 - Lecture 19
Lecture 37 - Lecture 20
Lecture 38 - Lecture 21
Lecture 39 - Lecture 22
Lecture 40 - Exercise 11
Lecture 41 - Summary week 6
Lecture 42 - Exercise 12
Lecture 43 - Exercise 13
Lecture 44 - Exercise 14
Lecture 45 - Exercise 15
Lecture 46 - Exercise 16
Lecture 47 - Exercise 17
Lecture 48 - Summary week 7
Lecture 49 - Lecture 23
Lecture 50 - Lecture 24
Lecture 51 - Lecture 25
Lecture 52 - Exercise 18
Lecture 53 - Exercise 19
Lecture 54 - Lab tour 3
Lecture 55 - Summary week 8
Lecture 56 - Lecture 26
Lecture 57 - Lecture 27
Lecture 58 - Lecture 28
Lecture 59 - Lecture 29
Lecture 60 - Lecture 30
Lecture 61 - Lecture 31
Lecture 62 - Lab tour 4
Lecture 63 - Summary week 9
Lecture 64 - Lecture 32
Lecture 65 - Lecture 33
Lecture 66 - Lecture 34
Lecture 67 - Lecture 35
Lecture 68 - Exercise 20

Lecture 69 - Lab tour 5
Lecture 70 - Summary week 10
Lecture 71 - Lecture 36
Lecture 72 - Lecture 37
Lecture 73 - Lecture 38
Lecture 74 - Lecture 39
Lecture 75 - Lecture 40
Lecture 76 - Summary week 11
Lecture 77 - Lecture 41
Lecture 78 - Lecture 42
Lecture 79 - Lecture 43
Lecture 80 - Lecture 44
Lecture 81 - Exercise 21
Lecture 82 - Exercise 22
Lecture 83 - Summary week 12

NPTEL Video Course - Electrical Engineering - NOC:Basic Electronics

Subject Co-ordinator - Prof. Mahesh B. Patil

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - BJT amplifier - 6
Lecture 31 - BJT amplifier - 7
Lecture 32 - Introduction to op-amps
Lecture 33 - Op-amp circuits - 1
Lecture 34 - Op-amp circuits - 2
Lecture 35 - Op-amp circuits - 3
Lecture 36 - Difference amplifier
Lecture 37 - Instrumentation amplifier - 1
Lecture 38 - Instrumentation amplifier - 2
Lecture 39 - Op-amp nonidealities - 1
Lecture 40 - Op-amp nonidealities - 2
Lecture 41 - Bode plots - 1
Lecture 42 - Bode plots - 2
Lecture 43 - Bode plots - 3
Lecture 44 - Op-amp filters
Lecture 45 - Simulation of op-amp filter
Lecture 46 - Precision rectifiers - 1
Lecture 47 - Precision rectifiers - 2
Lecture 48 - Precision rectifiers - 3
Lecture 49 - Simulation of triangle-to-sine converter
Lecture 50 - Schmitt triggers - 1
Lecture 51 - Schmitt triggers - 2
Lecture 52 - Schmitt triggers - 3
Lecture 53 - Sinusoidal oscillators - 1
Lecture 54 - Sinusoidal oscillators - 2
Lecture 55 - Introduction to digital circuits
Lecture 56 - Boolean algebra
Lecture 57 - Karnaugh maps
Lecture 58 - Combinatorial circuits - 1
Lecture 59 - Combinatorial circuits - 2
Lecture 60 - Combinatorial circuits - 3
Lecture 61 - Introduction to sequential circuits
Lecture 62 - Latch and flip-flop
Lecture 63 - JK flip-flop
Lecture 64 - D flip-flop
Lecture 65 - Shift registers
Lecture 66 - Counters - 1
Lecture 67 - Counters - 2
Lecture 68 - Simulation of a synchronous counter

Lecture 69 - 555 timer
Lecture 70 - Digital-to-analog conversion - 1
Lecture 71 - Digital-to-analog conversion - 2
Lecture 72 - Analog-to-digital conversion

NPTEL Video Course - Electrical Engineering - NOC:Antennas

Subject Co-ordinator - Prof. Girish Kumar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Compact MSA - II
Lecture 31 - Compact MSA - III
Lecture 32 - Tunable MSA - I
Lecture 33 - Tunable MSA - II
Lecture 34 - Circularly Polarized MSA - I
Lecture 35 - Circularly Polarized MSA - II
Lecture 36 - Circularly Polarized MSA - III
Lecture 37 - MSA Arrays - I
Lecture 38 - MSA Arrays - II
Lecture 39 - MSA Arrays - III
Lecture 40 - Helical Antennas - I
Lecture 41 - Helical Antennas - II
Lecture 42 - Helical Antennas - III
Lecture 43 - Helical Antennas - IV
Lecture 44 - Helical Antennas - V
Lecture 45 - Horn Antennas - I
Lecture 46 - Horn Antennas - II
Lecture 47 - Horn Antennas - III
Lecture 48 - Horn Antennas - IV
Lecture 49 - Horn Antennas - V
Lecture 50 - Yagi-Uda and Log-Periodic Antennas - I
Lecture 51 - Yagi-Uda and Log-Periodic Antennas - II
Lecture 52 - Yagi-Uda and Log-Periodic Antennas - III
Lecture 53 - IE3D Session TA - I
Lecture 54 - IE3D Session TA - II
Lecture 55 - IE3D Session TA - III
Lecture 56 - Reflector Antennas - I
Lecture 57 - Reflector Antennas - II
Lecture 58 - Reflector Antennas - III
Lecture 59 - Reflector Antennas - IV
Lecture 60 - Lab Session

NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Wavelets, Filter Banks and Time Frequency A

Subject Co-ordinator - Prof. V.M. Gadre

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Demonstration 4
Lecture 31 - Module 10 - Lecture 1 - Introduction to upsampling and down sampling as Multirate operations
Lecture 32 - Module 10 - Lecture 2 - Up sampling by a general factor M- a Z-domain analysis.
Lecture 33 - Module 10 - Lecture 3 - Down sampling by a general factor M- a Z-domain analysis
Lecture 34 - Module 11 - Lecture 1 - Z domain analysis of 2 channel filter bank.
Lecture 35 - Module 11 - Lecture 2 - Effect of X (-Z) in time domain and aliasing
Lecture 36 - Module 11 - Lecture 3 - Consequences of aliasing and simple approach to avoid it
Lecture 37 - Module 12 - Lecture 1 - Revisiting aliasing and the Idea of perfect reconstruction
Lecture 38 - Module 12 - Lecture 2 - Applying perfect reconstruction and alias cancellation on Haar MRA
Lecture 39 - Module 12 - Lecture 3 - Introduction to Daubechies family of MRA
Lecture 40 - Module 13 - Lecture 1 - Power Complementarity of low pass filter
Lecture 41 - Module 13 - Lecture 2 - Applying perfect reconstruction condition to obtain filter coefficient
Lecture 42 - Module 14 - Lecture 1 - Effect of minimum phase requirement on filter coefficients
Lecture 43 - Module 14 - Lecture 2 - Building compactly supported scaling functions
Lecture 44 - Module 14 - Lecture 3 - Second member of Daubechies family
Lecture 45 - Module 15 - Lecture 1 - Fourier transform analysis of Haar scaling and Wavelet functions
Lecture 46 - Module 15 - Lecture 2 - Revisiting Fourier Transform and Parseval's theorem
Lecture 47 - Module 15 - Lecture 3 - Transform Analysis of Haar Wavelet function
Lecture 48 - Module 16 - Lecture 1 - Nature of Haar scaling and Wavelet functions in frequency domain
Lecture 49 - Module 16 - Lecture 2 - The Idea of Time-Frequency Resolution
Lecture 50 - Module 16 - Lecture 3 - Some thoughts on Ideal time- frequency domain behavior
Lecture 51 - Module 17 - Lecture 1 - Defining Probability Density function
Lecture 52 - Module 17 - Lecture 2 - Defining Mean, Variance and Â containment in a given domainÂ
Lecture 53 - Module 17 - Lecture 3 - Example
Lecture 54 - Module 17 - Lecture 4 - Variance from a slightly different perspective
Lecture 55 - Module 18 - Lecture 1 - Signal transformations
Lecture 56 - Module 18 - Lecture 2 - Time-Bandwidth product and its properties
Lecture 57 - Module 18 - Lecture 3 - Simplification of Time-Bandwidth formulae
Lecture 58 - Module 19 - Lecture 1 - Introduction
Lecture 59 - Module 19 - Lecture 2 - Evaluation of Time-Bandwidth product
Lecture 60 - Module 19 - Lecture 3 - Optimal function in the sense of Time-Bandwidth product
Lecture 61 - Module 20 - Lecture 1 - Discontent with the Â Optimal functionÂ .
Lecture 62 - Module 20 - Lecture 2 - Journey from infinite to finite Time-Bandwidth product of Haar scaling f
Lecture 63 - Module 20 - Lecture 3 - More insights about Time-Bandwidth product
Lecture 64 - Module 20 - Lecture 4 - Time-frequency plane
Lecture 65 - Module 20 - Lecture 5 - Tiling the Time-frequency plane
Lecture 66 - Module 21 - Lecture 1 - STFT
Lecture 67 - Module 21 - Lecture 2 - STFT
Lecture 68 - Module 21 - Lecture 3 - STFT

Lecture 69 - Module 21 - Lecture 4 - Continuous Wavelet Transform (CWT)
Lecture 70 - Demonstration 5
Lecture 71 - StudentÂ s Presentation

NPTEL Video Course - Electrical Engineering - NOC:Analog Circuits (2017)

Subject Co-ordinator - Prof. Jayanta Mukherjee

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Module 1 - Introduction
Lecture 2 - Module 2 - Poles and zeros
Lecture 3 - Module 3 - OP-AMPs
Lecture 4 - Module 4 - Application of Op-Amps
Lecture 5 - Module 5 - Inverting amplifier and Non Inverting amplifier
Lecture 6 - Module 1 - Non Idealities in Op-AMP (Finite Gain, Finite Bandwidth and Slew Rate)
Lecture 7 - Module 2 - Non Idealities in Op-AMP (Offset Voltage and Bias Current)
Lecture 8 - Module 3 - Bode Plot
Lecture 9 - Module 4 - Frequency Response
Lecture 10 - Module 1 - Frequency Response (High Frequency Response)
Lecture 11 - Module 2 - Frequency Response example
Lecture 12 - Module 3 - Feedback
Lecture 13 - Module 4 - Effects of Feedback
Lecture 14 - Tutorial 1 and 2
Lecture 15 - Module 1 - Effect of feedback and stability
Lecture 16 - Module 2 - Stability
Lecture 17 - Module 3 - Stability and pole location
Lecture 18 - Module 4 - Stability and Pole location continuation
Lecture 19 - Tutorial 3
Lecture 20 - Module 1 - Gain Margin Â An example
Lecture 21 - Module 2 - Frequency Compensation
Lecture 22 - Module 3 - Filters
Lecture 23 - Module 4 - Filter prototypes
Lecture 24 - Tutorial 4
Lecture 25 - Tutorial 5
Lecture 26 - Tutorial 6
Lecture 27 - Module 1 - Chebyshev Prototype, Filter transformation
Lecture 28 - Module 2 - Filter Transformations (Continued....)
Lecture 29 - Module 3 - Active Filters

Lecture 30 - Module 4 - Non Linear Applications of OPAMPS
Lecture 31 - Module 5 - Limiter, Diodes
Lecture 32 - Module 1 - Oscillators
Lecture 33 - Module 2 - Oscillator Amplitude Control , Quadrature Oscillator
Lecture 34 - Module 3 - Multivibators
Lecture 35 - Module 4 - Multivibrators (Continued...)
Lecture 36 - Module 5 - Monostable Multivibator
Lecture 37 - Module 1 - Zener Effect, Rectifiers
Lecture 38 - Module 2 - Rectifiers
Lecture 39 - Module 3 - Clamper, Peak Rectifier, Super diodes
Lecture 40 - Module 4 - BJT DC Circuits
Lecture 41 - Module 5 - Current Mirror

NPTEL Video Course - Electrical Engineering - NOC:Microwave Theory and Techniques

Subject Co-ordinator - Prof. Girish Kumar

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Microwave Phase Shifters
Lecture 31 - Microwave Transistors
Lecture 32 - Microwave Amplifiers - I
Lecture 33 - Microwave Amplifiers - II
Lecture 34 - Microwave Amplifiers - III
Lecture 35 - Low Noise Amplifiers - I
Lecture 36 - Low Noise Amplifiers - II
Lecture 37 - Power Amplifiers
Lecture 38 - Microwave Tubes - I
Lecture 39 - Microwave Tubes - II
Lecture 40 - Microwave Tubes - III
Lecture 41 - Microwave Oscillators - I
Lecture 42 - Microwave Oscillators - II
Lecture 43 - Microwave Mixers - I
Lecture 44 - Microwave Mixers - II
Lecture 45 - Microwave Mixers - III
Lecture 46 - Fundamentals of Antennas
Lecture 47 - Dipole, Monopole, loop and Slot Antennas
Lecture 48 - Linear and Planar Arrays
Lecture 49 - Microstrip Antennas
Lecture 50 - Horn and Helical Antennas
Lecture 51 - Yagi - Uda, Log-Periodic and Reflector Antennas
Lecture 52 - RF MEMS and Microwave Imaging
Lecture 53 - Microwave Systems
Lecture 54 - Microwave Measurements and Lab Demonstration
Lecture 55 - CST Software Introduction with Filter Design
Lecture 56 - Power Divider and Combiner Design in CST
Lecture 57 - Hybrid Coupler Design
Lecture 58 - Antenna Design and Amplifier Simulation in CST
Lecture 59 - Mixer Design in NI AWR Software - I
Lecture 60 - Mixer Design in NI AWR Software - II

NPTEL Video Course - Electrical Engineering - NOC:Principles of Digital Communications

Subject Co-ordinator - Prof. S.N. Merchant

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Companded Quantization - II
Lecture 31 - Differential Pulse Code Modulation DPCM - I
Lecture 32 - DPCM-II (Linear Prediction)
Lecture 33 - Delta Modulation
Lecture 34 - M-ary PCM/PAM - I
Lecture 35 - M-ary PCM/PAM - II
Lecture 36 - Line Coding - I
Lecture 37 - Line Coding - II
Lecture 38 - Line Coding - III
Lecture 39 - Pulse Shaping for Zero ISI - I
Lecture 40 - Pulse Shaping for Zero ISI - II
Lecture 41 - Pulse Shaping for Zero ISI - III
Lecture 42 - Partial Response Signaling - I
Lecture 43 - Partial Response Signaling - II
Lecture 44 - Principle of Invariance of Probability of Error
Lecture 45 - Binary ASK and PSK
Lecture 46 - Binary Frequency Shift Keying - I
Lecture 47 - Binary Frequency Shift Keying - II
Lecture 48 - Quadrature Phase Shift Keying - I
Lecture 49 - Quadrature Phase Shift Keying - II
Lecture 50 - Quadrature Phase Shift Keying - III
Lecture 51 - Continuous Phase Frequency Shift Keying
Lecture 52 - Minimum Shift Keying - I
Lecture 53 - Minimum Shift Keying - II
Lecture 54 - M-ary Coherent ASK (M-ASK)
Lecture 55 - M-ary PSK
Lecture 56 - M-ary Quadrature Amplitude Modulation (M-QAM)
Lecture 57 - M-ary FSK
Lecture 58 - Comparison of M-ary Schemes
Lecture 59 - Non-coherent BFSK
Lecture 60 - Differential Phase Shift Keying
Lecture 61 - Channel Coding - I
Lecture 62 - Channel Coding - II
Lecture 63 - Channel Coding - III
Lecture 64 - Channel Coding
Lecture 65 - Channel Coding

NPTEL Video Course - Electrical Engineering - NOC:Fundamental of Power Electronics

Subject Co-ordinator - Prof. Vivek Agarwal

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Simulation - power factor improvement
Lecture 31 - Linear regulators - Intro
Lecture 32 - Shunt regulator
Lecture 33 - Example on shunt regulator
Lecture 34 - Non-ideality and solution
Lecture 35 - Applications of shunt regulator
Lecture 36 - Series regulator
Lecture 37 - Efficiency of series
Lecture 38 - Negative and dual voltage regulators
Lecture 39 - Over current limiting circuits
Lecture 40 - Improvements to series regulator
Lecture 41 - Regulator performance parameters
Lecture 42 - Datasheet of few IC regulators
Lecture 43 - Common IC regulator circuits
Lecture 44 - Practicals 1
Lecture 45 - Switched mode DC-DC converter intro
Lecture 46 - Volt-sec and Amp-sec balance
Lecture 47 - Input-output relationship
Lecture 48 - Buck converter - operation and waveforms
Lecture 49 - Buck converter - component selection
Lecture 50 - Primary configurations
Lecture 51 - Boost converter
Lecture 52 - Buck-Boost converter
Lecture 53 - Simulating the primary converters
Lecture 54 - Forward converter
Lecture 55 - Core reset in forward converter
Lecture 56 - Simulating with lossy core reset
Lecture 57 - Simulating with lossless core reset
Lecture 58 - Flyback converter
Lecture 59 - Simulating the flyback converter
Lecture 60 - Octave mfile for design
Lecture 61 - Magnetics design intro
Lecture 62 - Magnetics review
Lecture 63 - Permeance
Lecture 64 - Inductor value and energy storage
Lecture 65 - Inductor area product
Lecture 66 - Inductor design
Lecture 67 - Inductor example
Lecture 68 - Transformer design

Lecture 69 - Transformer example
Lecture 70 - Forward converter design mfile
Lecture 71 - Pushpull converter
Lecture 72 - Flux walking in pushpull
Lecture 73 - PWM generation
Lecture 74 - Simulation of pushpull converter
Lecture 75 - Half bridge converter
Lecture 76 - Simulation of halfbridge converter
Lecture 77 - Full bridge converter
Lecture 78 - Simulation of fullbridge converter
Lecture 79 - Area products and mfiles
Lecture 80 - Intro for drive circuits
Lecture 81 - BJT base drive
Lecture 82 - BJT base drive example
Lecture 83 - Multi-stage base drive
Lecture 84 - Base drive with speed-up circuit
Lecture 85 - Base drive with isolation
Lecture 86 - MOSFET gate drive
Lecture 87 - MOSFET drive with isolation
Lecture 88 - Over-current protection
Lecture 89 - Snubber circuits
Lecture 90 - Intro for close loop control
Lecture 91 - Close looping dc-dc converters
Lecture 92 - Simulation of close loop control
Lecture 93 - Current control for battery charger application
Lecture 94 - Instability in current control and slope compensation
Lecture 95 - Slope compensated current control
Lecture 96 - Simulation of current control
Lecture 97 - Single phase inverter with sinusoidal pwm
Lecture 98 - Simulation of sinusoidal PWM

NPTEL Video Course - Electrical Engineering - NOC:Electrical Equipment and Machines: Finite Element Analysis

Subject Co-ordinator - Prof. Shrikrishna V. Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Digital Signal Processing and its Applications

Subject Co-ordinator - Prof. V. M. Gadre

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Definitions of sequences and Properties of DTFT
Lecture 31 - Introduction to DTFT, IDTFT
Lecture 32 - Dual to convolution property
Lecture 33 - Multiplication Property, Introduction to Parsevalâ s theorem
Lecture 34 - Introduction and Property of DTFT
Lecture 35 - Review of Inverse DTFT
Lecture 36 - Parsevalâ s Theorem and energy and time spectral density
Lecture 37 - Discussion on Unit Step
Lecture 38 - Introduction to Z transform
Lecture 39 - Example of Z transform
Lecture 40 - Region of Convergence
Lecture 41 - Properties of Z transform
Lecture 42 - Z- Transform
Lecture 43 - Rational System
Lecture 44 - Introduction and Examples of Rational Z Transform and their Inverses
Lecture 45 - Double Pole Examples and their Inverse Z Transform
Lecture 46 - Partial Fraction Decomposition
Lecture 47 - LSI System Examples
Lecture 48 - Why are Rational Systems so important?
Lecture 49 - Solving Linear constant coefficient difference equations which are valid over a finite range of
Lecture 50 - Introduction to Resonance in Rational Systems
Lecture 51 - Characterization of Rational LSI system
Lecture 52 - Causality and stability of the ROC of the system function
Lecture 53 - Recap of Rational Systems and Discrete Time Filters
Lecture 54 - Specifications for Filter Design
Lecture 55 - Four Ideal Piecewise Constant Filters
Lecture 56 - Important Characteristics Of Ideal Filters
Lecture 57 - Synthesis of Discrete Time Filters, Realizable specifications
Lecture 58 - Realistic Specifications for low pass filter. Filter Design Process
Lecture 59 - Introduction to Filter Design. Analog IIR Filter,FIR discrete-time filter, IIR discrete-time fil
Lecture 60 - Analog to discrete transform
Lecture 61 - Intuitive transforms, Bilinear Transformation
Lecture 62 - Steps for IIR filter design
Lecture 63 - Analog filter design using Butterworth Approximation
Lecture 64 - Butterworth filter Derivation And Analysis of butterworth system function
Lecture 65 - Chebychev filter Derivation
Lecture 66 - Midsem paper review discussion
Lecture 67 - The Chebyschev Approximation
Lecture 68 - Next step in design: Obtain poles

Lecture 69 - Introduction to Frequency Transformations in the Analog Domain
Lecture 70 - High pass transformation
Lecture 71 - Band pass transformation
Lecture 72 - Frequency Transformation
Lecture 73 - Different types of filters
Lecture 74 - Impulse invariant method and ideal impulse response
Lecture 75 - Design of FIR of length (2N+1) by the truncation method,Plotting the function V(w)
Lecture 76 - IIR filter using rectangular window, IIR filter using triangular window
Lecture 77 - Proof that frequency response of an fir filter using rectangular window function centred at 0 is
Lecture 78 - Introduction to window functions
Lecture 79 - Examples of window functions
Lecture 80 - Explanation of Gibbâ s Phenomenon and itâ s application
Lecture 81 - Comparison of FIR And IIR Filterâ s
Lecture 82 - Comparison of FIR And IIR Filterâ s
Lecture 83 - Comparison of FIR And IIR Filterâ s
Lecture 84 - Introduction and approach to realization (causal rational system)
Lecture 85 - Comprehension of Signal Flow Graphs and Achievement of Pseudo Assembly Language Code
Lecture 86 - Introduction to IIR Filter Realization and Cascade Structure
Lecture 87 - Cascade Parallel Structure
Lecture 88 - Lattice Structure
Lecture 89 - Recap And Review of Lattice Structure, Realization of FIR Function
Lecture 90 - Backward recursion, Change in the recursive equation of lattice
Lecture 91 - Lattice structure for an arbitrary rational system
Lecture 92 - Example realization of lattice structure for rational system
Lecture 93 - Introductory Remarks of Discrete Fourier Transform and Frequency Domain Sampling
Lecture 94 - Principle of Duality, The Circular Convolution

NPTEL Video Course - Electrical Engineering - NOC:Stochastic Control and Communication

Subject Co-ordinator - Prof. Ankur A. Kulkarni

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Stochastic Control under incomplete state information: Example
Lecture 31 - Stochastic Control under incomplete state information: Example (Continued...)
Lecture 32 - Stochastic Control under incomplete state information: Example (Continued...)
Lecture 33 - Stochastic Control under incomplete state information: Example (Continued...)
Lecture 34 - LQ systems with Imperfect Information - I
Lecture 35 - LQ systems with Imperfect Information - II
Lecture 36 - LQ systems with Imperfect Information - III
Lecture 37 - LQ systems with Imperfect Information - IV
Lecture 38 - Filtering - I
Lecture 39 - Filtering - II
Lecture 40 - Kalman Filtering - I
Lecture 41 - Kalman Filtering - II
Lecture 42 - Kalman Filtering - III
Lecture 43 - Belief State Formulation - I
Lecture 44 - Belief State Formulation - II
Lecture 45 - Information Structures - I
Lecture 46 - Information Structures - II
Lecture 47 - Witsenhausen Problem - I
Lecture 48 - Witsenhausen Problem - II
Lecture 49 - Witsenhausen Problem - III
Lecture 50 - Witsenhausen Problem - IV
Lecture 51 - Witsenhausen Problem - V
Lecture 52 - Witsenhausen Problem - VI
Lecture 53 - Witsenhausen Problem - VII
Lecture 54 - Team Decision Theory - I
Lecture 55 - Team Decision Theory - II
Lecture 56 - Team Decision Theory - III
Lecture 57 - Team Decision Theory - IV
Lecture 58 - Team Decision Theory - V
Lecture 59 - Team Decision Theory - VI
Lecture 60 - Team Decision Theory - VII
Lecture 61 - Communication Theory - I
Lecture 62 - Communication Theory - II
Lecture 63 - Communication Theory - III
Lecture 64 - Communication Theory - IV
Lecture 65 - Communication Theory - V

NPTEL Video Course - Electrical Engineering - NOC:Applied Linear Algebra (2024)

Subject Co-ordinator - Prof. Dwaipayan Mukherjee

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 69 - Minimal Polynomial-I - Part C
Lecture 70 - Minimal Polynomial-I - Part D
Lecture 71 - Minimal Polynomial-II - Part A
Lecture 72 - Minimal Polynomial-II - Part B
Lecture 73 - Minimal Polynomial-II - Part C
Lecture 74 - Minimal Polynomial-II - Part D
Lecture 75 - Cayley Hamilton Theorem - Part A
Lecture 76 - Cayley Hamilton Theorem - Part B
Lecture 77 - Cayley Hamilton Theorem - Part C
Lecture 78 - Jordan Canonical Form - Part A
Lecture 79 - Jordan Canonical Form - Part B
Lecture 80 - Jordan Canonical Form - Part C
Lecture 81 - Algebraic Graph Theory and Consensus - Part A
Lecture 82 - Algebraic Graph Theory and Consensus - Part B
Lecture 83 - Algebraic Graph Theory and Consensus - Part C
Lecture 84 - Positive Matrices and Leontieff's Model - Part A
Lecture 85 - Positive Matrices and Leontieff's Model - Part B

NPTEL Video Course - Electrical Engineering - NOC:Digital Communication using GNU Radio

Subject Co-ordinator - Prof. Kumar Appaiah

Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Symbol error rate and Bit error rate
Lecture 31 - Computing bit error rates in GNU Radio
Lecture 32 - End-to-end Digital Communication System Simulation in GNU Radio
Lecture 33 - Parameter Estimation for Practical Receivers - Part 1
Lecture 34 - Parameter Estimation for Practical Receivers - Part 2
Lecture 35 - Phase Locked Loop and Differential Modulation
Lecture 36 - Maximum Likelihood delay estimate for a single symbol in GNU Radio
Lecture 37 - Maximum Likelihood delay estimate for multiple symbols in GNU Radio
Lecture 38 - Phase offse estimation in GNU Radio
Lecture 39 - Phase Locked Loop in GNU Radio
Lecture 40 - Costas Loop and Differential PSK in GNU Radio
Lecture 41 - Channel Equalisation
Lecture 42 - Detection Strategy for Dispersive Channels
Lecture 43 - Maximum Likelihood sequence estimation: Viterbi Algorithm
Lecture 44 - Suboptimal Channel Equalisation: Zero-forcing Receiver
Lecture 45 - Zero forcing Receiver in GNU Radio
Lecture 46 - Suboptimal Channel Equalisation: Linear Minimum mean-square error receiver
Lecture 47 - LMMSE Receiver in GNU Radio
Lecture 48 - Parallelising Frequency Selective Channels
Lecture 49 - Orthogonal Frequency Division Multiplexing (OFDM)
Lecture 50 - OFDM in the prescence of dispersive channels
Lecture 51 - Equalisation using OFDM in GNU Radio
Lecture 52 - Error Control Coding: Parity Check Codes
Lecture 53 - Error Control Coding: Repetition Codes
Lecture 54 - Error Control Coding: Linear Block Codes
Lecture 55 - Repetition Codes in GNU Radio
Lecture 56 - Error Control Coding: Perfect Codes
Lecture 57 - Error Control Coding: Hamming Codes
Lecture 58 - (7,4) Hamming Code in GNU Radio
Lecture 59 - Rate and error-free Communication
Lecture 60 - Quantisation
Lecture 61 - Visualising Quantisation in GNU Radio
Lecture 62 - Course Summary

NPTEL Video Course - Electrical Engineering - Circuit Theory

Subject Co-ordinator - Prof. S.C. Dutta Roy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Scattering Matrix
Lecture 31 - Scattering Parameters of a Two-port
Lecture 32 - Problem Session 8
Lecture 33 - Solutions of Minor - 2 Problems
Lecture 34 - Insertion Loss
Lecture 35 - Example of Insertion Loss and Elements
Lecture 36 - Elements of Realizability Theory (Continued.)
Lecture 37 - Positive Real Functions
Lecture 38 - Testing of Positive Real Functions
Lecture 39 - Problem Session 9
Lecture 40 - More on PRF's and their Synthesis
Lecture 41 - LC Driving Point Functions
Lecture 42 - LC Driving Point Synthesis (Continued.)
Lecture 43 - RC and RL Driving Point Synthesis
Lecture 44 - Problem Session 10
Lecture 45 - RC & RL One-port Synthesis (Continued.)
Lecture 46 - Elementary RLC One-port Synthesis
Lecture 47 - Properties and Synthesis of Transfer Parameters
Lecture 48 - Resistance Terminated LC Ladder
Lecture 49 - Resistance Terminated LC Ladder (Continued.)
Lecture 50 - Problem session 11
Lecture 51 - Network Transmission Criteria

NPTEL Video Course - Electrical Engineering - Control Engineering (Prof. M. Gopal)

Subject Co-ordinator - Prof. M. Gopal

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Embedded Systems

Subject Co-ordinator - Prof. Santanu Chaudhary

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Power System Generation, Transmission and Distribution (Encapsu

Subject Co-ordinator - Prof. D.P. Kothari

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Fast Decoupled Load Flow
Lecture 31 - Control of Voltage Profile
Lecture 32 - Optimal System Operation (Economic Operation)
Lecture 33 - Optimal Unit Commitment
Lecture 34 - Optimal Generation Scheduling
Lecture 35 - Optimal Load Flow (Continued.) and Hydro Thermal Scheduling

NPTEL Video Course - Electrical Engineering - Power System Dynamics

Subject Co-ordinator - Dr. M.L. Kothari

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Analog Electronic Circuits

Subject Co-ordinator - Prof. S.C. Dutta Roy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Digital Communication

Subject Co-ordinator - Prof. Surendra Prasad

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Introduction To Electronic Circuits

Subject Co-ordinator - Prof. S.C. Dutta Roy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Analog Electronic Circuit

Subject Co-ordinator - Dr. Shouribrata Chatterjee

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Analog Circuits Introduction to the Diode
Lecture 2 - Diodes, Introduction to The Transistor
Lecture 3 - MOS Device, Characteristics
Lecture 4 - DC operating point
Lecture 5 - DC operating point, amplifier design
Lecture 6 - Common source amplifier, small signal analysis
Lecture 7 - Common gate, common drain
Lecture 8 - Common gate circuit
Lecture 9 - Source degenerated amplifier
Lecture 10 - Swing limits
Lecture 11 - Swing limits (Continued...), multi transistor amplifiers
Lecture 12 - Multi-transistor amplifiers
Lecture 13 - Introduction to current sources
Lecture 14 - Current sources/mirrors (Continued...)
Lecture 15 - Current sources, biasing
Lecture 16 - Differential circuits
Lecture 17 - Differential amplifiers-I
Lecture 18 - Differential amplifiers-II
Lecture 19 - Differential amplifiers-III
Lecture 20 - Self biased active load diff. amp
Lecture 21 - Diff. Cascode amplifier, two stage amplifiers
Lecture 22 - Two stage diff. amps, op-amps
Lecture 23 - Op-amps, OTAs
Lecture 24 - Circuits with op-amps
Lecture 25 - Capacitance in MOS devices
Lecture 26 - Common source, drain, gate-revisited
Lecture 27 - Common gate, common drain with capacitances
Lecture 28 - Cascode, cascade-revisit with capacitance
Lecture 29 - Cascade amplifier (with capacitance)

Lecture 30 - Diversion
Lecture 31 - Diversion Continued
Lecture 32 - Compensation
Lecture 33 - Op-amp Design with Compensation
Lecture 34 - Unity Gain Bandwidth
Lecture 35 - Power Amplification
Lecture 36 - Power Amplifiers-2
Lecture 37 - Power Amplifiers- Class A,B,AB,C ClassD
Lecture 38 - Class D Amplifiers, Push-pull Amplifiers
Lecture 39 - Introduction to Voltage Regulators
Lecture 40 - Voltage Regulators- line, load; Conclusion Regulation

NPTEL Video Course - Electrical Engineering - NOC:Nonlinear and Adaptive Control

Subject Co-ordinator - Prof. Shubhendu Bhasin

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Information Theory, Coding and Cryptography

Subject Co-ordinator - Prof. Ranjan Bose

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Introduction to Trellis Coded Modulation (TCM)
Lecture 31 - Ungerboek's Design Rules and Performance Evaluation of TCM Schemes
Lecture 32 - TCM for Fading Channel and Space Time Trellis Codes (STTC)
Lecture 33 - Introduction to Space Time Block Codes (STBC)
Lecture 34 - Space Time Codes
Lecture 35 - Space Time Codes (Continued...)
Lecture 36 - Introduction to Cryptography
Lecture 37 - Some Well-Known Algorithms
Lecture 38 - Introduction to Physical Layer Security
Lecture 39 - Secrecy Outage Capacity, Secrecy Outage Probability, Cooperative Jamming

NPTEL Video Course - Electrical Engineering - Engineering Electromagnetics

Subject Co-ordinator - Prof. Sheel Aditya

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Wave Guides (Continued...)
Lecture 31 - Wave Guides (Continued...) Rectangular Wave Guides - 1
Lecture 32 - Resonators General Properties
Lecture 33 - Resonators (Continued...) Transmission Line Resonators
Lecture 34 - Resonators (Continued...) Wave Guide Resonators
Lecture 35 - Radiation
Lecture 36 - Radiation (Continued...)
Lecture 37 - Radiation (Continued...) - 1
Lecture 38 - Radiation (Continued...) - 2
Lecture 39 - Radiation (Continued...) Monopole Antennas half Wave Dipole Antenna
Lecture 40 - Radiation (Continued...)
Lecture 41 - Radiation (Continued...) 2 - Element Arrays,Yagi-Uda Array

NPTEL Video Course - Electrical Engineering - NOC:Principles of Digital Communications (2018)

Subject Co-ordinator - Prof. Abhishek Dixit

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Detection
Lecture 31 - Detection
Lecture 32 - Detection
Lecture 33 - Detection
Lecture 34 - Detection
Lecture 35 - Detection
Lecture 36 - Detection
Lecture 37 - Detection
Lecture 38 - Detection

NPTEL Video Course - Electrical Engineering - NOC:Electric Vehicles - Part 1

Subject Co-ordinator - Prof. Amit Jain

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction - EV Historical Background
Lecture 2 - Introduction - EV Benefits of Using EVs
Lecture 3 - Introduction - EV Overview of types of EVs and its Challenges
Lecture 4 - Introduction - EV Motor Drive Technologies
Lecture 5 - Introduction - EV Energy Source Technologies
Lecture 6 - Introduction - EV Battery Charging Technologies
Lecture 7 - Introduction - EV Vehicle to Grid
Lecture 8 - Introduction - EV Subsystems and Configurations
Lecture 9 - Introduction - HEV Subsystems and Configurations
Lecture 10 - Introduction - HEV Subsystems and Modes of Operation
Lecture 11 - Vehicle Dynamics Introduction and tractive effort
Lecture 12 - Vehicle Dynamics and dynamic equation
Lecture 13 - Vehicle Dynamics simulation dynamic equation constant Fte
Lecture 14 - Vehicle Dynamics dynamic equation variable Fte
Lecture 15 - Vehicle Dynamics simulation dynamic equation variable Fte
Lecture 16 - Vehicle Dynamics Modelling and simulation in Simulink
Lecture 17 - Summary Electric Vehicles Part 1 Course
Lecture 18 - Basics of DC Motor Drive
Lecture 19 - Realization of DC Chopper
Lecture 20 - Open Loop Operation of Chopper Fed DC Motor Drive
Lecture 21 - Review of Control Theory
Lecture 22 - Modeling and Current Controller Design for Separately Excited DC Motor Drive
Lecture 23 - Speed Controller Design and Performance Evaluation of DC Motor Drive
Lecture 24 - Fundamentals of Three Phase Induction Motor
Lecture 25 - Equivalent Circuit and Torque-Speed Characteristics of Induction Motor
Lecture 26 - Starting and Speed Control of Induction Motor
Lecture 27 - Realisation of DC to AC Power Converter
Lecture 28 - Impact of Non-Sinusoidal Voltage on Induction Motor
Lecture 29 - Selective Harmonic Elimination and Optimal Pulse Width Modulation Techniques

NPTEL Video Course - Electrical Engineering - NOC:Power Electronics

Subject Co-ordinator - Prof. G.Bhuvaneshwari

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Electrical Machines

Subject Co-ordinator - Prof. G.Bhuvaneshwari

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Special Electromechanical Systems

Subject Co-ordinator - Prof. S.S. Murthy

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Self Excited Induction Generators (Continued...)
Lecture 31 - Permanent Magnet Machines
Lecture 32 - Squareware Permanent Magnet Brushless Motor Drive
Lecture 33 - Sine Wave Permanent Magnet Brushless Motor Drives
Lecture 34 - Permanent Magnet Synchronous Motors

NPTEL Video Course - Electrical Engineering - NOC:High Power Multilevel Converters - Analysis, Design and Ope

Subject Co-ordinator - Prof. Anand Rup

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Introduction to Embedded System Design

Subject Co-ordinator - Prof. Badri N Subudhi, Prof.Dhananjay V. Gadre

Co-ordinating Institute - IIT - Jammu

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Pulse Width Modulation, PWM using Timer Capture
Lecture 31 - Analog to Digital Converter in the MSP430
Lecture 32 - ADC and DAC using R2R Ladder and Random number generation using LFSR
Lecture 33 - Serial Communication Protocols, USCI Module in MSP430
Lecture 34 - MSP430 Timer in Capture Mode
Lecture 35 - Coding Ninja
Lecture 36 - Building an Electronics Project
Lecture 37 - Circuit Prototyping Techniques
Lecture 38 - Single Purpose Computers
Lecture 39 - Single Purpose Computers (Continued...)
Lecture 40 - Recap of Course Coverage and Project Demonstration from Concept to Final

NPTEL Video Course - Electrical Engineering - NOC:Power Quality

Subject Co-ordinator - Prof. Bhim Singh

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Introduction to Electrical Engineering

Subject Co-ordinator - Prof. Bhim Singh

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40
Lecture 41
Lecture 42

NPTEL Video Course - Electrical Engineering - NOC:Transducers for Instrumentation

Subject Co-ordinator - Ankur Gupta

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36

NPTEL Video Course - Electrical Engineering - NOC:Computer-Aided Design of Electrical Machines

Subject Co-ordinator - Prof. Bhim Singh

Co-ordinating Institute - IIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Advanced Control Systems

Subject Co-ordinator - Prof. S. Majhi

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Optimization Techniques for Digital VLSI Design

Subject Co-ordinator - Dr. Santosh Biswas, Prof. Chandan Karfa

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Advanced Topics in Probability and Random Processes

Subject Co-ordinator - Prof. Prabin K Bora

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Microwave Engineering

Subject Co-ordinator - Dr. Ratnajit Bhattacharjee

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Microprocessors and Interfacing

Subject Co-ordinator - Prof. Shaik Rafi Ahamed

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Operational command words of 8259
Lecture 31 - 8237 Architecture, interfacing and Programming
Lecture 32 - Basic Concepts of serial I/O
Lecture 33 - Basic Concepts of serial I/O (Continued...)
Lecture 34 - Architecture of 8251

NPTEL Video Course - Electrical Engineering - NOC:Statistical Signal Processing

Subject Co-ordinator - Prof. Prabin Kumar Bora

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Computer Vision and Image Processing - Fundamentals and App

Subject Co-ordinator - Prof. M. K. Bhuyan

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:System Design through VERILOG

Subject Co-ordinator - Prof. Shaik Rafi Ahamed

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Usability Engineering

Subject Co-ordinator - Prof. Debayan Dhar

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Competitive analysis and preparing for design briefing - II
Lecture 31 - Conceptualization and Prototyping - I (A)
Lecture 32 - Conceptualization and Prototyping - I (B)
Lecture 33 - Conceptualization and Prototyping - I (C)
Lecture 34 - Conceptualization and Prototyping - II (A)
Lecture 35 - Conceptualization and Prototyping - II (B)
Lecture 36 - Usability heuristics and testing - I
Lecture 37 - Usability heuristics and testing - II
Lecture 38 - Usability heuristics and testing - III
Lecture 39 - Usability Testing (A)
Lecture 40 - Usability Testing (B)
Lecture 41 - Usability Testing (C)
Lecture 42 - UI/UX design based on Garret model: a case study
Lecture 43 - Effective contextual enquiry
Lecture 44 - Contextual enquiry: case study

NPTEL Video Course - Electrical Engineering - NOC:Probability and Random Processes

Subject Co-ordinator - Prof. Ribhu, Prof. Rohit Sinha

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Simulation of Communication Systems using Matlab

Subject Co-ordinator - Dr. Ribhu

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Properties of Random Processes
Lecture 31 - Power Spectra
Lecture 32 - Signals and Noise
Lecture 33 - Stochastic Models
Lecture 34 - The AR-1 Process
Lecture 35 - Stochastic Models II
Lecture 36 - Yule Walker Equations
Lecture 37 - Markov Chains - I
Lecture 38 - Markov Chains - II
Lecture 39 - Markov Chains - III
Lecture 40 - Analog to Digital Coversion
Lecture 41 - K Means
Lecture 42 - Correlation
Lecture 43 - Predictive Coding
Lecture 44 - Image Compression
Lecture 45 - Transform Domain Compression
Lecture 46 - Multi Resolution Coding
Lecture 47 - Introduction to Communications
Lecture 48 - Low Pass and BandPass Signals
Lecture 49 - Signal Spaces
Lecture 50 - PAM
Lecture 51 - Detection
Lecture 52 - Effects of AWGN
Lecture 53 - ML Detection - I
Lecture 54 - ML Detection - II
Lecture 55 - The Union Bound
Lecture 56 - Symbol Error Rates
Lecture 57 - Choosing Constellations
Lecture 58 - Orthogonal Signalling
Lecture 59 - Non-Coherent Dection - 1
Lecture 60 - Non-Coherent Dection - 2
Lecture 61 - DPSK - I
Lecture 62 - DPSK - II
Lecture 63 - Introduction to Wireless Communications
Lecture 64 - Conclusion

NPTEL Video Course - Electrical Engineering - NOC:Machine Learning and Deep Learning - Fundamentals and Appli

Subject Co-ordinator - Prof. M.K. Bhuyan

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Gaussian Mixture Model and EM Algorithm
Lecture 31 - K-means clustering.
Lecture 32 - Fuzzy K-means clustering
Lecture 33 - Hierarchical Agglomerative Clustering and Mean-shift Clustering
Lecture 34 - Artificial Neural Networks for Pattern Classification - Part 1
Lecture 35 - Artificial Neural Networks for Pattern Classification - Part 2
Lecture 36 - Artificial Neural Networks for Pattern Classification - Part 3
Lecture 37 - Introduction to Deep Learning and Convolutional Neural Network (CNN)
Lecture 38 - Vanishing and Exploding Gradients in Deep Neural Networks
Lecture 39 - CNN Architectures - LeNet-5 and AlexNet
Lecture 40 - CNN Architectures - VGG 16, GoogLeNet and ResNet
Lecture 41 - Generative Adversarial Networks (GAN) - Fundamentals and Applications
Lecture 42 - U-Net: Convolutional Networks for Image Segmentation
Lecture 43 - Introduction to Autoencoder and Recurrent Neural Networks (RNN)
Lecture 44 - Programming Concepts - 1
Lecture 45 - Programming Concepts - 2
Lecture 46 - Problem Solving Session - 1
Lecture 47 - Problem Solving Session - 2
Lecture 48 - Problem Solving Session - 3

NPTEL Video Course - Electrical Engineering - NOC:Integrated Circuits and Applications

Subject Co-ordinator - Prof. Shaik Rafi Ahamed

Co-ordinating Institute - IIT - Guwahati

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Phase detectors
Lecture 31 - Voltage Controlled oscillator
Lecture 32 - PLL IC 565 operation
Lecture 33 - PLL Applications
Lecture 34 - Fixed Voltage Regulator
Lecture 35 - Adjastable Voltage Regulator
Lecture 36 - Switching Regulators
Lecture 37 - Weighted Resistor D/A Converter
Lecture 38 - R-2R Ladder D/A Converter
Lecture 39 - Inverted R-2R Ladder D/A Converter
Lecture 40 - Analog to Digital Converters
Lecture 41 - CMOS Inverter
Lecture 42 - CMOS NAND Gate
Lecture 43 - Transient Response of CMOS NAND and NOR Gates
Lecture 44 - Boolean function Realization using CMOS and Sizing

NPTEL Video Course - Electrical Engineering - Advanced Electric Drives

Subject Co-ordinator - Dr. S.P. Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38
Lecture 39
Lecture 40

NPTEL Video Course - Electrical Engineering - High Voltage DC Transmission

Subject Co-ordinator - Dr. S.N. Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - High Voltage DC Transmission
Lecture 31 - High Voltage DC Transmission
Lecture 32 - High Voltage DC Transmission
Lecture 33 - High Voltage DC Transmission
Lecture 34 - High Voltage DC Transmission
Lecture 35 - High Voltage DC Transmission
Lecture 36 - High Voltage DC Transmission
Lecture 37 - High Voltage DC Transmission

NPTEL Video Course - Electrical Engineering - Intelligent Systems and Control

Subject Co-ordinator - Prof. Laxmidhar Behera

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Fuzzy Lyapunov controller - Computing with words
Lecture 31 - Controller Design for a T-S Fuzzy model
Lecture 32 - Linear controllers using T-S fuzzy model

NPTEL Video Course - Electrical Engineering - Power Systems Operation and Control

Subject Co-ordinator - Dr. S.N. Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Module 1 - Lecture 1
Module 1 - Lecture 2
Module 1 - Lecture 3
Module 2 - Lecture 1
Module 2 - Lecture 2
Module 2 - Lecture 3
Module 2 - Lecture 4
Module 2 - Lecture 5
Module 2 - Lecture 6
Module 2 - Lecture 7
Module 2 - Lecture 8
Module 2 - Lecture 9
Module 2 - Lecture 10
Module 2 - Lecture 11
Module 2 - Lecture 12
Module 2 - Lecture 13
Module 2 - Lecture 14
Module 3 - Lecture 1
Module 3 - Lecture 2
Module 3 - Lecture 3
Module 3 - Lecture 4
Module 3 - Lecture 5
Module 3 - Lecture 6
Module 3 - Lecture 7
Module 3 - Lecture 8
Module 3 - Lecture 9
Module 3 - Lecture 10
Module 4 - Lecture 1
Module 4 - Lecture 2

Module 4 - Lecture 3
Module 4 - Lecture 4
Module 5 - Lecture 1
Module 5 - Lecture 2
Module 6 - Lecture 1
Module 6 - Lecture 2

NPTEL Video Course - Electrical Engineering - NOC:Electromagnetic theory

Subject Co-ordinator - Dr. Pradeep Kumar K

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Method of images-II
Lecture 31 - Solution of LaplaceÂ s equation-III
Lecture 32 - Solution of LaplaceÂ s equation-IV
Lecture 33 - Introduction of magnetic field
Lecture 34 - Biot savart law and its application
Lecture 35 - Biot savart lawandits application-II
Lecture 36 - Magnetic vector potential
Lecture 37 - Magnetic force, torque and dipole
Lecture 38 - Magnetic force, torque and dipole (Continued...)
Lecture 39 - Magnetic materials-I
Lecture 40 - Magnetic materials-I (Continued...) and Magnetic moment
Lecture 41 - Magnetic materials-I (Continued...) and Boundary condition for Magnetic fields
Lecture 42 - Inductor and calculation of inductance for different shapes
Lecture 43 - Inductor and calculation of inductance for different shapes (Continued...)
Lecture 44 - Faradays law and its application-I
Lecture 45 - Faradays law and its application-II
Lecture 46 - Displacement current
Lecture 47 - MaxwellÂ s equation
Lecture 48 - Wave propagation
Lecture 49 - Solution of Helmholtz equation
Lecture 50 - Uniform plane waves
Lecture 51 - Polarization and Poynting Vector
Lecture 52 - Wave reflections (Normal incidence)
Lecture 53 - Waves in imperfect dielectrics and Good conductors
Lecture 54 - Skin depth/effect
Lecture 55 - Oblique incidence of waves
Lecture 56 - Oblique incidence of waves (Continued...)
Lecture 57 - Transmission line
Lecture 58 - Transmission line model
Lecture 59 - Steady state sinusoidal response of T-line-I
Lecture 60 - Steady state sinusoidal response of T-line-II
Lecture 61 - Steady state sinusoidal response of T-line-IIand Smith chart
Lecture 62 - Application of smith chart-I
Lecture 63 - Application of smith chart-II
Lecture 64 - Impedance matching
Lecture 65 - Transients on Transmission line-I
Lecture 66 - Transients on Transmission line-II
Lecture 67 - Pulse on Transmission line
Lecture 68 - Capacitive termination in Transmission line

Lecture 69 - Waveguide
Lecture 70 - Waveguide Analysis
Lecture 71 - TM modes in Waveguide
Lecture 72 - Rectangular waveguide
Lecture 73 - Rectangular waveguide
Lecture 74 - Waveguide
Lecture 75 - Waveguide losses
Lecture 76 - Dielectric Waveguide
Lecture 77 - Dielectric Waveguide (Continued...)
Lecture 78 - Radiation and Antenna
Lecture 79 - Hertzian Dipole Antenna
Lecture 80 - Hertzian Dipole Antenna (Continued...)
Lecture 81 - Quasi-statistics-I
Lecture 82 - Quasi-statistics-II
Lecture 83 - Long wire Antenna
Lecture 84 - Group velocity and Phase velocity
Lecture 85 - Numerical solution of Laplace's equation

NPTEL Video Course - Electrical Engineering - NOC:Principles of Communication - Part 1

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Indirect Method for Generation of FM Signals - Generation of Narrowband FM Signal
Lecture 31 - Indirect Method for Generation of FM Signals - Generation of Wideband FM Signal through Frequenc
Lecture 32 - Spectrum of Frequency Modulated (FM) Signals
Lecture 33 - Bandwidth of Frequency Modulated (FM) Signals - Carson's Rule
Lecture 34 - Demodulation of Frequency Modulated (FM) Signals, Condition of Envelope Detection
Lecture 35 - Analog to Digital Conversion of Signals and Introduction to Sampling
Lecture 36 - Spectrum of Sampled Signal, Aliasing and Nyquist Sampling Theorem
Lecture 37 - Ideal Impluse Train Sampling, Reconstruction of Original Signal from Samples, Sinc Interpolation
Lecture 38 - Introduction to Pulse Amplitude Modulation (PAM), Sample and Hold, Flat Top Sampling
Lecture 39 - Pulse Amplitude Modulation (PAM), Spectrum of PAM Signal , Reconstruction of Original Signal fro
Lecture 40 - Introduction to Quantization, Uniform Quantizer, Mid- Tread Quantizer
Lecture 41 - Quantization, Mid- Rise Quantizer, PDF and Power of Quantization Noise, Quantization Noise Power
Lecture 42 - Introduction to Lloyd- Max Quantization Algorithm, Optimal Quantizer Design
Lecture 43 - Lloyd- Max Quantization Algorithm, Iterative Computation of Optimal Quantization Levels and Inte
Lecture 44 - Companding for Non- Uniform Quantization, Mu-law Compressor, A- Law Compressor
Lecture 45 - Introduction to Delta Modulation, One-bit Quantizer
Lecture 46 - Signal Reconstruction in Delta Modulation, Schematic Diagrams, Slope Overload Distortion and Gra
Lecture 47 - Differential Pulse Coded Modulation (DPCM), DPCM Signal Reconstruction and Schematic Diagram
Lecture 48 - Frequency Mixing and Translation in Communication Systems, Heterodyne and Super Heterodyne Recei
Lecture 49 - Frequency Translation and Super Heterodyne Receivers, Problem of Image Frequency
Lecture 50 - Frequency Division Multiplexing (FDM), Carrier Spacing in FDM
Lecture 51 - Time Division Multiplexing (TDM), Operation of TDM, Sample Spacing in TDM
Lecture 52 - Bandwidth Requirements for Time Division Multiplexing (TDM), The T1 TDM System

NPTEL Video Course - Electrical Engineering - NOC:An Introduction to Coding Theory

Subject Co-ordinator - Dr. Adrish Banerjee

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Principles of Communication Systems - Part II

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Applied Engineering Electromagnetics

Subject Co-ordinator - Dr. Pradeep Kumar K

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Faradays law
Lecture 31 - Completing Maxwells equations and Boundary conditions
Lecture 32 - Boundary conditions for Electromagnetic fields
Lecture 33 - Electrostatics-I
Lecture 34 - Electrostatics-II
Lecture 35 - Electrostatics-III
Lecture 36 - Electrostatics-IV
Lecture 37 - Magnetostatic fields-I
Lecture 38 - Magnetostatic fields-II
Lecture 39 - Inductance calculations
Lecture 40 - From Maxwells equations to uniform plane waves
Lecture 41 - Plane wave propagation in lossless dielectric media
Lecture 42 - Polarization of plane waves
Lecture 43 - Can an Ideal capacitor exist?
Lecture 44 - Skin effect in conductors
Lecture 45 - Skin effect in round wires
Lecture 46 - Finite difference method
Lecture 47 - Reflection of uniform plane waves
Lecture 48 - Application
Lecture 49 - Oblique incidence of plane waves
Lecture 50 - Total internal reflection
Lecture 51 - Application
Lecture 52 - Application
Lecture 53 - Introduction to waveguides
Lecture 54 - Rectangular waveguides
Lecture 55 - Attenuation and Dispersion in rectangular waveguides
Lecture 56 - Planar optical waveguides
Lecture 57 - Application
Lecture 58 - Application
Lecture 59 - Mach-Zehnder Modulator
Lecture 60 - Wave Propagation in Anisotropic Medium
Lecture 61 - Wave Propagation in Ferrites
Lecture 62 - Magnetic Vector Potential - Part 1
Lecture 63 - Magnetic Vector Potential - Part 2
Lecture 64 - Fields of a Dipole Antenna
Lecture 65 - Antenna Parameters and Long wire Antenna
Lecture 66 - Friis Transmission Formula

NPTEL Video Course - Electrical Engineering - NOC:Principles of Signals and Systems

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Applied Optimization for Wireless, Machine Learning, Big Da

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Conjugate Function and Examples to prove Convexity of various Functions
Lecture 31 - Examples on Operations Preserving Convexity
Lecture 32 - Examples on Test for Convexity, Quasi-Convexity
Lecture 33 - Examples on Convex Functions
Lecture 34 - Practical Application
Lecture 35 - Practical Application
Lecture 36 - Practical Application
Lecture 37 - Practical Application
Lecture 38 - Practical Application
Lecture 39 - Practical Application
Lecture 40 - Practical Application
Lecture 41 - Linear modeling and Approximation Problems
Lecture 42 - Geometric Intuition for Least Squares
Lecture 43 - Practical Application
Lecture 44 - Practical Application
Lecture 45 - Least Norm Signal Estimation
Lecture 46 - Regularization
Lecture 47 - Convex Optimization Problem representation
Lecture 48 - Linear Program Practical Application
Lecture 49 - Stochastic Linear Program,Gaussian Uncertainty
Lecture 50 - Practical Application
Lecture 51 - Practical Application
Lecture 52 - Practical Application
Lecture 53 - Practical Application
Lecture 54 - Practical Application
Lecture 55 - Practical Application
Lecture 56 - Practical Application
Lecture 57 - Practical Application- Orthogonal Matching Pursuit (OMP) algorithm for Compressive Sensing
Lecture 58 - Example Problem
Lecture 59 - Practical Application
Lecture 60 - Practical Application of Machine Learning and Artificial Intelligence
Lecture 61 - Practical Application
Lecture 62 - Practical Application
Lecture 63 - Concept of Duality
Lecture 64 - Relation between optimal value of Primal and Dual Problems, concepts of Duality gap and Strong D
Lecture 65 - Example problem on Strong Duality
Lecture 66 - Karush-Kuhn-Tucker (KKT) conditions
Lecture 67 - Application of KKT condition
Lecture 68 - Optimal MIMO Power allocation (Waterfilling)-II

Lecture 69 - Example problem on Optimal MIMO Power allocation (Waterfilling)
Lecture 70 - Linear objective with box constraints, Linear Programming
Lecture 71 - Example Problems II
Lecture 72 - Examples on Quadratic Optimization
Lecture 73 - Examples on Duality
Lecture 74 - Examples on Duality
Lecture 75 - Semi Definite Program (SDP) and its application
Lecture 76 - Application
Lecture 77 - Introduction to big Data
Lecture 78 - Matrix Completion Problem in Big Data
Lecture 79 - Matrix Completion Problem in Big Data

NPTEL Video Course - Electrical Engineering - NOC:Fiber-Optic Communication Systems and Techniques

Subject Co-ordinator - Dr. Pradeep Kumar K

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Overview of fiber-optic communication systems
Lecture 2 - Review of Maxwellâ s equations
Lecture 3 - Uniform plane waves (UWPs) in free-space
Lecture 4 - Properties of UWPs (propagation constant, polarization, and Poynting vector)
Lecture 5 - Boundary conditions and reflection from a PEC
Lecture 6 - Obliquely incident waves-I (TE and TM waves, Snellâ s laws)
Lecture 7 - Obliquely incident waves-II (Reflection and transmission coefficients, Brewster angle)
Lecture 8 - Total internal reflection
Lecture 9 - Ray theory of dielectric slab waveguides
Lecture 10 - Transverse resonance condition for slab waveguides
Lecture 11 - Introduction to optical fibers
Lecture 12 - Ray theory of light propagation in optical fibers
Lecture 13 - Concept of waveguide modes
Lecture 14 - Systematic procedure to obtain modes of a waveguide
Lecture 15 - Systematic analysis of parallel plate metallic waveguide
Lecture 16 - Systematic analysis of dielectric slab waveguides
Lecture 17 - Further discussion on slab waveguides
Lecture 18 - Modal analysis of step index optical fiber
Lecture 19 - Properties of modes of step-index optical fiber - I
Lecture 20 - Properties of modes of step-index optical fiber - II
Lecture 21 - Linearly polarized modes
Lecture 22 - Attenuation and power loss in fibers
Lecture 23 - Introduction to dispersion in fibers
Lecture 24 - Mathematical modelling of dispersion
Lecture 25 - Pulse propagation equation and its solution
Lecture 26 - Pre-chirped pulses and Inter and Intra-modal dispersion in optical fibers
Lecture 27 - Beam Propagation Method
Lecture 28 - Polarization Effects on Pulse Propagation
Lecture 29 - Modes in Optical Fibres and Pulse Propagation in Optical Fibres

Lecture 30 - Graded Index Fibers
Lecture 31 - Light Sources, Detectors and Amplifiers
Lecture 32 - Basics of Lasers-I (Structure of Lasers, Process of Photon Emission)
Lecture 33 - Basics of Lasers-II (Einstein's Theory of Radiation)
Lecture 34 - Basics of Lasers-III (Population Inversion and Rate Equation for Lasers)
Lecture 35 - Basic Properties of Semiconductor Laser-I (Energy Gap, Intrinsic and Extrinsic Semiconductors)
Lecture 36 - Basic Properties of Semiconductor Laser-II (Fermi Level)
Lecture 37 - Optical Properties of Semiconductors-I (Direct Bandgap and Indirect Bandgap, Density of States)
Lecture 38 - Optical Properties of Semiconductors-II (Gain, Absorption, Recombination rate) Homojunction Lase
Lecture 39 - Double Heterostructure Lasers, Introduction to Quantum Well Lasers
Lecture 40 - Semiconductor Optical Amplifier
Lecture 41 - Erbium-doped fiber amplifier
Lecture 42 - Photodetectors
Lecture 43 - Noise in Photodetectors
Lecture 44 - Introduction to WDM components
Lecture 45 - Couplers, Circulators, FRM and Filters
Lecture 46 - Filter, MUX/DEMUX, Diffraction grating (FBG and Long period grating)
Lecture 47 - Optical Modulators-I (Current modulation)
Lecture 48 - Optical Modulators-II (Electro-optic modulators)
Lecture 49 - Review of Communication Concepts-I (Deterministic and Random Signals, Baseband and Passband Sign
Lecture 50 - Review of Communication Concepts-II (Signal and vectors, Signal energy, Orthonormal basis functi
Lecture 51 - Intensity modulation/ Direct Detection
Lecture 52 - BER discussion for OOK systems
Lecture 53 - Higher order modulation and Coherent Receiver
Lecture 54 - Coherent receiver for BPSK systems and BER calculation
Lecture 55 - Recovering Polarization
Lecture 56 - DSP algorithms for Chromatic dispersion mitigation
Lecture 57 - DSP algorithms for Carrier phase estimation - I
Lecture 58 - DSP algorithms for Carrier phase estimation - II
Lecture 59 - Nonlinear effects in fiber
Lecture 60 - Four wave mixing, Loss measurement, Dispersion measurement
Lecture 61 - Lab Demonstration (Laser diode characteristics, Loss measurement, Optical Intensity Modulation)

NPTEL Video Course - Electrical Engineering - NOC:Electromagnetic Waves in Guided and Wireless Media

Subject Co-ordinator - Dr. Pradeep Kumar K

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Near field and Far-field Antenna and Properties of Antennas
Lecture 31 - Linear antenna - I
Lecture 32 - Linear antenna - II and Properties of Transmitting and Receiving Antenna
Lecture 33 - Friis Transmission Formula
Lecture 34 - Antenna Array
Lecture 35 - Wireless Channel
Lecture 36 - Further discussion on Wireless Channel Modelling
Lecture 37 - Diffraction - I
Lecture 38 - Diffraction - II
Lecture 39 - Distribution of Laser Beam
Lecture 40 - Interference (Double slit experiment, Fabry Perot Interferometer)
Lecture 41 - Summary

NPTEL Video Course - Electrical Engineering - NOC:Basic Electric Circuits

Subject Co-ordinator - Prof. Ankush Sharma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Electric Drives

Subject Co-ordinator - Prof. Shyama Prasad Das

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Static Kramer drive and its closed-loop control, Introduction to synchronous motor
Lecture 31 - Various types of synchronous motors, Equivalent circuit and phasor diagram of cylindrical synchr
Lecture 32 - Phasor diagram of salient pole synchronous motor, Expression of power and torque for a salient p
Lecture 33 - Open-loop V/f control, Torque-speed characteristics, Self controlled synchronous motor drive emp
Lecture 34 - Detailed analysis of commutation of load commutated thyrisor inverter, Derivation of overlap ang
Lecture 35 - Low cost brushless DC motor (BLDCM), Trapezoidal permanent magnet AC motor
Lecture 36 - Trapezoidal permanent magnet AC motor, Derivation of power and torque, Closed-loop control of tr
Lecture 37 - Construction and operating principle of switched reluctance motor
Lecture 38 - Current/ voltage control for switched reluctance motor, operating modes of switched reluctance m
Lecture 39 - Current collector for mainline trains, Nature of traction load, Duty cycle of traction drives
Lecture 40 - Duty cycle of traction drives, Distance between two stops, Calculation of total tractive effort

NPTEL Video Course - Electrical Engineering - NOC:Fuzzy Sets, Logic and Systems and Applications

Subject Co-ordinator - Prof. Nishchal K Verma

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Operations on Crisp and Fuzzy Relations
Lecture 31 - Projection of Fuzzy Relation Set
Lecture 32 - Cylindrical Extension of Fuzzy Set
Lecture 33 - Properties of Fuzzy Relation - I
Lecture 34 - Properties of Fuzzy Relation - II
Lecture 35 - Extension Principle
Lecture 36 - Composition of Fuzzy Relations
Lecture 37 - Properties of Composition of Fuzzy Relations
Lecture 38 - Fuzzy Tolerance and Equivalence Relations - I
Lecture 39 - Fuzzy Tolerance and Equivalence Relations - II
Lecture 40 - Fuzzy Tolerance and Equivalence Relations - III
Lecture 41 - Linguistic Hedges
Lecture 42 - Linguistic Hedges and Negation/ Complement and Connectives
Lecture 43 - Concentration and Dilation and Composite Linguistic Term and Some Examples
Lecture 44 - Dilation and Composite Linguistic Term and Some Examples
Lecture 45 - Some Examples on Composite Linguistic Terms
Lecture 46 - Contrast Intensification of Fuzzy Sets
Lecture 47 - Orthogonality of Fuzzy Sets
Lecture 48 - Fuzzy Rules and Fuzzy Reasoning - I
Lecture 49 - Fuzzy Rules and Fuzzy Reasoning - II
Lecture 50 - Fuzzy Inference System
Lecture 51 - Mamdani Fuzzy Model - I
Lecture 52 - Mamdani Fuzzy Model - II
Lecture 53 - Mamdani Fuzzy Model - III
Lecture 54 - Example on Mamdani Fuzzy Model for Single Antecedent with Three Rules
Lecture 55 - Example on Mamdani Fuzzy Model for Two Antecedents with Four Rules
Lecture 56 - Larsen Fuzzy Model - I
Lecture 57 - Larsen Fuzzy Model - II
Lecture 58 - Larsen Fuzzy Model - III
Lecture 59 - Tsukamoto Fuzzy Model
Lecture 60 - TSK Fuzzy Model

NPTEL Video Course - Electrical Engineering - NOC:Peer to Peer Networks

Subject Co-ordinator - Prof. Yatindra N Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - P2P Anonymous Communication
Lecture 31 - The Anonymous Communication on the Internet through TOR Network
Lecture 32 - An Introduction To TOR Browser
Lecture 33 - Hidden Services on TOR Network
Lecture 34 - MOOC Wrap-Up

NPTEL Video Course - Electrical Engineering - NOC:Applied Linear Algebra for Signal Processing, Data Analytic

Subject Co-ordinator - Prof. Aditya K. Jagannatham

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - SVD Application in MIMO Wireless Technology: Spatial-Multiplexing and High Data Rates
Lecture 31 - SVD for MIMO wireless optimization, water-filling algorithm, optimal power allocation
Lecture 32 - SVD application for Machine Learning: Principal component analysis (PCA)
Lecture 33 - Multiple signal classification (MUSIC) algorithm: system model
Lecture 34 - MUSIC algorithm for Direction of Arrival (DoA) estimation
Lecture 35 - Linear minimum mean square error (LMMSE) principle
Lecture 36 - LMMSE estimate and error covariance matrix
Lecture 37 - LMMSE estimation in linear systems
Lecture 38 - LMMSE application: Wireless channel estimation and example
Lecture 39 - Time-series prediction via auto-regressive (AR) model
Lecture 40 - Recommender system: design and rating prediction
Lecture 41 - Recommender system: Illustration via movie rating prediction example
Lecture 42 - Fast Fourier transform (FFT) and Inverse fast Fourier transform (IFFT)
Lecture 43 - IFFT/ FFT application in Orthogonal Frequency Division Multiplexing (OFDM) wireless technology
Lecture 44 - OFDM system: Circulant matrices and properties
Lecture 45 - OFDM system model: Transmitter and receiver processing
Lecture 46 - Single-carrier frequency division for multiple access (SC-FDMA) technology
Lecture 47 - Linear dynamical systems: definition and solution via matrix exponential
Lecture 48 - Linear dynamical systems: matrix exponential via SVD
Lecture 49 - Machine Learning application: Support Vector Machines (SVM)
Lecture 50 - Support Vector Machines (SVM): Problem formulation via maximum hyperplane separation
Lecture 51 - Sparse regression: problem formulation and relation to Compressive Sensing (CS)
Lecture 52 - Sparse regression: solution via the Orthogonal Matching Pursuit (OMP) algorithm
Lecture 53 - OMP Example for Sparse Regression
Lecture 54 - Machine Learning Application: Clustering
Lecture 55 - K-Means Clustering algorithm
Lecture 56 - Introduction to Stochastic Processes and Markov Chains
Lecture 57 - Discrete Time Markov Chains and Transition Probability Matrix
Lecture 58 - Discrete Time Markov Chain Examples
Lecture 59 - m-STEP Transition Probabilities for Discrete Time Markov Chains
Lecture 60 - Limiting Behavior of Discrete Time Markov Chains
Lecture 61 - Least Squares Revisited: Rank Deficient Matrix
Lecture 62 - Least Squares using SVD
Lecture 63 - Weighted Least Squares
Lecture 64 - Weighted Least Squares Example
Lecture 65 - Woodbury Matrix Identity - Matrix Inversion Lemma
Lecture 66 - Woodbury Matrix Identity - Proof
Lecture 67 - Conditional Gaussian Density - Mean
Lecture 68 - Conditional Gaussian Density - Covariance

Lecture 69 - Scalar Linear Model for Gaussian Estimation
Lecture 70 - MMSE Estimate and Covariance for the Scalar Linear Model

NPTEL Video Course - Electrical Engineering - NOC:Economic Operations and Control of Power Systems

Subject Co-ordinator - Prof. Gururaj Mirle Vishwanath, Prof. Narayana Prasad Padhy

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30
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Lecture 57
Lecture 58
Lecture 59
Lecture 60

NPTEL Video Course - Electrical Engineering - NOC:Digital Switching

Subject Co-ordinator - Prof. Yatindra N Singh

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30
Lecture 31
Lecture 32
Lecture 33
Lecture 34
Lecture 35
Lecture 36
Lecture 37
Lecture 38

NPTEL Video Course - Electrical Engineering - NOC:Analog VLSI Design

Subject Co-ordinator - Prof. Imon Mondal

Co-ordinating Institute - IIT - Kanpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30
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Lecture 64
Lecture 65

NPTEL Video Course - Electrical Engineering - Electrical Machines I

Subject Co-ordinator - Dr. D. Kastha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Characteristics of DC Shunt Motors
Lecture 31 - Starting of DC Shunt Motors
Lecture 32 - Speed Control of DC Shunt Motors
Lecture 33 - Braking of DC Shunt Motors
Lecture 34 - Electronic Control of DC Shunt Motors
Lecture 35 - Testing of DC Shunt Motors
Lecture 36 - Characteristics of DC Series Motors
Lecture 37 - Starting and Braking of DC Series Motors
Lecture 38 - Speed Control and of DC Series Motors
Lecture 39 - Testing of DC Series Motors
Lecture 40 - Characteristics of Compound DC Series Motors

NPTEL Video Course - Electrical Engineering - Optimal Control

Subject Co-ordinator - Prof. G.D. Ray

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Dynamic Optimization Problem
Lecture 31 - Dynamic Optimization Problem
Lecture 32 - Dynamic Optimization Problem
Lecture 33 - Numerical Example and Solution of Optimal Control Problem using Calculus of Variation principle
Lecture 34 - Numerical Example and Solution of Optimal Control Problem using Calculus of Variation principle
Lecture 35 - Hamiltonian Formulation for solution of optimal Control problem and numerical example
Lecture 36 - Hamiltonian Formulation for solution of optimal Control problem and numerical example (Continued
Lecture 37 - Performance Indices and Linear Quadratic Regulator Problem
Lecture 38 - Performance Indices and Linear Quadratic Regulator Problem (Continued.)
Lecture 39 - Solution and Stability Analysis of Finite - time LQR Problem
Lecture 40 - Solution and Infinite - time LQR Problem and Stability Analysis
Lecture 41 - Numerical Example and Methods for Solution of A.R.E.
Lecture 42 - Numerical Example and Methods for Solution of A.R.E. (Continued.)
Lecture 43 - Frequency Domain Interpretation of LQR Controlled System
Lecture 44 - Gain and Phase Margin of LQR Controlled System
Lecture 45 - The Linear Quadratic Gaussian Problem
Lecture 46 - Loop-Transfer Recovery
Lecture 47 - Dynamic Programming for Discrete Time Systems
Lecture 48 - Minimum â Time Control of a Linear Time Invariant System
Lecture 49 - Solution of Minimum â Time Control Problem with an Example
Lecture 50 - Constraint in Control Inputs and State Variables
Lecture 51 - Constraint in Control Inputs and State Variables (Continued...)
Lecture 52 - Norms for Vectors, Matrices, Signals and Linear Systems
Lecture 53 - Signal and System Norms
Lecture 54 - Internal Stability, Sensitivity and Complementary Sensitivity Functions
Lecture 55 - Internal Stability, Sensitivity and Complementary Sensitivity Functions (Continued...)
Lecture 56 - Plant Uncertainty and Standard form for Robust Stability Analysis
Lecture 57 - Plant Uncertainty and Standard form for Robust Stability Analysis (Continued...)
Lecture 58 - Frequency Response of Linear System and Singular Value Decomposition of System
Lecture 59 - Control Problem Statement in H- alpha Framework
Lecture 60 - Control Problem Statement in H - alpha Framework (Continued...)

NPTEL Video Course - Electrical Engineering - Chaos, Fractals and Dynamic Systems

Subject Co-ordinator - Prof. S. Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Digital Signal Processing

Subject Co-ordinator - Prof. T.K. Basu

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Dynamics of Physical Systems

Subject Co-ordinator - Prof. S. Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Dynamics of Nonlinear Systems - I
Lecture 31 - Dynamics of Nonlinear Systems - II
Lecture 32 - Dynamics of Nonlinear Systems - III
Lecture 33 - Discrete-Time Dynamical Systems - I
Lecture 34 - Discrete-Time Dynamical Systems - II

NPTEL Video Course - Electrical Engineering - Energy Resources and Technology

Subject Co-ordinator - Prof. S. Banerjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Tidal Energy
Lecture 31 - Tidal Energy
Lecture 32 - Tidal Energy
Lecture 33 - Ocean Thermal Energy Conversion
Lecture 34 - Solar Pond and Wave Power
Lecture 35 - Geothermal Energy
Lecture 36 - Solar Distillation and Biomass Energy
Lecture 37 - Energy Storage
Lecture 38 - Magneto hydrodynamic Power Generation
Lecture 39 - Magneto hydrodynamic Power Generation
Lecture 40 - Hydrogen Economy

NPTEL Video Course - Electrical Engineering - Estimation of Signals and Systems

Subject Co-ordinator - Prof. S. Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Conclusion

NPTEL Video Course - Electrical Engineering - Illumination Engineering

Subject Co-ordinator - Prof. N.K. Kishore

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Industrial Automation and Control

Subject Co-ordinator - Prof. S. Sen, Prof. S. Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Pneumatic Systems - II
Lecture 31 - Energy Savings with Variable Speed Drives
Lecture 32 - DC Motor Drives
Lecture 33 - DC and BLDC Servo Drives
Lecture 34 - Induction Motor Drives
Lecture 35 - Step Motor Drives BLDC Drives
Lecture 36 - Embedded Systems
Lecture 37 - The Fieldbus Network - I
Lecture 38 - The Fieldbus Network - II
Lecture 39 - Higher Level Automation Systems
Lecture 40 - Course Review and Conclusion

NPTEL Video Course - Electrical Engineering - Industrial Instrumentation

Subject Co-ordinator - Prof. Alok Barua

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Networks Signals and Systems

Subject Co-ordinator - Prof. T.K. Basu

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Power System Analysis

Subject Co-ordinator - Prof. A.K. Sinha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Industrial Automation and Control

Subject Co-ordinator - Prof. S. Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Medical Image Analysis

Subject Co-ordinator - Prof. Debdoot Sheet

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Biomedical Signal Processing

Subject Co-ordinator - Prof. Sudipta Mukhopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Motivation
Lecture 2 - Preliminaries
Lecture 3 - Biomedical Signal Origin and Dynamics
Lecture 4 - Biomedical Signal Origin and Dynamics (Continued...)
Lecture 5 - Biomedical Signal Origin and Dynamics (Continued...)
Lecture 6 - Biomedical Signal Origin and Dynamics (Continued...)
Lecture 7 - Artifact Removal
Lecture 8 - Artifact Removal (Continued...)
Lecture 9 - Artifact Removal (Continued...)
Lecture 10 - Artifact Removal (Continued...)
Lecture 11 - Artifact Removal (Continued...)
Lecture 12 - Artifact Removal (Continued...)
Lecture 13 - Artifact Removal (Continued...)
Lecture 14 - Artifact Removal (Continued...)
Lecture 15 - Artifact Removal (Continued...)
Lecture 16 - Artifact Removal (Continued...)
Lecture 17 - Artifact Removal (Continued...)
Lecture 18 - Event Detection
Lecture 19 - Event Detection (Continued...)
Lecture 20 - Event Detection (Continued...)
Lecture 21 - Event Detection (Continued...)
Lecture 22 - Event Detection (Continued...)
Lecture 23 - Event Detection (Continued...)
Lecture 24 - Event Detection (Continued...)
Lecture 25 - Homomorphic Processing
Lecture 26 - Homomorphic Processing (Continued...)
Lecture 27 - Waveform Analysis
Lecture 28 - Waveform Analysis (Continued...)
Lecture 29 - Waveform Analysis

Lecture 30 - Waveform Analysis (Continued...)
Lecture 31 - Waveform Analysis (Continued...)
Lecture 32 - Waveform Analysis (Continued...)
Lecture 33 - Waveform Analysis (Continued...)
Lecture 34 - Frequency Domain Characterisation
Lecture 35 - Frequency Domain Characterisation (Continued...)
Lecture 36 - Frequency Domain Characterisation (Continued...)
Lecture 37 - Frequency Domain Characterisation (Continued...)
Lecture 38 - Frequency Domain Characterisation (Continued...)
Lecture 39 - Frequency Domain Characterisation (Continued...)
Lecture 40 - Modelling of Biomedical Systems
Lecture 41 - Modelling of Biomedical Systems (Continued...)
Lecture 42 - Modelling of Biomedical Systems (Continued...)
Lecture 43 - Modelling of Biomedical Systems (Continued...)
Lecture 44 - Modelling of Biomedical Systems (Continued...)
Lecture 45 - Modelling of Biomedical Systems (Continued...)
Lecture 46 - Modelling of Biomedical Systems (Continued...)
Lecture 47 - Tutorial - I
Lecture 48 - Tutorial - I (Continued...)
Lecture 49 - Tutorial - I (Continued...)
Lecture 50 - Tutorial - II
Lecture 51 - Tutorial - II (Continued...)
Lecture 52 - Tutorial - II (Continued...)
Lecture 53 - Tutorial - III
Lecture 54 - Tutorial - III (Continued...)
Lecture 55 - Tutorial - III (Continued...)
Lecture 56 - Tutorial - III (Continued...)
Lecture 57 - Tutorial - IV
Lecture 58 - Tutorial - IV (Continued...)
Lecture 59 - Tutorial - IV (Continued...)
Lecture 60 - Tutorial - IV (Continued...)
Lecture 61 - Tutorial - IV (Continued...)
Lecture 62 - Tutorial - IV (Continued...)
Lecture 63 - Tutorial - V
Lecture 64 - Tutorial - V (Continued...)
Lecture 65 - Tutorial - V (Continued...)
Lecture 66 - Tutorial - V (Continued...)
Lecture 67 - Tutorial - V (Continued...)
Lecture 68 - Live Session

NPTEL Video Course - Electrical Engineering - NOC:Microprocessors and Microcontrollers

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - 8051 Microcontroller (Continued...)
Lecture 31 - 8051 Microcontroller (Continued...)
Lecture 32 - 8051 Microcontroller (Continued...)
Lecture 33 - 8051 Microcontroller (Continued...)
Lecture 34 - 8051 Microcontroller (Continued...)
Lecture 35 - 8051 Microcontroller (Continued...)
Lecture 36 - 8051 Programming Examples
Lecture 37 - 8051 Programming Examples (Continued...)
Lecture 38 - 8051 Programming Examples (Continued...)
Lecture 39 - 8051 Programming Examples (Continued...)
Lecture 40 - 8051 Programming Examples (Continued...)
Lecture 41 - ARM
Lecture 42 - ARM (Continued...)
Lecture 43 - ARM (Continued...)
Lecture 44 - ARM (Continued...)
Lecture 45 - ARM (Continued...)
Lecture 46 - ARM (Continued...)
Lecture 47 - ARM (Continued...)
Lecture 48 - ARM (Continued...)
Lecture 49 - PIC
Lecture 50 - PIC, AVR
Lecture 51 - AVR (Continued...)
Lecture 52 - AVR (Continued...)
Lecture 53 - Interfacing
Lecture 54 - Interfacing (Continued...)
Lecture 55 - Interfacing (Continued...)
Lecture 56 - Interfacing (Continued...)
Lecture 57 - Interfacing (Continued...)
Lecture 58 - Interfacing (Continued...)
Lecture 59 - 8086
Lecture 60 - 8086 (Continued...)
Lecture 61 - 8086 (Continued...)
Lecture 62 - 8086 (Continued...)
Lecture 63 - 8086 (Continued...)
Lecture 64 - 8087

NPTEL Video Course - Electrical Engineering - NOC:Deep Learning For Visual Computing

Subject Co-ordinator - Prof. Debdoot Sheet

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Modifying a LeNet for CIFAR
Lecture 31 - Convolutional Autoencoder and Deep CNN
Lecture 32 - Convolutional Autoencoder for Representation Learning
Lecture 33 - AlexNet
Lecture 34 - VGGNet
Lecture 35 - Revisiting AlexNet and VGGNet for Computational Complexity
Lecture 36 - GoogLeNet - Going very deep with convolutions
Lecture 37 - GoogLeNet
Lecture 38 - ResNet - Residual Connections within Very Deep Networks and DenseNet - Densely connected network
Lecture 39 - ResNet
Lecture 40 - DenseNet
Lecture 41 - Space and Computational Complexity in DNN
Lecture 42 - Assessing the space and computational complexity of very deep CNNs
Lecture 43 - Domain Adaptation and Transfer Learning in Deep Neural Networks
Lecture 44 - Transfer Learning a GoogLeNet
Lecture 45 - Transfer Learning a ResNet
Lecture 46 - Activation pooling for object localization
Lecture 47 - Region Proposal Networks (rCNN and Faster rCNN)
Lecture 48 - GAP + rCNN
Lecture 49 - Semantic Segmentation with CNN
Lecture 50 - UNet and SegNet for Semantic Segmentation
Lecture 51 - Autoencoders and Latent Spaces
Lecture 52 - Principle of Generative Modeling
Lecture 53 - Adversarial Autoencoders
Lecture 54 - Adversarial Autoencoder for Synthetic Sample Generation
Lecture 55 - Adversarial Autoencoder for Classification
Lecture 56 - Understanding Video Analysis
Lecture 57 - Recurrent Neural Networks and Long Short-Term Memory
Lecture 58 - Spatio-Temporal Deep Learning for Video Analysis
Lecture 59 - Activity recognition using 3D-CNN
Lecture 60 - Activity recognition using CNN-LSTM

NPTEL Video Course - Electrical Engineering - NOC:Power System Engineering

Subject Co-ordinator - Prof. Debapriya Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Load flow of radial distribution networks (Continued...)
Lecture 31 - Load flow of radial distribution networks (Continued...)
Lecture 32 - Load flow of radial distribution networks (Continued...)
Lecture 33 - Load flow of radial distribution networks (Continued...)
Lecture 34 - Load flow of radial distribution networks (Continued...)
Lecture 35 - Load flow of radial distribution networks (Continued...)
Lecture 36 - Load flow of radial distribution networks (Continued...)
Lecture 37 - Load flow of radial distribution networks (Continued...), Voltage stability of distribution netw
Lecture 38 - Voltage stability of distribution network, Approximate method
Lecture 39 - Application of capacitors in distribution system
Lecture 40 - Application of capacitors in distribution system (Continued...)
Lecture 41 - Application of capacitors in distribution system (Continued...)
Lecture 42 - Application of capacitors in distribution system (Continued...)
Lecture 43 - Application of capacitors in distribution system (Continued...)
Lecture 44 - Application of capacitors in distribution system (Continued...), Load frequency control
Lecture 45 - Load frequency control (Continued...)
Lecture 46 - Load frequency control (Continued...)
Lecture 47 - Load frequency control (Continued...)
Lecture 48 - Load frequency control (Continued...)
Lecture 49 - Load frequency control (Continued...)
Lecture 50 - Load frequency control (Continued...)
Lecture 51 - Load frequency control (Continued...)
Lecture 52 - Load frequency control (Continued...)
Lecture 53 - Load frequency control (Continued...)
Lecture 54 - Load frequency control (Continued...)
Lecture 55 - Load frequency control (Continued...)
Lecture 56 - Load frequency control (Continued...)
Lecture 57 - Automatic generation control
Lecture 58 - Automatic generation control (Continued...)
Lecture 59 - Automatic generation control (Continued...), Unit commitment
Lecture 60 - Unit commitment (Continued...)
Lecture 61 - Live Session

NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Electrical Engineering

Subject Co-ordinator - Prof. Debapriya Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - First Order Circuits (Continued...)
Lecture 31 - First Order Circuits (Continued...)
Lecture 32 - First Order Circuits (Continued...)
Lecture 33 - First Order Circuits (Continued...)
Lecture 34 - First Order Circuits (Continued...)
Lecture 35 - First Order Circuits (Continued...)
Lecture 36 - First Order Circuits (Continued...)
Lecture 37 - Single phase AC circuits
Lecture 38 - Single phase AC circuits (Continued...)
Lecture 39 - Single phase AC circuits (Continued...)
Lecture 40 - Single phase AC circuits (Continued...)
Lecture 41 - Single phase AC circuits (Continued...)
Lecture 42 - Single phase AC circuits (Continued...)
Lecture 43 - Single phase AC circuits (Continued...)
Lecture 44 - Resonance and Maximum Power Transfer Theorem
Lecture 45 - Resonance and Maximum Power Transfer Theorem (Continued...)
Lecture 46 - Resonance and Maximum Power Transfer Theorem (Continued...)
Lecture 47 - Three phase circuits
Lecture 48 - Three phase circuits (Continued...)
Lecture 49 - Three phase circuits (Continued...)
Lecture 50 - Three phase circuits (Continued...)
Lecture 51 - Magnetic Circuits
Lecture 52 - Magnetic Circuits (Continued...)
Lecture 53 - Magnetic Circuits (Continued...)
Lecture 54 - Single Phase Transformer
Lecture 55 - Single Phase Transformer (Continued...)
Lecture 56 - Single Phase Transformer (Continued...)
Lecture 57 - Single Phase Transformer (Continued...)
Lecture 58 - Three phase Induction Motors
Lecture 59 - Three phase Induction Motors (Continued...)
Lecture 60 - Three phase Induction Motors (Continued...)
Lecture 61 - Three phase Induction Motors (Continued...)
Lecture 62 - DC Motors
Lecture 63 - DC Motors (Continued...)
Lecture 64 - DC Motors (Continued...)

NPTEL Video Course - Electrical Engineering - NOC:Digital Circuits

Subject Co-ordinator - Prof. Santanu Chattopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Sequential Circuits (Continued...)
Lecture 31 - Sequential Circuits (Continued...)
Lecture 32 - Sequential Circuits (Continued...)
Lecture 33 - Sequential Circuits (Continued...)
Lecture 34 - Sequential Circuits (Continued...)
Lecture 35 - Finite State Machine
Lecture 36 - Finite State Machine (Continued...)
Lecture 37 - Data Converters
Lecture 38 - Data Converters (Continued...)
Lecture 39 - Data Converters (Continued...)
Lecture 40 - Data Converters (Continued...)
Lecture 41 - Memory
Lecture 42 - Memory (Continued...)
Lecture 43 - Memory (Continued...)
Lecture 44 - FPGA
Lecture 45 - FPGA (Continued...)
Lecture 46 - VHDL
Lecture 47 - VHDL(Continued...)
Lecture 48 - 8085 Microprocessor
Lecture 49 - 8085 Microprocessor (Continued...)
Lecture 50 - 8085 Microprocessor (Continued...)
Lecture 51 - 8085 Microprocessor (Continued...)
Lecture 52 - 8085 Microprocessor (Continued...)
Lecture 53 - 8085 Microprocessor (Continued...)
Lecture 54 - 8085 Microprocessor (Continued...)
Lecture 55 - 8085 Microprocessor (Continued...)
Lecture 56 - 8085 Microprocessor (Continued...)
Lecture 57 - 8085 Microprocessor (Continued...)
Lecture 58 - 8085 Microprocessor (Continued...)
Lecture 59 - 8085 Microprocessor (Continued...)
Lecture 60 - 8085 Microprocessor (Continued...)
Lecture 61 - 8085 Microprocessor (Continued...)
Lecture 62 - 8085 Microprocessor (Continued...)
Lecture 63 - 8086 Microprocessor
Lecture 64 - 8086 Microprocessor (Continued...)
Lecture 65 - 8086 Microprocessor (Continued...)

NPTEL Video Course - Electrical Engineering - NOC:Analysis and Design Principles of Microwave Antennas

Subject Co-ordinator - Dr. Amitabha Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Architectural Design of Digital Integrated Circuits

Subject Co-ordinator - Prof. Indranil Hatai

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Multiplier Architecture
Lecture 31 - Multiplier Architecture
Lecture 32 - Multiplier Architecture
Lecture 33 - Multiplier Architecture
Lecture 34 - Multiplier Architecture
Lecture 35 - Squaring Circuit Design
Lecture 36 - Reconfigurable Constant Multiplier Design
Lecture 37 - Reconfigurable Constant Multiplier Design
Lecture 38 - Reconfigurable Constant Multiplier Design
Lecture 39 - Fixed Point Number Representation
Lecture 40 - Fixed Point Number Representation
Lecture 41 - CORDIC Architecture
Lecture 42 - CORDIC Architecture
Lecture 43 - CORDIC Architecture
Lecture 44 - CORDIC Architecture
Lecture 45 - Timing Analysis
Lecture 46 - Timing Analysis
Lecture 47 - Timing Analysis
Lecture 48 - Logic Hazard
Lecture 49 - FFT Architecture
Lecture 50 - FFT Architecture (Continued...)
Lecture 51 - Timing analysis Basics
Lecture 52 - Timing analysis Basics (Continued...)
Lecture 53 - Timing analysis Basics (Continued...)
Lecture 54 - Timing Issuesin Digital IC Design
Lecture 55 - Timing Issuesin Digital IC Design (Continued...)
Lecture 56 - Timing Issuesin Digital IC Design (Continued...)
Lecture 57 - Timing Issuesin Digital IC Design (Continued...)
Lecture 58 - Architectural Design of Digital Integrated Circuits
Lecture 59 - Design Tips for Basic Circuits Design (Continued...)
Lecture 60 - Design Tips for Basic Circuits Design (Continued...)
Lecture 61 - Design Tips for Basic Circuits Design (Continued...)
Lecture 62 - Low Power Digital Design
Lecture 63 - Low Power Digital Design (Continued...)
Lecture 64 - Low Power Digital Design
Lecture 65 - Low Power Digital Design (Continued...)
Lecture 66 - Hardware for Machine Learning
Lecture 67 - Hardware for Machine Learning

NPTEL Video Course - Electrical Engineering - NOC:Electrical Machines-II

Subject Co-ordinator - Prof.Tapas Kumar Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Digital Electronic Circuits

Subject Co-ordinator - Prof. Goutam Saha

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Power System Dynamics, Control and Monitoring

Subject Co-ordinator - Prof. Debapriya Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Evolution of Air Interface towards 5G

Subject Co-ordinator - Prof. Suvra Sekhar Das

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Electrical Measurement and Electronic Instruments

Subject Co-ordinator - Prof. Avishek Chatterjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Single Phase Energy Meter (Continued...)
Lecture 31 - Connection of Energy Meter, Wattmeter, and Three Phase Supply
Lecture 32 - DC Potentiometer
Lecture 33 - AC Potentiometer
Lecture 34 - Polar potentiometer and phase shifter
Lecture 35 - Polar potentiometer
Lecture 36 - Co-ordinate potentiometer
Lecture 37 - Kelvin-Varley potential divider
Lecture 38 - Impedance measurement
Lecture 39 - AC bridges - I
Lecture 40 - AC bridges - II
Lecture 41 - AC bridges - III
Lecture 42 - Current transformer and potential transformer
Lecture 43 - Review of transformer and magnetic circuit
Lecture 44 - Errrors in Instrument ransformer
Lecture 45 - Flux density measurement with Ballistic Galvanometer
Lecture 46 - Flux density measurement with Ballistic Galvanometer (Continued...)
Lecture 47 - Background
Lecture 48 - Background
Lecture 49 - Background
Lecture 50 - Background
Lecture 51 - Background
Lecture 52 - Background
Lecture 53 - Inverting amplifier versus Schmitt Trigger
Lecture 54 - Non-inverting amplifier versus Schmitt Trigger
Lecture 55 - Difference amplifier - I
Lecture 56 - Difference amplifier - II
Lecture 57 - Difference amplifier - III
Lecture 58 - Digital frequency meter
Lecture 59 - Digital frequency meter and Schmitt Trigger
Lecture 60 - Schmitt Trigger
Lecture 61 - Schmitt Trigger
Lecture 62 - Digital frequency meter
Lecture 63 - Linear ramp type digital voltmeter
Lecture 64 - Dual slope digital voltmeter - I
Lecture 65 - Dual slope digital voltmeter - II
Lecture 66 - Dual slope digital voltmeter and Integrator circuit
Lecture 67 - Digital ramp type voltmeter
Lecture 68 - Digital ramp type voltmeter and Successive approximation type voltmeter

NPTEL Video Course - Electrical Engineering - NOC:Principles and Techniques of Modern Radar Systems

Subject Co-ordinator - Dr. Amitabha Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Electrical Machines-I

Subject Co-ordinator - Prof.Tapas Kumar Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 69 - Ill Effects of Armature Reaction
Lecture 70 - Compensating and Interpoles
Lecture 71 - Armature Reaction (Continued...)
Lecture 72 - Field Flux Density, Armature Flux Density and Resultant Field Distribution
Lecture 73 - Field Patterns for Both Motor and Generators
Lecture 74 - Demagnetising and Cross Magnetising mmf for Brush Shifted Machine
Lecture 75 - Calculation of Compensating, Interpole and Series Field Turns
Lecture 76 - Estimating Armature and Field Resistance from its Rating
Lecture 77 - Power Flow Diagram, Rotational Loss
Lecture 78 - Shunt Motor
Lecture 79 - Starting of D.C Motor - 3-Point Starter
Lecture 80 - Speed Control of Shunt Motor - I
Lecture 81 - Speed Control of Shunt Motor - II
Lecture 82 - Speed Control of Shunt Motor - III
Lecture 83 - Field Control (Continued...)
Lecture 84 - D.C Motor Braking
Lecture 85 - Introduction to Series Motor
Lecture 86 - Series Motor Characteristics
Lecture 87 - Series Motor Speed Control
Lecture 88 - Universal Motor
Lecture 89 - Swinburne Test
Lecture 90 - Hopkinson Test
Lecture 91 - Efficiency Calculation
Lecture 92 - Field Test on D.C Series Motor
Lecture 93 - Simplex Wave winding
Lecture 94 - Wave Winding (Continued...)

NPTEL Video Course - Electrical Engineering - NOC:VLSI Signal Processing

Subject Co-ordinator - Prof. Mrityunjay Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Hardware Efficient 2 - Parallel FIR Filters
Lecture 31 - Hardware Efficient 3 - Parallel FIR Filters
Lecture 32 - Introduction to First Level Architectures
Lecture 33 - 2's Complement Number Systems
Lecture 34 - Multiplication of Two Binary Numbers
Lecture 35 - Carry Ripple and Carry Save Array
Lecture 36 - Bit Serial Multipliers
Lecture 37 - Bit Serial Digital Filters
Lecture 38 - Baugh Wooley Multiplier
Lecture 39 - Distributed Arithmetic

NPTEL Video Course - Electrical Engineering - NOC:Analog Electronic Circuits

Subject Co-ordinator - Prof. Pradip Mandal

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Common Emitter Amplifier (Continued...) - Design guidelines - Part A
Lecture 31 - Common Emitter Amplifier (Continued...) - Design guidelines - Part B
Lecture 32 - Common Source Amplifier - Part A
Lecture 33 - Common Source Amplifier - Part B
Lecture 34 - Common Source Amplifier (Continued...) Numerical examples and design guidelines - Part B
Lecture 35 - Frequency Response of CE and CS Amplifiers - Part A
Lecture 36 - Frequency Response of CE and CS Amplifiers - Part B
Lecture 37 - Frequency Response of CE and CS Amplifiers - Part C
Lecture 38 - Frequency Response of CE and CS Amplifiers (Continued...) - Part A
Lecture 39 - Frequency Response of CE And CS Amplifiers (Continued...) - Part B
Lecture 40 - Frequency Response of CE/CS Amplifiers Considering High Frequency Models of BJT and MOSFET - Par
Lecture 41 - Frequency Response of CE/CS Amplifiers Considering High Frequency Models of BJT and MOSFET - Par
Lecture 42 - Frequency Response of CE/CS Amplifiers Considering High Frequency Models of BJT And MOSFET - Par
Lecture 43 - Limitation of CE and CS Amplifiers in Cascading
Lecture 44 - Common Collector and Common Drain Amplifiers
Lecture 45 - Common Collector and Common Drain Amplifiers (Continued...)
Lecture 46 - Common Collector and Common Drain Amplifiers (Continued...)
Lecture 47 - Common Collector and Common Drain Amplifiers (Continued...)
Lecture 48 - Common Collector and Common Drain Amplifiers (Continued...)
Lecture 49 - Common Base and Common Gate Amplifiers
Lecture 50 - Common Base and Common Gate Amplifiers
Lecture 51 - Common Base and Common Gate Amplifiers (Continued...)
Lecture 52 - Common Base and Common Gate Amplifiers (Continued...)
Lecture 53 - Common Base and Common Gate Amplifiers (Continued...)
Lecture 54 - Common Base and Common Gate Amplifiers (Continued...)
Lecture 55 - Multi-Transistor Amplifiers
Lecture 56 - Multi-Transistor Amplifiers
Lecture 57 - Multi-Transistor Amplifiers
Lecture 58 - Multi-Transistor Amplifiers (Continued...)
Lecture 59 - Multi-Transistor Amplifiers (Continued...)
Lecture 60 - Multi-Transistor Amplifiers (Continued...)
Lecture 61 - Multi-Transistor Amplifiers
Lecture 62 - Multi-Transistor Amplifiers
Lecture 63 - Multi-Transistor Amplifiers
Lecture 64 - Multi-Transistor Amplifiers
Lecture 65 - Multi-Transistor Amplifiers
Lecture 66 - Multi-Transistor Amplifiers
Lecture 67 - Multi-Transistor Amplifiers
Lecture 68 - Multi-Transistor Amplifiers

NPTEL Video Course - Electrical Engineering - NOC:Network Analysis

Subject Co-ordinator - Prof. T.K. Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Concept of Active and Reactive Power in A.C Circuit - II
Lecture 31 - Expression for Complex Power in A.C Circuit
Lecture 32 - Numerical Example
Lecture 33 - Mesh and Nodal Analysis in A.C Circuit, Introduction to Impulse Function
Lecture 34 - Odd and Even Functions, Relation between Unit Step and Impulse Function
Lecture 35 - Solution of Differential Equation with Impulse Excitation
Lecture 36 - Numerical Example when Excitation is Impulse
Lecture 37 - Self and Mutual Inductances - I
Lecture 38 - Dot Convention in Mutually Coupled Coils
Lecture 39 - Mutually Coupled Coils in Series and Parallel
Lecture 40 - Energy Stored in Mutually Coupled Coils
Lecture 41 - Steady State Response with Sinusoidal Excitation when the Coils are Mutually Coupled
Lecture 42 - Basics of Signals in Brief
Lecture 43 - Laplace Transform - I
Lecture 44 - Laplace Transform - II
Lecture 45 - Laplace Transform Applied to Circuit Analysis - I
Lecture 46 - Laplace Transform Applied to Circuit Analysis - II
Lecture 47 - Numerical Examples - I
Lecture 48 - Numerical Examples - II
Lecture 49 - General Second Order Circuit Analysis with L.T - I
Lecture 50 - General Second Order Circuit Analysis with L.T - II
Lecture 51 - Network Theorem - I
Lecture 52 - Network Theorem - II
Lecture 53 - Norton's Theorem
Lecture 54 - Thevenin Theorem
Lecture 55 - Star-Delta and Delta-Star Transformation
Lecture 56 - Telligen's Theorem
Lecture 57 - Reciprocity Theorem
Lecture 58 - Maximum Power Transfer Theorem
Lecture 59 - Graph Theory Applied to Network Analysis - I
Lecture 60 - Graph Theory Applied to Network Analysis - II
Lecture 61 - Graph Theory Applied to Network Analysis - III
Lecture 62 - Graph Theory Applied to Network Analysis - IV
Lecture 63 - Graph Theory Applied to Network Analysis - V
Lecture 64 - Mesh Analysis with Graph Theory
Lecture 65 - Nodal Analysis with Graph Theory
Lecture 66 - Cut-Set Analysis with Graph Theory
Lecture 67 - Numerical Examples of Network Analysis with Graph Theory
Lecture 68 - Circuit Analysis with Dependent Sources - I

Lecture 69 - Circuit Analysis with Dependent Sources - II
Lecture 70 - Circuit Analysis with Dependent Sources - III
Lecture 71 - Two Port Network - I
Lecture 72 - Two Port Network - II
Lecture 73 - Two Port Network - III
Lecture 74 - Two Port Network - IV
Lecture 75 - Two Port Network - V
Lecture 76 - Two Port Network - VI
Lecture 77 - Two Port Network - VII
Lecture 78 - Gyrator
Lecture 79 - Ideal Op - Amp
Lecture 80 - Examples of Ideal Op-Amp Circuits - I
Lecture 81 - Examples of Ideal Op-Amp Circuits - II
Lecture 82 - General Impedance Transfer Circuit and Concluding Remarks

NPTEL Video Course - Electrical Engineering - NOC:Power System Protection

Subject Co-ordinator - Prof. Ashok Kumar Pradhan

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Signal Processing for mm Wave communication for 5G and beyo

Subject Co-ordinator - Prof. Amit Kumar Dutta

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - mmwave channel model (Continued...)
Lecture 31 - mmWave channel model (Continued...) -Tx side multiple antenna
Lecture 32 - Basics of Beamforming
Lecture 33 - Single Antenna beamforming
Lecture 34 - Concept of antenna many fold vector
Lecture 35 - 3D Concept of antenna many fold vector
Lecture 36 - Different Geometry of antennafrom electrical point of view
Lecture 37 - Basics of Beamforming pattern - Part I
Lecture 38 - Basics of Beamforming pattern - Part II
Lecture 39 - SISO Beamforming
Lecture 40 - MIMO Beamforming
Lecture 41 - Structural implementation of MIMO Beamforming
Lecture 42 - Different Level of Beamforming
Lecture 43 - MIMO Beamforming in Transmitter side
Lecture 44 - MIMO Beamforming in Receiver side - Part I
Lecture 45 - MIMO Beamforming in Receiver side - Part II
Lecture 46 - Mathematical description of MIMO Beamforming (Continued...)
Lecture 47 - Equalizer based detector
Lecture 48 - Parameter to be designed in MIMO Beamforming
Lecture 49 - OFDM Data Model
Lecture 50 - OFDM Data model (Continued...)
Lecture 51 - General OFDM
Lecture 52 - OFDM spectrum and CFO
Lecture 53 - MIMO OFDM structure
Lecture 54 - MIMO OFDM decode and beamforming
Lecture 55 - Design parameter estimation - Part 1
Lecture 56 - Design parameter estimation - Part 2
Lecture 57 - Design parameter estimation - Part 3
Lecture 58 - Design parameter estimation - Part 4
Lecture 59 - Design parameter estimation - Part 5
Lecture 60 - MU System
Lecture 61 - CFO and other impairment and their effects
Lecture 62 - Multi User Hybrid beam and impairment and analysis - Part 3
Lecture 63 - Multi User Hybrid beam and Impairment and analysis - Part 4
Lecture 64 - Multi User Hybrid beam and Impairment and analysis - Part 5

NPTEL Video Course - Electrical Engineering - NOC:Control and Tuning Methods in Switched Mode Power Converter

Subject Co-ordinator - Prof. Santanu Kapat

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Advanced Microwave Guided-Structures and Analysis

Subject Co-ordinator - Prof. Bratin Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 69 - Application to the Coupling Problem : Aperture-Coupled, Probe-Coupled and Waveguide (Continued..

NPTEL Video Course - Electrical Engineering - NOC:Cognition and its Computation

Subject Co-ordinator - Prof. Rajlakshmi Guha, Prof. Sharba Bandyopadhyay

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Constancy and Illusions
Lecture 31 - Neurobiology of attention, Working Memory
Lecture 32 - Cholinergic System, Bottom up and Top down
Lecture 33 - Object Recognition
Lecture 34 - Visual Search and Pattern Recognition
Lecture 35 - Auditory Scene Analysis, McGurk Effect
Lecture 36 - Learning Processes
Lecture 37 - Learning Processes (Continued...)
Lecture 38 - Memory
Lecture 39 - Learning Disorders
Lecture 40 - Memory Failure - Forgetting
Lecture 41 - Learning in biological neural networks
Lecture 42 - Examples
Lecture 43 - Different types of Plasticity
Lecture 44 - Developmental Plasticity/Learning/Critical Period
Lecture 45 - Examples of Disorders in Plasticity
Lecture 46 - Introduction to speech and language (Development)
Lecture 47 - Components of Speech, Speech Production
Lecture 48 - Speech Perception
Lecture 49 - Lessons from Animal Communication
Lecture 50 - Language and Thought - Speech Language Disorders
Lecture 51 - Theories of Emotion
Lecture 52 - Neurophysiology of emotions - Limbic System
Lecture 53 - Problem Solving
Lecture 54 - Decision Making
Lecture 55 - Frontal cortex in decision making
Lecture 56 - Topics in current research - I
Lecture 57 - Topics in current research - II
Lecture 58 - Topics in current research - III
Lecture 59 - Topics in current research - IV
Lecture 60 - Topics in current research - V

NPTEL Video Course - Electrical Engineering - NOC:Digital Control in Switched Mode Power Converters and FPGA-

Subject Co-ordinator - Prof. Santanu Kapat

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - MATLAB Model Development for Digital Current Hysteresis Control
Lecture 31 - Continuous-Time Small-Signal Modeling under Digital Control
Lecture 32 - Discrete Time Modeling with Closed Current Loop
Lecture 33 - State-Space Modeling and Steps For Deriving Discrete-Time Models
Lecture 34 - Derivation of Discrete-Time Large-Signal Models
Lecture 35 - Validation of Discrete-Time Large-Signal Models using MATLAB - Part I
Lecture 36 - Validation of Discrete-Time Large-Signal Models using MATLAB - Part II
Lecture 37 - Derivation of Discrete-Time Small-Signal Models - I
Lecture 38 - Derivation of Discrete-Time Small-Signal Models - II
Lecture 39 - Discrete-Time Transfer Functions and Closed Loop Block Diagrams
Lecture 40 - Model Accuracy with MATLAB Case Studies - Comparative Study
Lecture 41 - Continuous-Time to Discrete-Time Conversion Methods - A Summary
Lecture 42 - Recap of Frequency Domain Design of Analog VMC and CMC
Lecture 43 - Design under Digital Voltage Mode Control - Frequency Domain Approaches
Lecture 44 - Design under Digital Current Mode Control - Frequency Domain Approaches
Lecture 45 - Design Case Study and MATLAB Simulation of Digital Voltage Mode Control
Lecture 46 - Design Case Study and MATLAB Simulation of Digital Current Mode Control
Lecture 47 - Time Optimal Control of a Buck Converter and Identifying Performance Limits
Lecture 48 - Trajectory based CMC Design for Proximate Time Optimal Recovery
Lecture 49 - Trajectory based Digital CMC Tuning and MATLAB Case Studies
Lecture 50 - Digital Pulse Skipping Control and MATLAB Simulation Case Studies
Lecture 51 - Selection of ADC and DAC in Digitally Controlled SMPCs
Lecture 52 - High Frequency Current Sensing Techniques in Digitally Controlled SMPCs
Lecture 53 - Current Sensing Techniques in Digitally Controlled High Power Converters
Lecture 54 - Signal Conditioning Circuits and PCB Design for Mixed-Signal Implementation
Lecture 55 - Reference Power Stage Design and Schematic for Buck and Boost Converters - I
Lecture 56 - Reference Power Stage Design and Schematic for Buck and Boost Converters - II
Lecture 57 - Step-by-Step Guidelines for Digital Control Implementation using FPGA
Lecture 58 - Test and Measurement of a Buck Converter using Digital Storage Oscilloscope
Lecture 59 - Functionalities in Mixed Signal Oscilloscope for Validating Digital Control
Lecture 60 - Power Spectrum Analysis of SMPCs using Mixed-Signal Oscilloscope
Lecture 61 - Introduction to Verilog Hardware Description Language (HDL)
Lecture 62 - Guidelines for Verilog HDL Programming - Some Key Rules
Lecture 63 - Structural and Dataflow Modeling in Verilog HDL for Combinational Logics
Lecture 64 - Behavioral Modeling in Verilog HDL for Sequential Digital Circuits
Lecture 65 - Simulation of Verilog-HDL based Design using Xilinx Webpack - I
Lecture 66 - Simulation of Verilog-HDL based Design using Xilinx Webpack - II
Lecture 67 - Fixed Point Implementation in Embedded Control System
Lecture 68 - Fixed Point Arithmetic and Concept of Q Format

NPTEL Video Course - Electrical Engineering - NOC:VLSI Interconnects

Subject Co-ordinator - Prof. Sarang Pendharker

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Coupling effects and mitigation techniques
Lecture 31 - Matrix formulation of coupled interconnects
Lecture 32 - Coupled RLC interconnects
Lecture 33 - Decoupling of interconnects by diagonalization of matrix
Lecture 34 - Analysis of coupled interconnects: Examples - 1
Lecture 35 - Analysis of coupled interconnects: Examples - 2
Lecture 36 - Simulation of RC coupled interconnects
Lecture 37 - Extraction of capacitance - Part 1
Lecture 38 - Extraction of capacitance - Part 2
Lecture 39 - Extraction of inductance - Part 1
Lecture 40 - Extraction of inductance - Part 2
Lecture 41 - Estimation of interconnect parameters from S-parameters

NPTEL Video Course - Electrical Engineering - NOC:Semiconductor Device Modeling and Simulation

Subject Co-ordinator - Prof. Vivek Dixit

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - REAL MOS (Continued...)
Lecture 31 - MOSFET
Lecture 32 - MOSFET (Continued...)
Lecture 33 - Problem Session - 5
Lecture 34 - Semiclassical Transport
Lecture 35 - Semiclassical Transport (Continued...)
Lecture 36 - Semiclassical Transport (Continued...)
Lecture 37 - Semiclassical Transport (Continued...)
Lecture 38 - Semiclassical Transport (Continued...)
Lecture 39 - Problem Session - 6
Lecture 40 - Drift-diffusion model
Lecture 41 - Drift-diffusion model (Continued...)
Lecture 42 - Drift-diffusion model (Continued...)
Lecture 43 - Drift-diffusion model (Continued...)
Lecture 44 - Generation-Recombination
Lecture 45 - Generation-Recombination (Continued...)
Lecture 46 - Solving DD Equations (Continued...)
Lecture 47 - Solving DD Equations (Continued...)
Lecture 48 - Problem Session - 7
Lecture 49 - Hydrodynamic Model
Lecture 50 - Hydrodynamic Model (Continued...)
Lecture 51 - Hydrodynamic Model (Continued...)
Lecture 52 - Monte Carlo simuations
Lecture 53 - Problem Session - 8
Lecture 54 - Quantum Mechanics
Lecture 55 - Solving Schrodinger Equation
Lecture 56 - Quantum Correction Models
Lecture 57 - Quantum Transport
Lecture 58 - Transfer Matrix Approach
Lecture 59 - TCAD Tools
Lecture 60 - ATLAS SILVACO
Lecture 61 - Simulating Junctions
Lecture 62 - Models and Simulation Concepts
Lecture 63 - Mixed-mode Simulation

NPTEL Video Course - Electrical Engineering - NOC:RF and Microwave Networks

Subject Co-ordinator - Prof. Bratin Ghosh

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Obstacles in waveguides (Continued...)
Lecture 31 - Small obstacles in waveguides
Lecture 32 - Small obstacles in waveguides (Continued...)
Lecture 33 - Small obstacles in waveguides, Reciprocity
Lecture 34 - Reciprocity
Lecture 35 - Reciprocity (Continued...)
Lecture 36 - Tutorial - 5
Lecture 37 - Posts in rectangular waveguide
Lecture 38 - Posts in rectangular waveguide (Continued...)
Lecture 39 - Posts in rectangular waveguide (Continued...)
Lecture 40 - Posts in rectangular waveguide (Continued...)
Lecture 41 - Diaphragms in waveguide
Lecture 42 - Diaphragms in waveguide (Continued...)
Lecture 43 - Diaphragms in waveguide (Continued...)
Lecture 44 - Diaphragms in waveguide (Continued...)
Lecture 45 - Tutorial - 6
Lecture 46 - Currents in Waveguides
Lecture 47 - Currents in Waveguides (Continued...)
Lecture 48 - Coaxial to waveguide junction with matched termination
Lecture 49 - Coaxial to waveguide feeds with arbitrary termination
Lecture 50 - Coaxial to waveguide feeds with arbitrary termination (Continued...)
Lecture 51 - Coaxial to waveguide feeds with arbitrary termination (Continued...)
Lecture 52 - Coaxial to waveguide feeds with arbitrary termination (Continued...)
Lecture 53 - Tutorial - 7
Lecture 54 - Apertures in the ground plane
Lecture 55 - Apertures in the ground plane (Continued...)
Lecture 56 - Apertures in the ground plane (Continued...)
Lecture 57 - Apertures in the ground plane (Continued...), Plane current sheets
Lecture 58 - Plane current sheets (Continued...)
Lecture 59 - Tutorial - 8
Lecture 60 - Excitation of Apertures
Lecture 61 - Tutorial - 9
Lecture 62 - Modal expansion in cavities
Lecture 63 - Probes in cavities
Lecture 64 - Tutorial - 10
Lecture 65 - Aperture coupling to cavities
Lecture 66 - Aperture coupling to cavities (Continued...)
Lecture 67 - Wave interaction with cylindrical structures
Lecture 68 - Wave interaction with cylindrical structures (Continued...)

NPTEL Video Course - Electrical Engineering - NOC:Introduction to Adaptive Signal Processing

Subject Co-ordinator - Prof. Mrityunjoy Chakraborty

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Affine Projection Algorithm (APA)
Lecture 31 - Affine Projection Algorithm (APA)
Lecture 32 - Introduction to RLS Algorithm
Lecture 33 - Introduction to RLS Algorithm (Continued...)
Lecture 34 - Introduction to RLS Algorithm (Continued...)
Lecture 35 - Formulation of the RLS Algorithm
Lecture 36 - Introduction to RLS Algorithm
Lecture 37 - Introduction to RLS Algorithm
Lecture 38 - Formulation of the RLS Algorithm
Lecture 39 - Derivation of the RLS transversal adaptive filter
Lecture 40 - Derivation of the RLS transversal adaptive filter
Lecture 41 - Derivation of the RLS transversal adaptive filter

NPTEL Video Course - Electrical Engineering - NOC:Nanobiophotonics: Touching Our Daily Life

Subject Co-ordinator - Dr. Basudev Lahiri

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Protein Microarray Technology
Lecture 31 - Laser Principles and Operation
Lecture 32 - Nonlinear Optical Processes
Lecture 33 - In Vivo Photoexcitation
Lecture 34 - Light/Laser Activated Therapy
Lecture 35 - Laser Tissue Contouring
Lecture 36 - Metamaterials
Lecture 37 - Metamaterials as Biosensors
Lecture 38 - Biosensing with Optical Nano-Antennas
Lecture 39 - Nanoscale Chemical Imaging
Lecture 40 - Optical Tweezers
Lecture 41 - Introduction to Optogenetics
Lecture 42 - Controlling the Brain with Light
Lecture 43 - The Nervous System
Lecture 44 - The Neural Circuits
Lecture 45 - Optical Neuroimaging and Tomography
Lecture 46 - Functional Near-Infrared Spectroscopy (fNIRS) of the Brain
Lecture 47 - Neuro imaging with Light-Sheet Microscopy
Lecture 48 - Brain imaging with Two Photon Microscopy
Lecture 49 - Brain imaging with functional optoacoustic Imaging
Lecture 50 - Tomographic technique for Brain imaging
Lecture 51 - Optogenetic Modulation of Neural Circuits
Lecture 52 - Nanoparticles for Optical Modulation of Neuronal Behavior
Lecture 53 - Optical Stimulation of Neural Circuits in Freely Moving Animals
Lecture 54 - Higher Harmonic Generation Imaging for Neuropathology
Lecture 55 - Multi-Photon Nanosurgery
Lecture 56 - Bioinspired materials for photonics
Lecture 57 - Bioderived Materials
Lecture 58 - Bioinspired Materials
Lecture 59 - Biotemplates
Lecture 60 - Summary and Revisiting Few Topics

NPTEL Video Course - Electrical Engineering - NOC:EMI-EMC and Signal Integrity: Principles, Techniques and Ap

Subject Co-ordinator - Prof. Amitabha Bhattacharya

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Embedded Sensing, Actuation and Interfacing Systems

Subject Co-ordinator - Prof. Banibrata Mukherjee

Co-ordinating Institute - IIT - Kharagpur

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Direct Interfacing Scheme for Differential Capacitive Sensor
Lecture 31 - Lossy Capacitive Sensor and its Interfacing Aspect
Lecture 32 - Advanced Interfacing Circuits for Lossy Capacitive Sensor
Lecture 33 - Autobalance Active Bridge Interfacing Circuit
Lecture 34 - Background of Miniaturization
Lecture 35 - Micromachining Technology for MEMS Devices
Lecture 36 - Bulk and Surface Micromachining and Fabrication Steps
Lecture 37 - MEMS Fabrication Process - Part 1
Lecture 38 - MEMS Fabrication Process - Part 2
Lecture 39 - MEMS Fabrication Process - Part 3
Lecture 40 - MEMS Fabrication Process - Part 4
Lecture 41 - MEMS-IC Integration Aspects and Miniaturized Sensor
Lecture 42 - MEMS Pressure Sensor and Interfacing Electronics
Lecture 43 - MEMS Accelerometer
Lecture 44 - MEMS Capacitive Accelerometer and Interfacing Electronics
Lecture 45 - Interfacing Electronics Details for MEMS Accelerometer
Lecture 46 - MEMS Gyroscope and Flow sensor
Lecture 47 - MEMS Actuator
Lecture 48 - MEMS Electrostatic Actuator Analysis
Lecture 49 - Background of Renewable Energy Harvesting
Lecture 50 - Various Transduction Mechanisms for Energy Harvester
Lecture 51 - Vibration Energy Harvester and its Interfacing Aspects
Lecture 52 - Interfacing Power Management Circuit for Vibration Energy Harvester
Lecture 53 - Demonstration of Energy Harvester Set-up and Self-powered Embedded System
Lecture 54 - Background of Embedded Sensors and Actuators in Automotives
Lecture 55 - Applications in Safety System of Automotive
Lecture 56 - Applications in Safety System and Engine Control System
Lecture 57 - Application in Cardiovascular Measurements
Lecture 58 - Applications in Remote Healthcare and Smart Medical Devices
Lecture 59 - Electronic Nose and its Applications in Disease Detection
Lecture 60 - Virtual Sensing, Research Scopes, Summary and Key Takeaways of the Course

NPTEL Video Course - Electrical Engineering - Modelling and Analysis of Electric Machines

Subject Co-ordinator - Dr. Krishna Vasudevan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Analog ICs

Subject Co-ordinator - Prof. K. Radhakrishna Rao

Co-ordinating Institute - IIT - Madras | Texas Instruments - India

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Digital Integrated Circuits

Subject Co-ordinator - Prof. Amitava Dasgupta

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - BiCMOS Driver;BiCMOS 32-bit Adder
Lecture 31 - Digital Integrated Circuits
Lecture 32 - Digital Integrated Circuits
Lecture 33 - CMOS SRAM
Lecture 34 - BiCMOS SRAM
Lecture 35 - DRAM-CMOS and BiCMOS
Lecture 36 - ROM-EPROM,EEPROM and Flash EPROM
Lecture 37 - GaAs MESFET Characteristics and Equivalent Circuits
Lecture 38 - Direct Coupled FET Logic; Superbuffer FET Logic
Lecture 39 - Buffered FET Logic; Schottky Diode FET Logic
Lecture 40 - Transmission Line Effects

NPTEL Video Course - Electrical Engineering - Electromagnetic Fields

Subject Co-ordinator - Prof. Harishankar Ramachandran

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Networks and Systems

Subject Co-ordinator - Prof. V.G.K. Murti

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Network Functions - 1
Lecture 31 - Network Functions - 2
Lecture 32 - Network Functions - 3
Lecture 33 - Network Functions - 4
Lecture 34 - Network Theorems - 1
Lecture 35 - Network Theorems - 2
Lecture 36 - Network Theorems - 3
Lecture 37 - Network Theorems - 4
Lecture 38 - Discrete - Time Systems - 1
Lecture 39 - Discrete - Time Systems - 2
Lecture 40 - Discrete - Time Systems - 3
Lecture 41 - Discrete - Time Systems - 4
Lecture 42 - Discrete - Time Systems - 5
Lecture 43 - Discrete - Time Systems - 6
Lecture 44 - Discrete - Time Systems - 7
Lecture 45 - State-Variable Methods - 1
Lecture 46 - State-Variable Methods - 2
Lecture 47 - State Variable Methods - 3
Lecture 48 - State Variable Methods - 4
Lecture 49 - State Variable Methods - 5
Lecture 50 - State Variable Methods - 6

NPTEL Video Course - Electrical Engineering - Probability Foundation for Electrical Engineers

Subject Co-ordinator - Dr. Krishna Jagannathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Analog Circuits

Subject Co-ordinator - Dr. Nagendra Krishnapura

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Common source amplifier analysis: Effect of biasing components
Lecture 31 - Constraint on the input coupling capacitor
Lecture 32 - Constraint on the output coupling capacitor
Lecture 33 - Dependence of ID on VDS
Lecture 34 - Small signal output conductance of a MOS transistor
Lecture 35 - Effect of gds on a common source amplifier; Inherent gain limit of a transistor
Lecture 36 - Variation gm with transistor parameters
Lecture 37 - Variation of gm with constant VGS and constant drain current bias
Lecture 38 - Negative feedback control for constant drain current bias
Lecture 39 - Types of feedback for constant drain current bias
Lecture 40 - Sense at the drain and feedback to the gate-Drain feedback
Lecture 41 - Intuitive explanation of low sensitivity with drain feedback
Lecture 42 - Common source amplifier with drain feedback bias
Lecture 43 - Constraint on the gate bias resistor
Lecture 44 - Constraint on the input coupling capacitor
Lecture 45 - Constraint on the output coupling capacitor
Lecture 46 - Input and output resistances of the common source amplifier with constant VGS bias
Lecture 47 - Current mirror
Lecture 48 - Common souce amplifier with current mirror bias
Lecture 49 - Constraint on coupling capacitors and bias resistance
Lecture 50 - Diode connected transistor
Lecture 51 - Source feedback biasing
Lecture 52 - Common source amplifier with source feedback bias
Lecture 53 - Constraints on capacitor values
Lecture 54 - Sensing at the drain and feeding back to the source
Lecture 55 - Sensing at the source and feeding back to the gate
Lecture 56 - Ensuring that transistor is in saturation
Lecture 57 - Using a resistor instead of current source for biasing
Lecture 58 - Controlled sources using a MOS transistor-Introduction
Lecture 59 - Voltage controlled voltage source
Lecture 60 - VCVS using a MOS transistor
Lecture 61 - VCVS using a MOS transistor - Small signal picture
Lecture 62 - VCVS using a MOS transistor - Complete circuit
Lecture 63 - Source follower: Effect of output conductance; Constraints on coupling capacitors
Lecture 64 - VCCS using a MOS transistor
Lecture 65 - VCCS using a MOS transistor: Small signal picture
Lecture 66 - VCCS using a MOS transistor: Complete circuit
Lecture 67 - VCCS using a MOS transistor: AC coupling the output
Lecture 68 - Source degenrated CS amplifier

Lecture 69 - CCCS using a MOS transistor
Lecture 70 - CCCS using a MOS transistor: Small signal picture
Lecture 71 - CCCS using a MOS transistor: Complete circuit
Lecture 72 - CCVS using a MOS transistor
Lecture 73 - CCVS using a MOS transistor: Gain
Lecture 74 - CCVS using a MOS transistor: Input and output resistances
Lecture 75 - CCVS using a MOS transistor: Complete circuit
Lecture 76 - VCVS using an opamp
Lecture 77 - CCVS using an opamp
Lecture 78 - Negative feedback and virtual short in an opamp
Lecture 79 - Negative feedback and virtual short in a transistor
Lecture 80 - Constraints on controlled sources using opamps and transistors
Lecture 81 - Quick tour of amplifying devices
Lecture 82 - Signal swing limits in amplifiers
Lecture 83 - Swing limit due to transistor entering triode region
Lecture 84 - Swing limit due to transistor entering cutoff region
Lecture 85 - Swing limit calculation example
Lecture 86 - Swing limits-more calculations
Lecture 87 - pMOS transistor
Lecture 88 - Small signal model of the pMOS transistor
Lecture 89 - Common source amplifier using the pMOS transistor
Lecture 90 - Swing limits of the pMOS common source amplifier
Lecture 91 - Biasing a pMOS transistor at a constant current; pMOS current mirror
Lecture 92 - Converting nMOS transistor circuits to pMOS
Lecture 93 - Bias current generation
Lecture 94 - Examples of more than one transistor in feedback
Lecture 95 - Gain limitation in a common source amplifier with resistive load
Lecture 96 - nMOS active load for pMOS common source amplifier
Lecture 97 - CMOS inverter
Lecture 98 - Large signal characteristics of pMOS CS amplifier with nMOS active load
Lecture 99 - Large signal characteristics of nMOS CS amplifier with pMOS active load
Lecture 100 - Large signal characteristics of a CMOS inverter
Lecture 101 - Active load amplifiers as digital gates
Lecture 102 - Sensitivity of output bias to input bias in a CMOS inverter
Lecture 103 - Self biasing a CMOS inverter
Lecture 104 - An application of self biased inverters
Lecture 105 - Current consumption of a self-biased inverter; Current biasing
Lecture 106 - Amplifying a difference signal; Differential pair
Lecture 107 - Differential pair-small signal basics

NPTEL Video Course - Electrical Engineering - NOC:Introduction to Non Linear Dynamics

Subject Co-ordinator - Prof. Gaurav Raina

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Control Engineering

Subject Co-ordinator - Prof. Ramkrishna.P

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Problems on PID Controllers
Lecture 31 - Basics of Control design Proportional, Integral and Derivative Actions
Lecture 32 - Control design in time domain and discusses the lead compensator
Lecture 33 - Improvement of the Transient Response using lead compensation
Lecture 34 - Design of control using lag compensators
Lecture 35 - The design of Lead-Lag compensators using root locus
Lecture 36 - Introduction design of control in frequency domain
Lecture 37 - Design of Lead Compensator using Bode Plots
Lecture 38 - Design of Lag Compensators using Bode Plots
Lecture 39 - Design of Lead-Lag Compensators using Bode plots
Lecture 40 - Experimental Determination of Transfer Function
Lecture 41 - Effect of Zeros on System Response
Lecture 42 - Navigation - Stories and Some Basics
Lecture 43 - Navigation - Dead Reckoning and Reference Frames
Lecture 44 - Inertial Sensors and Their Characteristics
Lecture 45 - Filter Design to Attentuate Inertial Sensor Noise
Lecture 46 - Complementary Filter
Lecture 47 - Complementary Filter - 1
Lecture 48 - Introduction to State Space Systems
Lecture 49 - Linearization of State Space Dynamics
Lecture 50 - Linearization of State Space Dynamics - 1
Lecture 51 - Controllability and Observability

NPTEL Video Course - Electronics and Communication Engineering - NOC:Analog IC Design

Subject Co-ordinator - Prof. S. Aniruddhan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Telescopic OpAmp - Datasheet
Lecture 31 - Telescopic OpAmp - Design Example
Lecture 32 - Folded-Cascode OpAmp - 1
Lecture 33 - Folded-Cascode OpAmp - 2
Lecture 34 - Folded-Cascode OpAmp - 3
Lecture 35 - Folded-Cascode OpAmp - 4
Lecture 36 - Folded-Cascode OpAmp - 5
Lecture 37 - Negative feedback amplifier
Lecture 38 - Step response, sinusoidal steady state response
Lecture 39 - Loop gain and unity loop gain frequency; Opamp
Lecture 40 - Opamp realization using controlled sources; Delay in the loop
Lecture 41 - Negative feedback amplifier with ideal delay-small delays
Lecture 42 - Negative feedback amplifier with ideal delay-large delays
Lecture 43 - Negative feedback amplifier with parasitic poles and zeros
Lecture 44 - Negative feedback amplifier with parasitic poles and zeros; Nyquist criterion
Lecture 45 - Nyquist criterion; Phase margin
Lecture 46 - Phase margin
Lecture 47 - Single stage opamp realization
Lecture 48 - Two stage miller compensated opamp
Lecture 49 - Two stage miller compensated opamp.
Lecture 50 - Two and three stage miller compensated opamps; Feedforward compensated opamp
Lecture 51 - Two Stage Opamp
Lecture 52 - Two Stage Opamp ; Three Stage and Triple Cascade Opamps
Lecture 53 - Common Mode Rejection Ratio ; Example
Lecture 54 - Fully differential single stage opamp
Lecture 55 - Common mode feedback
Lecture 56 - Fully differential single stage opamp-2
Lecture 57 - Fully differential two stage opamp; Fully differential versus pseudo-differential

NPTEL Video Course - Electrical Engineering - NOC:Probability Foundations for Electrical Engineers

Subject Co-ordinator - Prof. R.Aravind, Dr. Andrew Thangaraj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Multiple random variables and joint distribution
Lecture 31 - Example
Lecture 32 - Marginal PMF
Lecture 33 - Trinomial joint PMF
Lecture 34 - Events and Conditioning with Two Random Variables
Lecture 35 - Example
Lecture 36 - Independent random variables
Lecture 37 - More on independence
Lecture 38 - Example
Lecture 39 - Addition of Random Variables
Lecture 40 - Sum, Difference and Max of Two Random Variables
Lecture 41 - More Computations
Lecture 42 - Example
Lecture 43 - Real line as sample space
Lecture 44 - Probability density function (pdf)
Lecture 45 - Cumulative distribution function (CDF)
Lecture 46 - Continuous random variables
Lecture 47 - pdf and CDF of continuous random variables
Lecture 48 - Spinning pointer example
Lecture 49 - Important continuous distributions
Lecture 50 - More continuous distributions
Lecture 51 - Two-dimensional real sample space
Lecture 52 - Joint pdf and joint CDF
Lecture 53 - More on assigning probability to regions of x-y plain
Lecture 54 - Darts example and marginal pdfs
Lecture 55 - Independence to two continuous random variables
Lecture 56 - Examples
Lecture 57 - Prob[X > Y]
Lecture 58 - Transformations of random variables
Lecture 59 - CDF method
Lecture 60 - pdf method
Lecture 61 - Examples
Lecture 62 - One-to-one transformations
Lecture 63 - Expected Value or Mean of a Random Variable
Lecture 64 - Properties of Expectation
Lecture 65 - Expectation Computations for Important Distributions
Lecture 66 - Variance
Lecture 67 - Examples of Variance
Lecture 68 - Expectations with Two Random Variables

Lecture 69 - Correlation and Covariance
Lecture 70 - Examples
Lecture 71 - Examples
Lecture 72 - Examples
Lecture 73 - Live Session

NPTEL Video Course - Electrical Engineering - NOC:Introduction to Photonics

Subject Co-ordinator - Prof. Balaji Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Semiconductor light Source and detector - Band structure
Lecture 31 - Semiconductor light Source and detector - Light emission
Lecture 32 - Semiconductor light Source and detector LED Characteristics
Lecture 33 - Lab Demonstration
Lecture 34 - Semiconductor light Source and detector Laser Characteristics
Lecture 35 - Semiconductor Detectors - 1
Lecture 36 - Semiconductor Detectors - 2
Lecture 37 - Semiconductor Detectors - 3
Lecture 38 - Lab Demonstration
Lecture 39 - Semiconductor Detectors - 4
Lecture 40 - Light manipulation-Mallus' Law
Lecture 41 - Light manipulation-Birefringence
Lecture 42 - Light manipulation-Faraday Rotation
Lecture 43 - Lab Demonstration
Lecture 44 - Non-linear optics-Pockels effect
Lecture 45 - Non-linear optics-Kerr Effect
Lecture 46 - Lab Demonstration
Lecture 47 - Non-linear optics-stimulated Brillouin scattering
Lecture 48 - Non-linear optics-stimulated Raman scattering

NPTEL Video Course - Electrical Engineering - NOC:Multirate DSP

Subject Co-ordinator - Prof. David Kovil Pillai

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - DFT and High Resolution Spectral Analysis - Part 1
Lecture 31 - DFT and High Resolution Spectral Analysis - Part 2
Lecture 32 - Transmultiplexer and Maximally Decimated Filterbanks - Part 1
Lecture 33 - Transmultiplexer and Maximally Decimated Filterbanks - Part 2
Lecture 34 - Maximally Decimated Filterbanks 2 - Part 1
Lecture 35 - Maximally Decimated Filterbanks 2 - Part 2
Lecture 36 - Study of Two-channel filter bank
Lecture 37 - Introduction to Quadrature Mirror Filters (QMF)
Lecture 38 - 2-channel QMF Filter Bank Design
Lecture 39 - Study of All-pass filters
Lecture 40 - Study of All-pass lattice
Lecture 41 - All-pass decomposition, the study of Mth band and Nyquist filters
Lecture 42 - Study of two-channel filter bank with perfect reconstruction
Lecture 43 - First part name
Lecture 44 - First part name
Lecture 45 - Capacity of wireless channels - CSIR - Part 1
Lecture 46 - Capacity of wireless channels - CSIT - Part 2
Lecture 47 - Capacity of wireless channels - Formulation of capacity calculation - Part 3
Lecture 48 - Capacity of wireless channels - Formulation of capacity calculation (Continued...) - Part 1
Lecture 49 - Capacity of wireless channels - Formulation of capacity calculation (Continued...) - Part 2
Lecture 50 - Capacity of wireless channels - Time-invariant Frequency selective channel - Part 3
Lecture 51 - Capacity of wireless channels - Time varying Frequency selective channels - Part 1
Lecture 52 - Multi-rate DSP framework for Multi-carrier Modulation - Part 2
Lecture 53 - MCM with overlapping spectra - Part 1
Lecture 54 - Recap of multirate DSP concepts for building OFDM - Part 2
Lecture 55 - Introduction to Redundancy and it's implementation in multi-rate framework - Part 3
Lecture 56 - M-channel multicarrier Transceiver - Part 1
Lecture 57 - M-channel multicarrier Transceiver - Part 2
Lecture 58 - M-channel multicarrier Transceiver - Part 3
Lecture 59 - Pseudo -circulant structure - Part 1
Lecture 60 - Pseudo -circulant structure - Part 2
Lecture 61 - MCM impairments and CP - Part 1
Lecture 62 - MCM impairments and CP - Part 2
Lecture 63 - Orthogonal Frequency Division Multiplexing - Part 1
Lecture 64 - Orthogonal Frequency Division Multiplexing - Part 2
Lecture 65 - Review of OFDM with CP
Lecture 66 - Review of Lec 1-28
Lecture 67 - OFDM applications - Quantization - Part 1
Lecture 68 - OFDM applications - Quantization - Part 2

Lecture 69 - Some more applications of MDSP

NPTEL Video Course - Electrical Engineering - NOC:LDPC and Polar Codes in 5G Standard

Subject Co-ordinator - Dr. Andrew Thangaraj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Electromagnetic Compatibility, EMC

Subject Co-ordinator - Prof. Daniel Mansson, Prof. Rajeev Thottappillil

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Mapping Signal Processing Algorithms to Architectures

Subject Co-ordinator - Prof. Nitin Chandrachoodan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Valid pipelining examples
Lecture 31 - Feedforward cutsets
Lecture 32 - Balanced pipeline
Lecture 33 - Retiming basic concept
Lecture 34 - Retiming basic concept
Lecture 35 - (Missing Title)
Lecture 36 - Resource sharing
Lecture 37 - Changing iteration period
Lecture 38 - Hardware assumptions and constraint analysis
Lecture 39 - Mathematical formulation
Lecture 40 - Examples with formulation
Lecture 41 - Example
Lecture 42 - Hardware architecture
Lecture 43 - Review biquad folding sets
Lecture 44 - Complete biquad hardware
Lecture 45 - DEMO
Lecture 46 - DEMO
Lecture 47 - Obtaining a folding schedule
Lecture 48 - ASAP schedule
Lecture 49 - Utilization Efficiency
Lecture 50 - ALAP schedule
Lecture 51 - Iteration period bound and scheduling
Lecture 52 - Retiming for scheduling
Lecture 53 - Blocked schedules
Lecture 54 - Overlapped schedules
Lecture 55 - Improved blocked schedule
Lecture 56 - Allocation, Binding and Scheduling
Lecture 57 - DEMO
Lecture 58 - DEMO
Lecture 59 - Scheduling
Lecture 60 - Example
Lecture 61 - Heuristic approaches to scheduling
Lecture 62 - Mathematical formulation
Lecture 63 - ILP formulation
Lecture 64 - List scheduling
Lecture 65 - Hardware model
Lecture 66 - Force Directed Scheduling
Lecture 67 - DEMO
Lecture 68 - DEMO

Lecture 69 - DEMO
Lecture 70 - Software Compilation
Lecture 71 - Optimization Examples
Lecture 72 - Loop optimizations - 1
Lecture 73 - Loop optimizations - 2
Lecture 74 - Loop optimizations - 3
Lecture 75 - Software pipelining - 1
Lecture 76 - Software pipelining - 2
Lecture 77 - FFT Optimization
Lecture 78 - Demo
Lecture 79 - Background
Lecture 80 - Demo
Lecture 81 - Demo
Lecture 82 - Demo
Lecture 83 - Demo
Lecture 84 - Background
Lecture 85 - On-chip communication basics
Lecture 86 - Many-to-Many communication
Lecture 87 - AXI bus handshaking
Lecture 88 - AXI bus (Continued...)
Lecture 89 - Demo
Lecture 90 - Demo
Lecture 91 - Demo
Lecture 92 - DMA and arbitration
Lecture 93 - Network-on-chip basics
Lecture 94 - NoC - Topologies and metrics
Lecture 95 - NoC - Routing
Lecture 96 - NoC - Switching and flow control
Lecture 97 - Systolic Arrays - Background
Lecture 98 - Systolic Arrays - Examples
Lecture 99 - CORDIC algorithm
Lecture 100 - Parallel implementation of FIR filters
Lecture 101 - Unfolding Transformation
Lecture 102 - Lookahead Transformation
Lecture 103 - Introduction to GPUs and Matrix multiplication

NPTEL Video Course - Electrical Engineering - NOC:Linear System Theory

Subject Co-ordinator - Prof. Ramakrishna Pasumarthi

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Controllability of Discrete Time Systems
Lecture 31 - Controllable Decomposition
Lecture 32 - Stabilizability
Lecture 33 - Observability
Lecture 34 - Gramians and Duality
Lecture 35 - Observability for Discrete Time Systems and Observability Tests
Lecture 36 - Observable Decompositon and Detectability
Lecture 37 - Kalman Decomposition and Minimal Realisation
Lecture 38 - Canonical Forms and State Feedback Control
Lecture 39 - Control Design using Pole Placement
Lecture 40 - Tutorial for Modules 9 and 10
Lecture 41 - State Estimation and Output Feedback
Lecture 42 - Design of Observer and Observer based Controller
Lecture 43 - Optimal Control and Linear Quadratic Regulator (LQR)
Lecture 44 - Feedback Invariant and Algebraic Ricatti Equation
Lecture 45 - Tutorial for Module 11
Lecture 46 - Linear Matrix Inequalities
Lecture 47 - Properties of LMIs and Delay LMIs

NPTEL Video Course - Electrical Engineering - NOC:Digital Signal Processing

Subject Co-ordinator - C. S. Ramalingam

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Complex conjugation
Lecture 31 - Time reversal
Lecture 32 - Differentiation in the Z-domain
Lecture 33 - Convolution in the time domain
Lecture 34 - Relationship between x[n] and X(1)
Lecture 35 - Initial Value Theorem
Lecture 36 - Final Value Theorem
Lecture 37 - Multiplication in the time domain
Lecture 38 - Parseval's Theorem
Lecture 39 - Partial Fractions Method
Lecture 40 - Power series method
Lecture 41 - Contour Integral Method
Lecture 42 - Contour Integral Method (Continued...)
Lecture 43 - Inverse DTFT
Lecture 44 - DTFT of Sequences that are not absolutely summable
Lecture 45 - Response to cos(?_0 n+?)
Lecture 46 - Causality and Stability
Lecture 47 - Response to suddenly applied inputs
Lecture 48 - Introduction to frequency response
Lecture 49 - Magnitude response and its geometric interpretation
Lecture 50 - Magnitude Response (Continued...)
Lecture 51 - Response of a single complex zero/pole
Lecture 52 - Resonator and Improved Resonator
Lecture 53 - Notch filter
Lecture 54 - Moving Average Filter
Lecture 55 - Comb filter
Lecture 56 - Phase response of a single complex zero
Lecture 57 - Effect of crossing a unit circle zero, wrapped and unwrapped phase, resonator phase response
Lecture 58 - Allpass Filter
Lecture 59 - Group delay and its physical interpretation
Lecture 60 - Zero-phase filtering, effect on nonlinear phase on waveshape
Lecture 61 - Zero-Phase Filtering, Linear Phase - 1
Lecture 62 - Linear Phase - 2
Lecture 63 - Linear Phase - 3
Lecture 64 - Linear Phase - 3
Lecture 65 - Linear Phase - 3
Lecture 66 - Linear Phase - 4, Sampling - 1
Lecture 67 - Linear Phase - 4, Sampling - 1
Lecture 68 - Linear Phase - 4, Sampling - 1

NPTEL Video Course - Electrical Engineering - NOC:Computational Electromagnetics

Subject Co-ordinator - Prof. Uday Khankhoje

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - 3-D example
Lecture 31 - Motivation for MoM
Lecture 32 - Linear Vector Spaces
Lecture 33 - Formulating Method of Moments
Lecture 34 - Surface Integral Equations
Lecture 35 - Surface Integral Equations
Lecture 36 - Surface Integral Equations
Lecture 37 - Surface Integral Equations
Lecture 38 - Volume Integral Equations
Lecture 39 - Volume Integral Equations
Lecture 40 - Volume Integral Equations
Lecture 41 - Volume Integral Equations
Lecture 42 - Surface integral equations for PEC
Lecture 43 - Surface v/s volume integral equations
Lecture 44 - Definition of radar cross-section
Lecture 45 - Computational Considerations
Lecture 46 - History and Overview of the FEM
Lecture 47 - Basic framework of FEM
Lecture 48 - 1D Basis Functions
Lecture 49 - 2D Basis Functions
Lecture 50 - Weak form of 1D-FEM - Part 1
Lecture 51 - Weak form of 1D-FEM - Part 2
Lecture 52 - Generating System of Equations for 1D FEM
Lecture 53 - 1D wave equation
Lecture 54 - 1D Wave Equation
Lecture 55 - 1D Wave Equation
Lecture 56 - 1D Wave Equation
Lecture 57 - 2D FEM Shape Functions
Lecture 58 - Converting to Weak Form (2D FEM)
Lecture 59 - Radiation Boundary Condition
Lecture 60 - Total field formulation
Lecture 61 - Scattered field formulation
Lecture 62 - Comparing total and scattered field formulation
Lecture 63 - Matrix assembly - Part 1
Lecture 64 - Matrix assembly - Part 2
Lecture 65 - Computing Far Field
Lecture 66 - Numerical Aspects of 2D FEM
Lecture 67 - Summary of FEM Procedure
Lecture 68 - Introduction to FDTD

Lecture 69 - 2D FDTD Formulation
Lecture 70 - 2D FDTD Formulation
Lecture 71 - 2D FDTD Formulation
Lecture 72 - Stability Criteria - Part 1
Lecture 73 - Stability Criteria - Part 2
Lecture 74 - Stability Criteria - Higher Dimensions
Lecture 75 - Accuracy Considerations - 1D
Lecture 76 - Accuracy Considerations - Higher Dimensions
Lecture 77 - Dealing with non-dispersive dielectric media
Lecture 78 - Dealing with dispersive dielectric media
Lecture 79 - Debye Model - Part 1
Lecture 80 - Debye Model - Part 2
Lecture 81 - Absorbing Boundary Conditions - 1D
Lecture 82 - Absorbing Boundary Conditions - 2D
Lecture 83 - Implementing ABC in FDTD
Lecture 84 - Failure of ABC
Lecture 85 - Perfectly Matched Layers (PML) - Introduction
Lecture 86 - Implementing PML using Coordinate Stretching
Lecture 87 - PML - Phase Matching
Lecture 88 - PML - Tangential Boundary Conditions
Lecture 89 - Perfectly Matched Interface
Lecture 90 - PML theory - Summary
Lecture 91 - Implementing PML into FDTD - Part 1
Lecture 92 - Implementing PML into FDTD - Part 2
Lecture 93 - Sources in FDTD - Currents
Lecture 94 - Sources in FDTD - Part 2
Lecture 95 - Summary of FDTD
Lecture 96 - MEEP
Lecture 97 - Inverse Problems - Introduction
Lecture 98 - Inverse Problems - Mathematical Formulation
Lecture 99 - Inverse Problems - Challenges
Lecture 100 - Inverse Problems - Non-Linearity
Lecture 101 - Inverse Problems - Summary
Lecture 102 - Antennas - Potential formulation
Lecture 103 - Antennas - Hertz Dipole - Part 1
Lecture 104 - Antennas - Hertz Dipole - Part 2
Lecture 105 - Antennas - Radiation Patterns
Lecture 106 - Antennas - Motivation for CEM
Lecture 107 - Antennas - Pocklingtonâ s Integral Equation - Part 1

Lecture 108 - Antennas - Pocklingtonâ s Integral Equation - Part 2
Lecture 109 - Antennas - Source Modeling
Lecture 110 - Antennas - Circuit Model
Lecture 111 - Antennas - MoM details
Lecture 112 - Antennas - Mutual Coupling - Part 1
Lecture 113 - Antennas - Mutual Coupling - Part 2
Lecture 114 - Hybrid Methods - Motivation
Lecture 115 - Finite Element-Boundary Integral - Part 1
Lecture 116 - Finite Element-Boundary Integral - Part 2
Lecture 117 - Finite Element-Boundary Integral - Part 3

NPTEL Video Course - Electrical Engineering - NOC:Transmission Lines and Electromagnetic Waves

Subject Co-ordinator - Dr. Ananth Krishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Octave simulation of modes of a Rectangular Waveguide
Lecture 31 - Phase Velocity and Group velocity
Lecture 32 - Octave simulation of Field pattern of a parellel plate waveguide
Lecture 33 - Cavity resonatorand Real life applications of waveguides and cavity

NPTEL Video Course - Electrical Engineering - NOC:Digital IC Design

Subject Co-ordinator - Prof. Janakiraman

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Inverter: Leakage Power and Transistor Stacks
Lecture 31 - Stacking Effect and Sleep Transistors
Lecture 32 - Ring Oscillators and Process Variations
Lecture 33 - Implementing Any Boolean Logic Function
Lecture 34 - Implementing Any Boolean Logic Function: Examples. Gate sizing
Lecture 35 - Gate Sizing
Lecture 36 - Logic Gate Capacitance
Lecture 37 - Gate Delay
Lecture 38 - Parasitic Delay
Lecture 39 - Gate Delay with a Load Capacitance
Lecture 40 - Logical Effort
Lecture 41 - Gate Delay
Lecture 42 - Path Delay Calculation and Optimization Formulation
Lecture 43 - Path Delay Optimization: Intuition
Lecture 44 - Path Delay Optimization: Example
Lecture 45 - Buffer Insertion
Lecture 46 - Input Ordering and Asymmetric Gates
Lecture 47 - Skewed Gates
Lecture 48 - Special Functions
Lecture 49 - Pseudo NMOS Logic
Lecture 50 - Pseudo NMOS Inverter
Lecture 51 - Pseudo NMOS Logical Effort and CVSL
Lecture 52 - Dynamic Circuits and Input Monotonicity
Lecture 53 - Domino Logic and Weak Keepers
Lecture 54 - Transmission Gate Logic
Lecture 55 - Gate Sizing for Large Circuits
Lecture 56 - Ripple Adder Introduction
Lecture 57 - Full Adder Circuit Implementation
Lecture 58 - Full Adder Optimization
Lecture 59 - Carry Skip Adder
Lecture 60 - Carry Select Adder
Lecture 61 - Linear and Square Root Carry Select Adder
Lecture 62 - Two's Complement Arithmetic
Lecture 63 - Two's Complement Sign Extension
Lecture 64 - Array Multiplier
Lecture 65 - Array Multiplier - Timing Analysis
Lecture 66 - Carry Save Multiplier
Lecture 67 - Carry Save Multiplier - Signed Multiplication
Lecture 68 - Introduction to Pipelining

Lecture 69 - Time Borrowing
Lecture 70 - Master Slave Flip Flop
Lecture 71 - Flop Timing Parameters
Lecture 72 - Alternate Circuit Implementations
Lecture 73 - Clock Overlap
Lecture 74 - C2MOS Flop
Lecture 75 - Flop Characterization
Lecture 76 - Max and Min Delay of Flop Based Systems
Lecture 77 - Flop Min Delay Constraint
Lecture 78 - Latch - Max and Min Delay Constraints
Lecture 79 - Latch - Timing Analysis with Skew
Lecture 80 - Time Borrowing

NPTEL Video Course - Electrical Engineering - NOC:Power Management Integrated Circuits

Subject Co-ordinator - Prof. Qadeer Ahmad Khan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Hybrid LDO, Short-Circuit Protection
Lecture 31 - Hiccup Mode and Foldback Current Limit
Lecture 32 - Introduction to Switching Regulators
Lecture 33 - volt-second Balance, Non-Idealities in the Power Stage of a Buck Converter
Lecture 34 - Transformer Model of a Buck Converter, Conduction Efficiency, Efficiency of an LDO versus Effici
Lecture 35 - Synchronous versus Non-Synchronous Switching Regulators, PWM Control Techniques
Lecture 36 - Losses in Switching Regulators (Conduction Loss, Gate-Driver Switching Loss)
Lecture 37 - Dead-Time Switching Loss in DC-DC Converters
Lecture 38 - Hard Switching Loss in DC DC Converters
Lecture 39 - Magnetic Loss in DC-DC Converters, Relative Significance of Losses as a Function of the Load Cur
Lecture 40 - Output Voltage Ripple of a Buck Converter
Lecture 41 - Choosing the Inductor and Capacitor for a Buck Converter
Lecture 42 - CCM Vs DCM Operation in DC DC Converters
Lecture 43 - CCM DCM Boundary Condition, Voltage Conversion Ratio in DCM
Lecture 44 - Concept of Pulse Frequency Modulation PFM
Lecture 45 - Classification of Pulse Width Modulators
Lecture 46 - DC - DC Converter Control Techniques, Stability Analysis of Voltage Mode Buck Converter - Part 1
Lecture 47 - Stability Analysis of Voltage Mode Buck Converter - Part 2
Lecture 48 - Stability Analysis of Voltage Mode Buck Converter - Part 3
Lecture 49 - Dominant Pole Compensation (Type-I with Gm-C Architecture)
Lecture 50 - Dominant Pole Compensation (Type-I with Op Amp-RC Architecture)
Lecture 51 - Introduction to Type-II Compensation
Lecture 52 - Type-II Compensator using Gm-C Architecture - Part 1
Lecture 53 - Type-II Compensator using Gm-C Architecture - Part 2
Lecture 54 - Type-II Compensator using Gm-C Architecture - Part 3
Lecture 55 - Type-II Compensator using Op Amp-RC Architecture
Lecture 56 - Introduction to Type-III Compensator
Lecture 57 - Type-III Compensator using Op Amp-RC Architecture
Lecture 58 - Simulation of DC-DC Converter with Type-III Compensator
Lecture 59 - Type-III Compensator using Gm-C Architecture
Lecture 60 - Feed-Forward Line Compensation, Loop Gain Compensation by Modulating Gm
Lecture 61 - Designing a Buck Converter, Power Loss Budgeting
Lecture 62 - Sizing Power MOSFETs
Lecture 63 - Estimating Switching Losses and Choosing the Switching Frequency
Lecture 64 - Choosing Inductance and Capacitance Values
Lecture 65 - Choosing 'C' Depending on Factors that Limit the Load Transient Response
Lecture 66 - Inductor and Capacitor Characteristics, Reducing the Effect of Capacitor ESL
Lecture 67 - Gate Buffer and Non-Overlap Clock Generator in Gate-Driver Circuit
Lecture 68 - Pulse-Width Modulator- Trailing Edge, Leading Edge and Dual Edge; Triangle Wave Generator

Lecture 69 - Average Ramp Voltage of Single-Edge PW Modulator,Design Considerations of EA
Lecture 70 - Delays Associated with PW Modulator, PFM and PSM Operation, DCM Operation using NMOS
Lecture 71 - Designing a Zero-Cross Comparator, Inverter-Based Auto-Zeroed Comparator, Simulation Demo
Lecture 72 - Current Mode Control- Peak, Valley, Emulated; VMC versus CMC; Sub-Harmonic Oscillation
Lecture 73 - Ramp-Adaptive Slope Compensation to Avoid Current Loop Instability
Lecture 74 - Non-Linear Control of DC-DC Converters, Phase-Shift between i_L and v_C
Lecture 75 - Stabilising a Voltage-Mode Hysteretic Converter using R_esr, Relation between F_sw and the Hyste
Lecture 76 - Hysteretic Converter - Simulation Demo
Lecture 77 - Current-Mode Hysteretic Converter, Using R-C as Ripple Generator
Lecture 78 - Controlling the Switching Frequency of a Hysteretic Converter, Delay in the Hysteretic Comparato
Lecture 79 - Frequency and Voltage Regulation Loops in a Fixed-Frequency Hysteretic Converter
Lecture 80 - Resetting the Capacitor Voltage in a Hysteretic Converter, Constant ON-Time Control
Lecture 81 - Introduction to Boost Converter, RHP Zero in a Boost Converter
Lecture 82 - Introduction to Buck-Boost Converter
Lecture 83 - Tri-Mode Buck-Boost Converter (Buck, Buck-Boost and Boost)
Lecture 84 - Boundary Conditions for Mode Transition in a Tri-Mode Buck-Boost Converter
Lecture 85 - Generating Buck and Boost Duty Cycles in a Tri-Mode Buck-Boost Converter
Lecture 86 - Introduction to Switched-Capacitor DC-DC Converters,Switched-Capacitor DC-DC Converter with V_o
Lecture 87 - Applications of Switched-Capacitor DC-DC Converters in Open-Loop, Regulating the Output using Fe
Lecture 88 - H-Bridge Switched-Capacitor DC-DC Converter,SC DC-DC converter with Multiple Gain Settings
Lecture 89 - Current Sensing Techniques in DC-DC Converters
Lecture 90 - Analog Layout Techniques - Part 1
Lecture 91 - Analog Layout Techniques - Part 2
Lecture 92 - Digital Control of DC-DC Converters, ADC Architectures
Lecture 93 - Digital Pulse-Width Modulator Architectures, Adaptive Compensation
Lecture 94 - Limitations of Analog and Digital Controllers, Time-Based Controller for Buck Converter
Lecture 95 - Time-Based Controller for Buck Converter and for LDO, Issues with Time-Based Control
Lecture 96 - Multi-Phase DC-DC Converters
Lecture 97 - Dynamic Voltage and Frequency Scaling, Single Inductor Multiple Output (SIMO) DC-DC Converter
Lecture 98 - LCD/AMOLED Display Drivers - Part 1
Lecture 99 - LCD/AMOLED Display Drivers - Part 2
Lecture 100 - LCD/AMOLED Display Drivers - Part 3
Lecture 101 - LED Drivers for Camera Flash
Lecture 102 - Li-Ion Battery and its Charging Phases
Lecture 103 - Battery Charger IC

NPTEL Video Course - Electrical Engineering - NOC:DC Power Transmission Systems

Subject Co-ordinator - Prof. Krishna S

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Optical Engineering

Subject Co-ordinator - Prof. Shanti Bhattacharya

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Application of Gaussian beam equations
Lecture 31 - Interferometry basics
Lecture 32 - Interferometry basics - Part 1
Lecture 33 - Introduction to Python
Lecture 34 - Python - Part 2
Lecture 35 - Introduction to Matlab
Lecture 36 - Interferometry basics - Part 2
Lecture 37 - Python - Part 3
Lecture 38 - Matlab tutorial on interference
Lecture 39 - Applications of interference - Part 1
Lecture 40 - Holography
Lecture 41 - Applications of interference
Lecture 42 - Applications of Optical Engineering
Lecture 43 - Diffractive Optics
Lecture 44 - Diffraction Grating

NPTEL Video Course - Electrical Engineering - NOC:Nonlinear System Analysis

Subject Co-ordinator - Dr. Arun D. Mahindrakar, Prof. Ramkrishna Pasumarthy

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Supplementary lecture
Lecture 31 - Center Manifold Theorem
Lecture 32 - Interconnection between non linearity and a linear system - Sector Nonlinearities And Aizermannâ
Lecture 33 - Counter example for Aizermannâ s conjecture
Lecture 34 - Passivity inspiration - passive circuits - dissipation equality
Lecture 35 - Dissipative Equality for circuit (Continued...)
Lecture 36 - PR condition for passivity of SISO system
Lecture 37 - Examples of PR transfer functions
Lecture 38 - Relation between storage function and Lyapunov function - PR Lemma
Lecture 39 - Proof of PR Lemma
Lecture 40 - Proof (Continued...) using spectral factorization theorem
Lecture 41 - PR definition for MIMO case
Lecture 42 - PSD Storage function in PR Lemma and how to make it PD (strictly PR)
Lecture 43 - KYP Theorem
Lecture 44 - Passivity preservation under interconnection
Lecture 45 - Aizermannâ s conjecture under passivity assumption is true
Lecture 46 - Sector Nonlinearities and need for generlaizing KYP Lemma
Lecture 47 - Need for Loop transformations
Lecture 48 - Loop Transformations - Part 1
Lecture 49 - Loop Transformations - Part 2
Lecture 50 - Circle criterion for PR
Lecture 51 - Examples based on circle criterion and stability under circle transformations

NPTEL Video Course - Electrical Engineering - NOC:Signals and Systems

Subject Co-ordinator - Prof. Kushal K. Shah

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Fourier Transform of Noise
Lecture 31 - Types of Noise
Lecture 32 - Overview of Systems and General Properties
Lecture 33 - Linearity and Time Invariance
Lecture 34 - LTI System Examples
Lecture 35 - Frequency Response of RLC circuits - I
Lecture 36 - Frequency Response of RLC circuits - II
Lecture 37 - LCCDE Representation of Continuous-Time LTI Systems
Lecture 38 - Frequency Domain Representation of LCCDE Systems
Lecture 39 - Time Domain Representation of LTI Systems
Lecture 40 - Continuous-Time Convolution Integral
Lecture 41 - Continuous-Time Convolution
Lecture 42 - Continuous-Time Convolution
Lecture 43 - Continuous-Time Convolution
Lecture 44 - LTI Systems
Lecture 45 - LTI Systems
Lecture 46 - LTI Systems
Lecture 47 - Fourier Transform in Complex Frequency Domain
Lecture 48 - Laplace Transform
Lecture 49 - Laplace Transform
Lecture 50 - Laplace Transform
Lecture 51 - Laplace Transform
Lecture 52 - Laplace Analysis of LTI Systems
Lecture 53 - Laplace Analysis of RLC Circuits - I
Lecture 54 - Laplace Transform
Lecture 55 - Laplace Transform
Lecture 56 - Laplace Transform
Lecture 57 - Laplace Analysis of LTI Systems
Lecture 58 - Laplace Analysis of LTI Systems
Lecture 59 - Laplace Analysis of First Order RLC Circuits
Lecture 60 - Laplace Analysis of Second Order RLC Circuits
Lecture 61 - Fourier Transform of Periodic Signals
Lecture 62 - Fourier Series Representation in Continuous-Time
Lecture 63 - Fourier Series Properties - I
Lecture 64 - Fourier Series Properties - II
Lecture 65 - LTI System Response for Periodic Input Signal
Lecture 66 - Fourier Series in Continuous-Time
Lecture 67 - Fourier Series in Continuous-Time
Lecture 68 - Discrete-Time Convolution Sum

NPTEL Video Course - Electrical Engineering - NOC:Linear Dynamical Systems

Subject Co-ordinator - Prof. Tushar Jain

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:A brief Introduction of Micro-Sensors

Subject Co-ordinator - Prof. Santanu Talukder

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Fiber Optic Communication Technology

Subject Co-ordinator - Prof. Deepa Venkitesh

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Setbacks of direct modulation of laser
Lecture 31 - Setbacks of direct modulation of laser
Lecture 32 - Assignment Discussion - Week 3
Lecture 33 - Recap of direction modulation consequences
Lecture 34 - Noise in Lasers
Lecture 35 - Relative Intensity Noise
Lecture 36 - Laser Phase Noise - 1
Lecture 37 - Laser Phase Noise - 2
Lecture 38 - Effect of Laser Phase Noise
Lecture 39 - Electro-optic phase modulation
Lecture 40 - Electro-optic intensity modulator
Lecture 41 - Biasing of MZM
Lecture 42 - Biasing of MZM
Lecture 43 - Line coding schemes and their bandwidth requirements
Lecture 44 - Assignment Discussion - Week 4
Lecture 45 - Introduction to optical Fiber
Lecture 46 - Attenuation in optical fibers
Lecture 47 - Fiber Modes
Lecture 48 - Modes of a step index fiber - 1
Lecture 49 - Modes of a step index fiber - 2
Lecture 50 - Modes of a step index fiber - 3
Lecture 51 - Modes of a step index fiber - 4
Lecture 52 - Modes of a step index fiber - 5
Lecture 53 - Modes and Cut-off conditions
Lecture 54 - Universal b-V curves
Lecture 55 - Modal Profiles in step index fiber
Lecture 56 - Mode Field Diameter
Lecture 57 - Dispersion- Intermodal dispersion derivation
Lecture 58 - Dispersion-Bit rate distance Product
Lecture 59 - Phase Velocity and Group Velocity - 1
Lecture 60 - Phase Velocity and Group Velocity - 2
Lecture 61 - Material dispersion
Lecture 62 - Waveguide dispersion
Lecture 63 - Total Dispersion in optical fiber
Lecture 64 - Polarization mode dispersion
Lecture 65 - Photodetectors concepts
Lecture 66 - p-n and p-i-n Photodetectors
Lecture 67 - Avalance Photodetector
Lecture 68 - Direct detection receiver and sources of noise

Lecture 69 - Quantifying noises in direct detection receivers
Lecture 70 - SNR and Operation Regimes
Lecture 71 - Noise Equivalent power and SNR in APDs
Lecture 72 - Coherent Receivers
Lecture 73 - SNR analysis of coherent receivers
Lecture 74 - Performance Evaluation - 1
Lecture 75 - Performance Evaluation - 2
Lecture 76 - Performance Metrics
Lecture 77 - Performance Metrics
Lecture 78 - Quantum limit of photodetection
Lecture 79 - Optical Amplifier
Lecture 80 - Erbium doped fiber amplifier - 1
Lecture 81 - Erbium doped fiber amplifier - 2
Lecture 82 - Erbium doped fiber amplifier - 3
Lecture 83 - Erbium doped fiber amplifier - 4
Lecture 84 - Link Design - Rise Time Budget
Lecture 85 - Link Design - Case Study
Lecture 86 - Link Design - Passive Optical Network and long haul link
Lecture 87 - Dispersion - Recap
Lecture 88 - Dispersion Compensation - Pulse Propagation with disperison
Lecture 89 - Pulse propagation - 2
Lecture 90 - Dispersion Compensation - Dispersion Transfer Function
Lecture 91 - Dispersion Compensation - Case Study
Lecture 92 - Dispersion COmpensation - WDM and DSP
Lecture 93 - Nonlinear Effects- Nonlinear refractive Index
Lecture 94 - Self Phase Modulation
Lecture 95 - Cross Phase Modulation
Lecture 96 - Scattering Processes in optical fibers
Lecture 97 - Stimulated Brillouin Scattering
Lecture 98 - Stimulated Raman Scattering
Lecture 99 - Components - Directional Couplers
Lecture 100 - Components - VOA, Polariser, Polarisation Controllers
Lecture 101 - Components - Isolator
Lecture 102 - Components - Circulator, Definitions
Lecture 103 - Components - Wavelength filters
Lecture 104 - Components - Arrayed Waveguide Gratings, WSS
Lecture 105 - Balanced Detection
Lecture 106 - Polarisation Diverse Coherent Receiver
Lecture 107 - Phase and Polarisation Diverse Coherent Reciever

NPTEL Video Course - Electrical Engineering - NOC:Image Signal Processing

Subject Co-ordinator - Prof. A. N. Rajagopalan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 69 - Impulse noise filtering
Lecture 70 - Transform Domain Filtering
Lecture 71 - Illumination Handling
Lecture 72 - Applications of Restoration, and Image Deblurring
Lecture 73 - Haddamard's conditions and Least squares solution
Lecture 74 - Min-norm solution and Norm of Linear operator
Lecture 75 - Numerical stability analysis
Lecture 76 - Image Deblurring
Lecture 77 - Tikhonov-Miller Regularization
Lecture 78 - Conditional Mean as an Estimator
Lecture 79 - Linear Estimator
Lecture 80 - Wiener Filter
Lecture 81 - Fourier Wiener Filter
Lecture 82 - 1D Superresolution
Lecture 83 - Superresolution Examples

NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Electric Vehicles: Technology and Economics

Subject Co-ordinator - Prof. Ashok Jhunjhunwala, Prof. Prabhjot Kaur, Prof. Kaushal Kumar Jha, Prof. L Kannar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Computation of Effective cost of battery - Part 2
Lecture 31 - Charging Batteries
Lecture 32 - Fundamentals of Battery Pack Design
Lecture 33 - Mechanical Design - Part 1
Lecture 34 - Mechanical Design - Part 2
Lecture 35 - Mechanical Design - Part 3
Lecture 36 - Mechanical Design - Part 4
Lecture 37 - Thermal Design - Part 1
Lecture 38 - Thermal Design - Part 2
Lecture 39 - Thermal Design - Part 3
Lecture 40 - Thermal Design - Part 4
Lecture 41 - Electrical Design - Part 1
Lecture 42 - Electrical Design - Part 2
Lecture 43 - Electrical Design - Part 3
Lecture 44 - BMS Design of Electic Vehicle - Part 1
Lecture 45 - BMS Design of Electic Vehicle - Part 2
Lecture 46 - BMS Design of Electic Vehicle - Part 3
Lecture 47 - EV Motors and Controllers - Understanding Flow - Part 1
Lecture 48 - EV Motors and Controllers - Understanding Flow - Part 2
Lecture 49 - Power and Efficiency
Lecture 50 - Torque Production - Part 1
Lecture 51 - Torque Production - Part 2
Lecture 52 - Torque Production - Part 3
Lecture 53 - Speed and Back EMF
Lecture 54 - The d-q Equivalent circuit - Part 1
Lecture 55 - The d-q Equivalent circuit - Part 2
Lecture 56 - Field-oriented Control
Lecture 57 - Three phase AC - Part 1
Lecture 58 - Three phase AC - Part 2
Lecture 59 - Thermal Design - Part 1
Lecture 60 - Thermal Design - Part 2
Lecture 61 - Engineering Considerations - Part 1
Lecture 62 - Engineering Considerations - Part 2
Lecture 63 - Future Frontiers
Lecture 64 - EV Chargers
Lecture 65 - EV Chargers
Lecture 66 - EV Chargers
Lecture 67 - Battery Swapping
Lecture 68 - Standardization and On board Chargers

NPTEL Video Course - Electrical Engineering - NOC:Applied Linear Algebra

Subject Co-ordinator - Prof. Andrew Thangaraj

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Basic Electrical Circuits

Subject Co-ordinator - Dr. Nagendra Krishnapura

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Power and energy in an inductor
Lecture 31 - Power and energy in a voltage source
Lecture 32 - Power and energy in a current source
Lecture 33 - Goals of circuit analysis
Lecture 34 - Number of independent KCL equations
Lecture 35 - Number of independent KVL equations and branch relationships
Lecture 36 - Analysis of circuits with a single independent source
Lecture 37 - Analysis of circuits with multiple independent sources using superposition
Lecture 38 - Superposition
Lecture 39 - What is nodal analysis
Lecture 40 - Setting up nodal analysis equations
Lecture 41 - Structure of the conductance matrix
Lecture 42 - How do elements circuit appear in the nodal analysis formulation
Lecture 43 - Completely solving the circuit starting from nodal analysis
Lecture 44 - Nodal analysis example
Lecture 45 - Matrix inversion basics
Lecture 46 - Nodal analysis with independent voltage sources
Lecture 47 - Supernode for nodal analysis with independent voltage sources
Lecture 48 - Nodal analysis with VCCS
Lecture 49 - Nodal analysis with VCVS
Lecture 50 - Nodal analysis with CCVS
Lecture 51 - Nodal analysis with CCCS
Lecture 52 - Nodal analysis summary
Lecture 53 - Planar circuits
Lecture 54 - Mesh currents and their relationship to branch currents
Lecture 55 - Mesh analysis
Lecture 56 - Mesh analysis with independent current sources-Supermesh
Lecture 57 - Mesh analysis with current controlled voltage sources
Lecture 58 - Mesh analysis with current controlled current sources
Lecture 59 - Mesh analysis using voltage controlled sources
Lecture 60 - Nodal analysis versus Mesh analysis
Lecture 61 - Superposition theorem
Lecture 62 - Pushing a voltage source through a node
Lecture 63 - Splitting a current source
Lecture 64 - Substitution theorem
Lecture 65 - Substitution theorem
Lecture 66 - Substituting a voltage or current source with a resistor
Lecture 67 - Extensions to Superposition and Substitution theorem
Lecture 68 - Thevenin's theorem

Lecture 69 - Worked out example
Lecture 70 - Norton's theorem
Lecture 71 - Worked out example
Lecture 72 - Maximum power transfer theorem
Lecture 73 - Preliminaries
Lecture 74 - Two port parameters
Lecture 75 - y parameters
Lecture 76 - y parameters
Lecture 77 - z parameters
Lecture 78 - z parameters
Lecture 79 - h parameters
Lecture 80 - h parameters
Lecture 81 - g parameters
Lecture 82 - g parameters
Lecture 83 - Calculations with a two-port element
Lecture 84 - Calculations with a two-port element
Lecture 85 - Degenerate cases
Lecture 86 - Relationships between different two-port parameters
Lecture 87 - Equivalent circuit representation of two-ports
Lecture 88 - Reciprocity
Lecture 89 - Proof of reciprocity of resistive two-ports
Lecture 90 - Proof for 4-terminal two-ports
Lecture 91 - Reciprocity in terms of different two-port parameters
Lecture 92 - Reciprocity in circuits containing controlled sources
Lecture 93 - Examples
Lecture 94 - Feedback amplifier using an opamp
Lecture 95 - Ideal opamp
Lecture 96 - Negative feedback around the opamp
Lecture 97 - Finding opamp sign for negative feedback
Lecture 98 - Example
Lecture 99 - Analysis of circuits with opamps
Lecture 100 - More on opamps
Lecture 101 - Inverting amplifier
Lecture 102 - Summing amplifier
Lecture 103 - Instrumentation amplifier
Lecture 104 - Negative resistance
Lecture 105 - Finding opamp signs for negative feedback-circuits with multiple opamps
Lecture 106 - Opamp supply voltages and saturation
Lecture 107 - KCL with an opamp and supply currents

NPTEL Video Course - Electrical Engineering - NOC:Optical Fiber Sensors

Subject Co-ordinator - Prof. Balaji Srinivasan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Phase modulated sensors - 10
Lecture 31 - Phase modulated Sensors - 11
Lecture 32 - Wavelength modulated sensors - 1
Lecture 33 - Wavelength modulated sensors - 2
Lecture 34 - Wavelength modulated sensors - 3
Lecture 35 - Wavelength modulated sensors - 4
Lecture 36 - Wavelength modulated sensors - 5
Lecture 37 - Wavelength modulated sensors - 6
Lecture 38 - Wavelength modulated sensors - 7
Lecture 39 - Wavelength modulated sensors - 8
Lecture 40 - Polarization modulated sensors - 1
Lecture 41 - Polarization modulated sensors - 2
Lecture 42 - Polarization modulated sensors - 3

NPTEL Video Course - Electrical Engineering - NOC:Introduction to Time - Varying Electrical Networks

Subject Co-ordinator - Prof. Shanthi Pavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Frequency response of an LTV system
Lecture 31 - LTV system example : Time-varying RC filter
Lecture 32 - Linear Periodically Time-Varying Systems (LPTV)
Lecture 33 - Response of an LPTV system to a complex exponential input
Lecture 34 - Harmonic Transfer Functions
Lecture 35 - Zadeh expansion of an LPTV system
Lecture 36 - MNA analysis of LPTV networks
Lecture 37 - MNA stamp of a periodically time varying conductance
Lecture 38 - MNA stamp of a capacitor and a voltage source in an LPTV network
Lecture 39 - Analysis of an example LPTV network - Part 1
Lecture 40 - Analysis of an example LPTV network - Part 2
Lecture 41 - LPTV network analysis, RC filter, time-varying
Lecture 42 - Impedance and admittance in LTI and LPTV networks
Lecture 43 - Thevenin and Norton's Theorems for LPTV networks
Lecture 44 - The N-path principle
Lecture 45 - N-path example
Lecture 46 - Time-domain intuition of the N-path principle
Lecture 47 - N-path example: Time-Interleaved ADCs
Lecture 48 - Dc-dc converter as an LPTV system
Lecture 49 - N-path principle: Multiphase dc-dc converter
Lecture 50 - The N-path filter
Lecture 51 - Computing H_0(j2\pi f_s) for a 4-path filter
Lecture 52 - Input impedance of the 4-path filter at f_s
Lecture 53 - Computing H_0(j2\pi 2 f_s) for a 4-path filter
Lecture 54 - Determining H_0 for input frequency deviations from f_s
Lecture 55 - Reciprocity and Inter-reciprocity in LPTV networks : Part 1
Lecture 56 - Reciprocity and Inter-reciprocity in LPTV networks : Part 2, the transfer-function theorem
Lecture 57 - Why is the transfer-function theorem important?
Lecture 58 - The frequency-reversal theorem for inter-reciprocal (adjoint) LPTV networks : introduction
Lecture 59 - The frequency-reversal theorem for inter-reciprocal (adjoint) LPTV networks : derivation
Lecture 60 - Why is the frequency-reversal theorem important?
Lecture 61 - Inter-reciprocity in signal-flow graphs
Lecture 62 - Applications of inter-reciprocity: analysis of chopped amplifiers
Lecture 63 - Applications of inter-reciprocity: analysis of chopped amplifiers (Continued...)
Lecture 64 - Applications of inter-reciprocity: chopping with square-wave modulation
Lecture 65 - Applications of inter-reciprocity: the switched-RC network
Lecture 66 - Time-domain implications of inter-reciprocity and the adjoint network
Lecture 67 - Time-domain implications of inter-reciprocity and the adjoint network : Example calculation
Lecture 68 - LPTV networks with sampled outputs: Switched capacitor circuits

Lecture 69 - LPTV networks with sampled outputs: A continuous-time delta-sigma data converter
Lecture 70 - LPTV networks with sampled outputs: The equivalent LTI filter
Lecture 71 - Finding the equivalent LTI filter of a sampled LPTV system : example
Lecture 72 - Equivalent LTI filter for a switched-RC network
Lecture 73 - Finding the equivalent LTI filter of a sampled LPTV system : example of a continuous-time delta-
Lecture 74 - Finding the equivalent LTI filter of a sampled LPTV system with offset sampling
Lecture 75 - LPTV networks driven by modulated inputs
Lecture 76 - Introduction to noise in LPTV Networks
Lecture 77 - Noise in LPTV networks with sampled outputs
Lecture 78 - Total integrated noise in networks with R,L,C and periodically operated switches

NPTEL Video Course - Electrical Engineering - NOC:Digital System Design

Subject Co-ordinator - Prof. Neeraj Goel

Co-ordinating Institute - IIT - Ropar

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Encoders
Lecture 31 - Programmable hardware
Lecture 32 - Ripple carry adder
Lecture 33 - Carry look ahead adder
Lecture 34 - Modeling BUS in Verilog
Lecture 35 - Fast adder:Carry select adder
Lecture 36 - Multiple operand adder
Lecture 37 - Multiplication
Lecture 38 - Iterative circuits - 1
Lecture 39 - Iterative circuits - 2
Lecture 40 - Introduction to sequential circuits
Lecture 41 - Latches
Lecture 42 - D-Flip-flops
Lecture 43 - More Flip-flops
Lecture 44 - Counters
Lecture 45 - Verilog-Behavior model - 1
Lecture 46 - Verilog-Behavior model - 2
Lecture 47 - Registers - 1
Lecture 48 - Registers - 2
Lecture 49 - Memory
Lecture 50 - Sequential circuit analysis
Lecture 51 - Derivation state graph
Lecture 52 - Sequence detector: Example 1
Lecture 53 - Sequence detector: Example 2
Lecture 54 - State machine reduction
Lecture 55 - State encoding
Lecture 56 - Multi-cycle adder design
Lecture 57 - Pipelined adder design
Lecture 58 - Multiplication design
Lecture 59 - Division hardware design
Lecture 60 - Interacting state machines
Lecture 61 - Register Transfer Level design
Lecture 62 - GCD computer at RTL Level
Lecture 63 - RTL Design - Bubble sort
Lecture 64 - RTL Design - Traffic light controller
Lecture 65 - FPGA
Lecture 66 - Xilinx CLB
Lecture 67 - FPGA - Design flow
Lecture 68 - FPGA design demo

Lecture 69 - Introduction to ASIC design flow - Part 1
Lecture 70 - Introduction to ASIC design flow - Part 2
Lecture 71 - Future directions

NPTEL Video Course - Electrical Engineering - NOC:Stochastic Modeling and the Theory of Queues

Subject Co-ordinator - Prof. Krishna Jagannathan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Wald's Equality
Lecture 31 - Wald's Equality (Continued...)
Lecture 32 - Elementary Renewal Theorem
Lecture 33 - The Renewal Equation
Lecture 34 - The Renewal Equation (Continued...)
Lecture 35 - G/G/1 Queue and Little's theorem
Lecture 36 - Little's theorem
Lecture 37 - M/G/1 Queue
Lecture 38 - M/G/1 Queue and PK Formula
Lecture 39 - M/G/1 Queue and PK Formula (Continued...)
Lecture 40 - Ensemble rewards - Age and Duration
Lecture 41 - Ensemble rewards - Age and Duration (Continued...)
Lecture 42 - Key Renewal Theorem and Ensemble rewards
Lecture 43 - Introduction to finite state Discrete Time Markov Chains
Lecture 44 - Class and Types of Classes in a DTMC
Lecture 45 - Periodicity in a DTMC
Lecture 46 - Matrix Representation of a DTMC
Lecture 47 - The long term behaviour of a DTMC
Lecture 48 - Stationary Distribution and Long term behaviour of a DTMC - Part 1
Lecture 49 - Stationary Distribution and Long term behaviour of a DTMC - Part 2
Lecture 50 - Stationary Distribution and Long term behaviour of a DTMC - Part 3
Lecture 51 - Spectral Properties of Stochastic Matrices - Part 1
Lecture 52 - Spectral Properties of Stochastic Matrices - Part 2
Lecture 53 - The Short-term Behaviour of a DTMC
Lecture 54 - Introduction to Countable-state DTMC
Lecture 55 - Introduction to Countable-state DTMC (Continued...)
Lecture 56 - The Strong Markov Property
Lecture 57 - Renewal Theory applied to DTMC's
Lecture 58 - Stationary Distribution of a Countable State Space DTMC and Renewal Theory
Lecture 59 - Stationary Distribution of a Countable State Space DTMC and Renewal Theory (Continued...)
Lecture 60 - Stationary Distribution and The Steady State Behaviour of a Countable-state DTMC - Part 1
Lecture 61 - Stationary Distribution and The Steady State Behaviour of a Countable-state DTMC - Part 2
Lecture 62 - Convergence to Steady State of a Coutable-state DTMC (Stochastic Coupling)
Lecture 63 - The Birth-Death Markov Chains
Lecture 64 - The Reversibility Markov Chains
Lecture 65 - The Reversibility Markov Chains (Continued...)
Lecture 66 - Time Sampled M/M/1 Queue and The Burke's Theorem
Lecture 67 - Introduction to Continuous Time Markov Chains
Lecture 68 - Introduction to CTMC (Continued...)

NPTEL Video Course - Electrical Engineering - NOC:Integrated Photonics Devices and Circuits

Subject Co-ordinator - Prof. Bijoy Krishna Das

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Introduction to Semiconductor Devices

Subject Co-ordinator - Prof. Naresh Kumar Emani

Co-ordinating Institute - IIT - Hyderabad

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Types of Semiconductors
Lecture 2 - Classical Vs Quantum Mechanics
Lecture 3 - Electrons in infinite and finite 1D potential well
Lecture 4 - 3D potential well model of atom and Bohr's model
Lecture 5 - Covalent bonds and inter-atomic interactions in Silicon
Lecture 6 - Energy band formation
Lecture 7 - Electron hole pair generation
Lecture 8 - Direct and Indirect bandgap semiconductors
Lecture 9 - Energy levels in infinite and finite potential wells (short demo)
Lecture 10 - Effective mass in Semiconductors
Lecture 11 - Intrinsic carrier density
Lecture 12 - Doping and extrinsic semiconductors
Lecture 13 - Fermi level in extrinsic semiconductors
Lecture 14 - Temperature dependence of Fermi level
Lecture 15 - Temperature dependence of Fermi level
Lecture 16 - Charge neutrality relationship
Lecture 17 - Drift current and energy band representation of kinetic energy of carriers
Lecture 18 - Semiconductor bands in a electric field
Lecture 19 - Diffusion current
Lecture 20 - Non-uniform doping
Lecture 21 - Equilibrium Vs Nonequilibrium carrier response
Lecture 22 - Minority carrier diffusion equation (MCDE) - Example problems
Lecture 23 - Quasi Fermi level in nonequilibrium conditions
Lecture 24 - Quasi Fermi level and minority carrier diffusion length
Lecture 25 - Semiconductor device fabrication
Lecture 26 - PN Junctions - An introduction
Lecture 27 - PN Junction electrostatics
Lecture 28 - Energy band diagram of PN junction
Lecture 29 - Depletion width and peak electric field

Lecture 30 - PN junction electrostatics - examples
Lecture 31 - Demo of PN Junction Lab on Nanohub
Lecture 32 - Forward and reverse biased PN junctions
Lecture 33 - Minority carrier injection in PN junctions
Lecture 34 - Current in forward biased PN junction
Lecture 35 - Current in reverse biased PN junction
Lecture 36 - Depletion capacitance in PN junction
Lecture 37 - Non-idealities in PN junction diode
Lecture 38 - Nanohub Demo - PN Junction with applied bias
Lecture 39 - Schottky barrier in metal-semiconductor junction
Lecture 40 - Current flow across a Schottky barrier
Lecture 41 - Ohmic vs rectifying contacts
Lecture 42 - An Ideal MOS Capacitor
Lecture 43 - Operating regimes of a MOSCAP
Lecture 44 - Simplified band diagrams of accumulation and depletion in MOSCAP
Lecture 45 - Inversion in a MOSCAP
Lecture 46 - NMOSCAP in accumulation mode
Lecture 47 - NMOSCAP in depletion mode
Lecture 48 - NMOSCAP in inversion mode
Lecture 49 - Exact solution vs delta-depletion approximation
Lecture 50 - Threshold voltage in a MOSCAP
Lecture 51 - Nanohub Demo - MOSCAP tool
Lecture 52 - Non-ideal MOS Capacitor
Lecture 53 - MOSCAP Capacitance-Voltage (CV) Characteristics
Lecture 54 - Example problems with MOSCAPs
Lecture 55 - Impact of doping, oxide thickness and temperature on CV
Lecture 56 - Nanohub Demo - MOS CV
Lecture 57 - Introduction to MOSFET
Lecture 58 - Operating modes of a MOSFET
Lecture 59 - IV Characteristics of a long channel MOSFET
Lecture 60 - Example problems with MOSFETs
Lecture 61 - MOSFET device metrics
Lecture 62 - CMOS Technology
Lecture 63 - MOSFET Scaling and technology nodes
Lecture 64 - Limits of scaling
Lecture 65 - Current characteristics of a short channel MOSFET
Lecture 66 - Threshold voltage characteristics of short channel MOSFET
Lecture 67 - MOSFETs in the 21st century
Lecture 68 - Optical absorption and bandgap

Lecture 69 - Introduction to solar cells
Lecture 70 - Efficiency of a solar cell
Lecture 71 - Types of photodetectors
Lecture 72 - PIN and avalanche Photodectectors
Lecture 73 - Photodetector metrics
Lecture 74 - Radiative absoption and emission processes
Lecture 75 - Materials for optoelectronic devices
Lecture 76 - Operation of a light emitting diode (LED)
Lecture 77 - LED emission spectrum
Lecture 78 - Stimulated emission and lasing

NPTEL Video Course - Electrical Engineering - NOC:Electric Vehicles and Renewable Energy

Subject Co-ordinator - Prof. Ashok Jhunjhunwala, Prof. Prabhjot Kaur, Prof. Kaushal Kumar Jha, Prof. L Kannar

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 69 - Thermal Design - Part 3
Lecture 70 - Engineering Considerations - Part 1
Lecture 71 - Engineering Considerations - Part 2
Lecture 72 - Engineering Considerations - Part 3 and Future Frontiers
Lecture 73 - EV Charger Introduction
Lecture 74 - Charger Paramaters and Types
Lecture 75 - Slow Fast chargers and Swapping
Lecture 76 - Swapping
Lecture 77 - Standardization and on board chargers
Lecture 78 - Public chargers
Lecture 79 - Public charger economics in Indian Context
Lecture 80 - Bulk Chargers, Swapping stations and data analytics
Lecture 81 - Introduction to Energy Scenario in India - Part 1
Lecture 82 - Introduction to Energy Scenario in India - Part 2
Lecture 83 - A novel Approach towards 100% RE in India - Part 1
Lecture 84 - A novel Approach towards 100% RE in India - Part 2
Lecture 85 - Going Beyond solar, wind, Li Ion and chilled water storage
Lecture 86 - Solar Photovoltaic
Lecture 87 - Solar Cell and its Characteristics
Lecture 88 - Solar Cells to Modules
Lecture 89 - Wind Energy
Lecture 90 - The War of Currents
Lecture 91 - The Birth of Solar - DC
Lecture 92 - Storage Options for Energy - Part 1
Lecture 93 - Storage Options for Energy - Part 2
Lecture 94 - Storage Options for Energy - Part 3
Lecture 95 - Storage Options for Energy - Part 4
Lecture 96 - The EV Ecosystem - Part 1
Lecture 97 - The EV Ecosystem - Part 2

NPTEL Video Course - Electrical Engineering - Phase-locked loops

Subject Co-ordinator - Dr. Saurabh Saxena

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Nano and Quantum Photonics

Subject Co-ordinator - Prof. Naresh Kumar Emani

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Applications of Photonic Crystals
Lecture 31 - PhC in 1D - T-matrix examples
Lecture 32 - Introduction to Metamaterials
Lecture 33 - Metamaterials at GHz and THz frequecies
Lecture 34 - Negative index materials at optical frequencies
Lecture 35 - Plasmonic Metasurfaces
Lecture 36 - Dielectric Metasurfaces
Lecture 37 - Tunable and Active Metamaterials
Lecture 38 - Radiative Absorption and Emission
Lecture 39 - Miniaturization of Integrated Photonic Devices
Lecture 40 - Recent trends in nanoscale lasers
Lecture 41 - Non-Hermitian Systems
Lecture 42 - Resonant light-atom interactions
Lecture 43 - Experimental observation of Rabi oscillations
Lecture 44 - Atom-Cavity Interaction - Weak and strong coupling regimes
Lecture 45 - Experimental observation of weak and strong coupling
Lecture 46 - Fabrication of nanophotonic structures - 1
Lecture 47 - Fabrication of nanophotonic structures - 2
Lecture 48 - Measuring light quanta
Lecture 49 - Photon Statistics
Lecture 50 - Photodetection and shot noise limit
Lecture 51 - Second order correlation function
Lecture 52 - Hanbury Brown-Twiss Experiment with Photons
Lecture 53 - EM Waves as harmonic oscillator
Lecture 54 - Vacuum fluctuations
Lecture 55 - Coherent and squeezed states
Lecture 56 - Squeezed and photon number states
Lecture 57 - Application of squeezed states
Lecture 58 - Preliminaries for quantum theory of light
Lecture 59 - Quantum theory of light
Lecture 60 - Operator solution of quantum harmonic oscillator
Lecture 61 - Photon number states
Lecture 62 - Field quadratures and operators
Lecture 63 - Uncertainty relations for quantum light
Lecture 64 - Applications of quantum light - Quantum Key Distribution

NPTEL Video Course - Electrical Engineering - NOC:Analog Electronic Circuits (IITM)

Subject Co-ordinator - Prof. Shanthi Pavan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Modern Computer Vision

Subject Co-ordinator - Prof. A. N. Rajagopalan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Introduction to RNN - 2
Lecture 31 - Encoder-Decoder models in RNN
Lecture 32 - LSTM
Lecture 33 - Low-level vision - 1
Lecture 34 - Low-level vision - 2
Lecture 35 - Low-level vision - 3
Lecture 36 - Spatial Domain Filtering
Lecture 37 - Frequency Domain Filtering
Lecture 38 - Edge Detection - 1
Lecture 39 - Edge Detection - 2
Lecture 40 - DeepNets for Edge Detection
Lecture 41 - Line detection
Lecture 42 - Feature detectors
Lecture 43 - Harris Corner Detector - 1
Lecture 44 - Harris Corner Detector - 2
Lecture 45 - Harris Corner Detector - 3
Lecture 46 - Blob detection - 1
Lecture 47 - Blob detection - 2
Lecture 48 - Blob detection - 3
Lecture 49 - SIFT - 1
Lecture 50 - SIFT - 2
Lecture 51 - Feature descriptors - 1
Lecture 52 - Feature descriptors - 2
Lecture 53 - SURF - 1
Lecture 54 - SURF - 2
Lecture 55 - Single-View Geometry - 1
Lecture 56 - Single-View Geometry - 2
Lecture 57 - 2D Geometric transformations - 1
Lecture 58 - 2D Geometric transformations - 2
Lecture 59 - Camera intrinsics and extrinsics - 1
Lecture 60 - Camera intrinsics and extrinsics - 2
Lecture 61 - Two-view stereo - 1
Lecture 62 - Two-view stereo - 2
Lecture 63 - Two-view stereo - 3
Lecture 64 - Algebraic representation of epipolar geometry - 1
Lecture 65 - Algebraic representation of epipolar geometry - 2
Lecture 66 - Fundamental matrix computation - 1
Lecture 67 - Fundamental matrix computation - 2
Lecture 68 - Structure from Motion - 1

Lecture 69 - Structure from Motion - 2
Lecture 70 - Structure from Motion - 3
Lecture 71 - Batch processing in SFM
Lecture 72 - Multi-view SFM
Lecture 73 - Factorization methods in SFM
Lecture 74 - Bundle adjustment
Lecture 75 - Dense 3D reconstruction
Lecture 76 - Some results in Stereo and SFM
Lecture 77 - Deepnets for stereo and SFM - 1
Lecture 78 - Deepnets for stereo and SFM - 2
Lecture 79 - Mid-level vision - 1
Lecture 80 - Mid-level vision - 2
Lecture 81 - Lucas-Kanade method for OF
Lecture 82 - Handling large motion in optical flow
Lecture 83 - Image segmentation
Lecture 84 - GMM for clustering
Lecture 85 - Deepnets for Segmentation and OF -1
Lecture 86 - Deepnets for Segmentation and OF -2
Lecture 87 - Deepnets for Segmentation and OF -3
Lecture 88 - Deepnets for Object Detection - 1
Lecture 89 - Deepnets for Object Detection - 2
Lecture 90 - Vision and Language

NPTEL Video Course - Electrical Engineering - NOC:Optical Wireless Communications for Beyond 5G Networks and

Subject Co-ordinator - Prof. Anand Srivastava

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - ACO-OFDM
Lecture 31 - Color Shift Keying (CSK)
Lecture 32 - Higher order CSK
Lecture 33 - NOMA
Lecture 34 - NOMA VLC
Lecture 35 - MIMO
Lecture 36 - VLC based MIMO NOMA
Lecture 37 - Power allocation in VLC based MIMO NOMA
Lecture 38 - Hybrid Network LiFi and WiFi Coexistance
Lecture 39 - Vehicle to Vehicle communication using Visible light
Lecture 40 - Anand Singh Part - 1
Lecture 41 - Anand Singh Part - 2
Lecture 42 - Dilnasin lecture - 1
Lecture 43 - Saswati Paramita
Lecture 44 - Dilnashin Tutorial - 2
Lecture 45 - Guriendar Prof Anand 001
Lecture 46 - Rehana Prof Anand

NPTEL Video Course - Electrical Engineering - NOC:VLSI Design Flow: RTL to GDS

Subject Co-ordinator - Prof. Sneh Saurabh

Co-ordinating Institute - IIIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Static Timing Analysis - III
Lecture 31 - Static Timing Analysis using OpenSTA
Lecture 32 - Constraints - I
Lecture 33 - Constraints - II
Lecture 34 - Technology Mapping
Lecture 35 - Timing-driven Optimization
Lecture 36 - Technology Library and Constraints
Lecture 37 - Power Analysis
Lecture 38 - Power Optimization
Lecture 39 - Basic Concepts of DFT
Lecture 40 - Scan Design Flow
Lecture 41 - Power Analysis using OpenSTA
Lecture 42 - Automatic Test Pattern Generation (ATPG)
Lecture 43 - Built-in Self Test (BIST)
Lecture 44 - Basic Concepts for Physical Design - I
Lecture 45 - Basic Concepts for Physical Design - II
Lecture 46 - Installation of OpenRoad
Lecture 47 - Chip Planning - I
Lecture 48 - Chip Planning - II
Lecture 49 - Placement
Lecture 50 - Chip Planning and Placement
Lecture 51 - Clock Tree Synthesis (CTS)
Lecture 52 - Routing
Lecture 53 - Post-layout Verification and Signoff
Lecture 54 - Clock Tree Synthesis (CTS) and Routing

NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Wireless Communication (Hindi)

Subject Co-ordinator - Dr.Vivek Bohara

Co-ordinating Institute - IIIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Multi-Carrier Modulation and OFDM - Part 2
Lecture 31 - Multi-Carrier Modulation and OFDM - Part 3
Lecture 32 - Multi-Carrier Modulation and OFDM - Part 4
Lecture 33 - Numerical on OFDM
Lecture 34 - Programming for OFDM
Lecture 35 - OFDM System with Cyclic Prefix
Lecture 36 - OFDM Signal Transmission and OFDM System Design
Lecture 37 - Advantages and Drawbacks of OFDM System
Lecture 38 - OFDM Standards
Lecture 39 - Multiple Access Schemes
Lecture 40 - Technologies for Wireless Cellular Standards

NPTEL Video Course - Electrical Engineering - NOC:Sensor Technologies: Physics, Fabrication, and Circuits

Subject Co-ordinator - Prof.Mitradip Bhattacharjee

Co-ordinating Institute - IISER - Bhopal

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Advanced topics in Wireless Communication (Hindi)

Subject Co-ordinator - Prof. Vivek Ashok Bohara

Co-ordinating Institute - IIIT - Delhi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Introduction to Space Time Block Codes
Lecture 31 - Tutorial 4 - Convolution Codes: Hard and Soft Decoding
Lecture 32 - MIMO Zero-Forcing Receiver
Lecture 33 - MIMO MMSE Receiver
Lecture 34 - Introduction to MIMO SVD
Lecture 35 - Diagonalization of MIMO channel
Lecture 36 - Optimal Capacity of MIMO channel and MIMO Beamforming
Lecture 37 - Tutorial 5 - Random Access Technoques: ALOHA and CSMA
Lecture 38 - MIMO V-BLAST Receivers
Lecture 39 - Introduction to Adaptive Modulation and Coding
Lecture 40 - Modulation and Coding with Variable MQAM
Lecture 41 - Conventional Multiple Access Schemes
Lecture 42 - Next generation Multiple Access Schemes and Multi-User Channels
Lecture 43 - Overview of Cellular and Wi-Fi Standards
Lecture 44 - Evolution of Cellular and Wi-Fi Standards
Lecture 45 - Tutorial 6 - MIMO SVD Example
Lecture 46 - Tutorial 7 - Rate Splitting Multiple Access

NPTEL Video Course - Electrical Engineering - NOC:State Space Approach to Control System Analysis and Design

Subject Co-ordinator - Prof A P Tiwari

Co-ordinating Institute - IIT - Mandi

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Optimal Control

Subject Co-ordinator - Prof. Barjeev Tyagi

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electronics and Communication Engineering - NOC:Basics of Software Defined Radios and Pr

Subject Co-ordinator - Dr. Meenakshi Rawat

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Electrical Distribution System Analysis

Subject Co-ordinator - Prof. G. B. Kumbhar

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction to Electrical Distribution System
Lecture 2 - Components of Distribution System Substation and Busbar Layouts
Lecture 3 - Components of Distribution System and Feeder Configurations
Lecture 4 - Nature of Loads in a Distribution System
Lecture 5 - Load Allocation in a Distribution System
Lecture 6 - K Factors and Their Applications
Lecture 7 - Analysis of Uniformly Distributed
Lecture 8 - Lumping Loads in Geometric Configurations Rectangular
Lecture 9 - Lumping Loads in Geometric Configurations Triangular
Lecture 10 - Impedance of Distribution Lines and Feeders - Part I
Lecture 11 - Series Impedance of Distribution Lines and Feeders - Part II
Lecture 12 - Models of Distribution Lines and Cables
Lecture 13 - Modelling of Single-Phase and Three-Phase Transformers
Lecture 14 - Modelling of Three-Phase Transformers - Part I
Lecture 15 - Modelling of Three-Phase Transformers - Part II
Lecture 16 - Modelling of Three-Phase Transformers - Part III
Lecture 17 - Modelling of Three-Phase Transformers - Part IV
Lecture 18 - Modelling of Step Voltage Regulators - Part I
Lecture 19 - Modelling of Step Voltage Regulators - Part II
Lecture 20 - Modelling of Step Voltage Regulators - Part III
Lecture 21 - Modelling of Step Voltage Regulators - Part IV
Lecture 22 - Load Models in Distribution System - Part I
Lecture 23 - Load Models in Distribution System - Part II
Lecture 24 - Modelling of Distributed Generation
Lecture 25 - Applications and Modeling of Capacitor Banks
Lecture 26 - Summary of Modelling of Distribution System Components
Lecture 27 - Backward/Forward Sweep Load Flow Analysis - Part I
Lecture 28 - Backward/Forward Sweep Load Flow Analysis - Part II
Lecture 29 - Direct Approach Based Load Flow Analysis - Part I

NPTEL Video Course - Electrical Engineering - NOC:Introduction to Smart Grid

Subject Co-ordinator - Prof. Premalata Jena, Prof. N.P. Padhy

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Operation and Control of AC-DC hybrid Microgrid - II
Lecture 31 - Simulation and Case Study of AC Microgrid
Lecture 32 - Simulation and Case Study of DC Microgrid
Lecture 33 - Simulation and Case Study of AC-DC Hybrid Microgrid
Lecture 34 - Demand Side Management in Smart Grid
Lecture 35 - Demand Response Analysis of Smart Grid
Lecture 36 - Energy Management
Lecture 37 - Design of Smart Grid and Practical Smart Grid Case Study - I
Lecture 38 - Design of Smart Grid and Practical Smart Grid Case Study - II
Lecture 39 - System Analysis of AC/DC Smart Grid
Lecture 40 - Conclusions

NPTEL Video Course - Electrical Engineering - NOC:Facts Devices

Subject Co-ordinator - Prof. Avik Bhattacharya

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Advanced Linear Continuous Control Systems: Applications wi

Subject Co-ordinator - Prof. Yogesh Vijay Hote

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Computer Aided Power System Analysis

Subject Co-ordinator - Prof. Biswarup Das

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Advance Power Electronics and Control

Subject Co-ordinator - Prof. Avik Bhattacharya

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:CMOS Digital VLSI Design

Subject Co-ordinator - Prof. Sudeb Dasgupta

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Microelectronics: Devices to Circuits

Subject Co-ordinator - Prof. Sudeb Dasgupta

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Bipolar Junction Transistor
Lecture 2 - Bipolar Junction Transistor
Lecture 3 - Bipolar Junction Transistor
Lecture 4 - BJT Operation in active mode Circuit symbol and conventions - I
Lecture 5 - BJT Operation in active mode Circuit symbol and conventions - II
Lecture 6 - BJT as an amplifier small circuit model - I
Lecture 7 - BJT as an amplifier small circuit model - II
Lecture 8 - BJT Small Signal Circuit Model - I
Lecture 9 - BJT Small Signal Circuit Model - II
Lecture 10 - BJT as a switch and Ebers Moll Model
Lecture 11 - Simple BJT Inverter and second order effects
Lecture 12 - BJT Second order effects - I
Lecture 13 - BJT Second order effects - II
Lecture 14 - MOS Transistor basics - I
Lecture 15 - MOS Transistor basics - II
Lecture 16 - MOS Transistor basics - III
Lecture 17 - MOS Parasitic and SPICE Model
Lecture 18 - CMOS Inverter Basics - I
Lecture 19 - CMOS Inverter Basics - II
Lecture 20 - CMOS Inverter Basics - III
Lecture 21 - Power Analysis - I
Lecture 22 - Logical Efforts - I
Lecture 23 - Fabrication-Process - I
Lecture 24 - Fabrication-Process - II
Lecture 25 - Biasing of Amplifier and its behaviour as an Analog switch - I
Lecture 26 - Biasing of Amplifier and its behaviour as an Analog switch - II
Lecture 27 - Biasing of Amplifier and its behaviour as an Analog switch - III
Lecture 28 - CMOS CS/CG/CD Amplifier Configuration
Lecture 29 - CMOS CG/CD Amplifier Configuration

NPTEL Video Course - Electrical Engineering - NOC:DC Microgrid

Subject Co-ordinator - Prof. Avik Bhattacharya

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Power Quality Improvement Technique

Subject Co-ordinator - Prof. Avik Bhattacharya

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Shunt Active Power Filter - II
Lecture 31 - Shunt Active Power Filter - III
Lecture 32 - Shunt Active Power Filter - IV
Lecture 33 - Hybrid Active Power Filter - I
Lecture 34 - Hybrid Active power Filter - II
Lecture 35 - Hybrid Shunt Active Power Filter
Lecture 36 - UPQC Introduction and classification
Lecture 37 - UPQC Classification
Lecture 38 - Operation and Control of UPQC
Lecture 39 - Control of UPQC
Lecture 40 - Conclusion

NPTEL Video Course - Electrical Engineering - NOC:Power System Protection and Switchgear

Subject Co-ordinator - Prof. Bhaveshkumar R. Bhalja

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:RF Transceiver of Design

Subject Co-ordinator - Prof. Darshak Bhatt

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:VLSI Physical Design with Timing Analysis

Subject Co-ordinator - Prof. Bishnu Prasad Das

Co-ordinating Institute - IIT - Roorkee

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Wirelength estimation techniques
Lecture 31 - Min-cut placement
Lecture 32 - Placement Algorithms
Lecture 33 - Placement algorithms and legalization
Lecture 34 - Introduction to Clock Tree Synthesis
Lecture 35 - Clock Routing Algorithms - I
Lecture 36 - Clock Routing Algorithms - II
Lecture 37 - Clock Routing Algorithms - III
Lecture 38 - Introduction and Optimization Goals - Global Routing
Lecture 39 - Single net routing (Rectilinear routing)
Lecture 40 - Global Routing in the connectivity graph
Lecture 41 - Finding Shortest Paths with Dijkstra's Algorithm
Lecture 42 - Full-Netlist Routing
Lecture 43 - Introduction: Detailed Routing
Lecture 44 - Channel Routing Algorithms - I
Lecture 45 - Channel Routing Algorithms - II
Lecture 46 - Switchbox and Over the cell routing
Lecture 47 - Timing Constraints in latch based system
Lecture 48 - Timing Constraints in Pulsed Latch-based System
Lecture 49 - Time Borrowing in Latch
Lecture 50 - Crosstalk Analysis
Lecture 51 - Standard Cell Library
Lecture 52 - Low Power Cells in Standard Cell Library
Lecture 53 - Sub-threshold Standard Cell Library
Lecture 54 - Timing Library for Standard Cells
Lecture 55 - PDK and Other files
Lecture 56 - Open-Source Tool Installation and Qflow
Lecture 57 - Open-Source tool - YOSYS
Lecture 58 - OpenSTA Static Timing Analyzer
Lecture 59 - OpenROAD Physical Synthesis Flow - I
Lecture 60 - OpenROAD Physical Synthesis Flow - II

NPTEL Video Course - Electrical Engineering - An Introduction to Electronics Systems Packaging

Subject Co-ordinator - Prof. G.V. Mahesh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction and Objectives of the course
Lecture 2 - Definition of a system and history of semiconductors
Lecture 3 - Products and levels of packaging
Lecture 4 - Packaging aspects of handheld products; Case studies in applications
Lecture 5 - Case Study (continued); Definition of PWB, summary and Questions for review
Lecture 6 - Basics of Semiconductor and Process flowchart; Video on â Sand-to-Siliconâ •
Lecture 7 - Wafer fabrication, inspection and testing
Lecture 8 - Wafer packaging; Packaging evolution; Chip connection choices
Lecture 9 - Wire bonding, TAB and flipchip-1
Lecture 10 - Wire bonding, TAB and flipchip-2; Tutorials
Lecture 11 - Why packaging? & Single chip packages or modules (SCM)
Lecture 12 - Commonly used packages and advanced packages; Materials in packages
Lecture 13 - Advances packages (continued); Thermal mismatch in packages; Current trends in packaging
Lecture 14 - Multichip modules (MCM)-types; System-in-package (SIP); Packaging roadmaps; Hybrid circuits; Qui
Lecture 15 - Electrical Issues â I; Resistive Parasitic
Lecture 16 - Electrical Issues â II; Capacitive and Inductive Parasitic
Lecture 17 - Electrical Issues â III; Layout guidelines and the Reflection problem
Lecture 18 - Electrical Issues â IV; Interconnection
Lecture 19 - Quick Tutorial on packages; Benefits from CAD; Introduction to DFM, DFR & DFT
Lecture 20 - Components of a CAD package and its highlights
Lecture 21 - Design Flow considerations; Beginning a circuit design with schematic work and component layout
Lecture 22 - Demo and examples of layout and routing; Technology file generation from CAD; DFM check list and
Lecture 23 - Review of CAD output files for PCB fabrication; Photo plotting and mask generation
Lecture 24 - Process flow-chart; Vias; PWB substrates
Lecture 25 - Substrates continued; Video highlights; Surface preparation
Lecture 26 - Photoresist and application methods; UV exposure and developing; Printing technologies for PWBs
Lecture 27 - PWB etching; Resist stripping; Screen-printing technology
Lecture 28 - Through-hole manufacture process steps; Panel and pattern plating methods
Lecture 29 - Video highlights on manufacturing; Solder mask for PWBs; Multilayer PWBs; Introduction to microv

NPTEL Video Course - Electrical Engineering - Power Electronics and Distributed Generation

Subject Co-ordinator - Dr. Vinod John

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - DG evaluation problems and examples
Lecture 31 - Switch selection in two level voltage source inverters and loss evaluation
Lecture 32 - Thermal model, management and cycling failure of IGBT modules
Lecture 33 - Semiconductor switch design reliability considerations
Lecture 34 - AC filters for grid connected inverters
Lecture 35 - AC inductor design and need for LCL filter
Lecture 36 - LCL filter design
Lecture 37 - Examples in power electronic design for DG systems
Lecture 38 - Examples in power electronic design for DG systems continued
Lecture 39 - Higher order passive damping design for LCL filters
Lecture 40 - Balance of hardware component for inverters in DG systems

NPTEL Video Course - Electrical Engineering - Pulse width Modulation for Power Electronic Converters

Subject Co-ordinator - Dr. G. Narayanan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - Switched Mode Power Conversion

Subject Co-ordinator - Prof. L. Umanand, Prof. V. Ramanarayanan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Implementation of PID controller
Lecture 31 - Pulse Width Modulator
Lecture 32 - Controller Design - I
Lecture 33 - Controller Design - II
Lecture 34 - Controllers and Sensing Circuit
Lecture 35 - Regulation of Multiple outputs - I
Lecture 36 - Regulation of Multiple outputs - II
Lecture 37 - Current Control
Lecture 38 - Unity Power Factor Converter
Lecture 39 - Magnetic Design
Lecture 40 - DC-DC Converter Design

NPTEL Video Course - Electrical Engineering - Basic Electrical Technology

Subject Co-ordinator - Prof. L. Umanand

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Three Phase System - Part 2
Lecture 31 - Three Phase System - Part 3
Lecture 32 - Three Phase System - Part 4
Lecture 33 - Three Phase Transformer - Part 1
Lecture 34 - Three Phase Transformer - Part 2
Lecture 35 - Induction Motor - Part 1
Lecture 36 - Induction Motor - Part 2
Lecture 37 - Induction Motor - Part 3
Lecture 38 - Induction Motor - Part 4
Lecture 39 - Synchronous Machine

NPTEL Video Course - Electrical Engineering - Industrial Drives - Power Electronics

Subject Co-ordinator - Prof. K. Gopakumar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Design for Internet of Things

Subject Co-ordinator - Prof. T.V. Prabhakar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Case Study 1 - Joule Jotter
Lecture 31 - Case Study 2 - Cloud Based Systems

NPTEL Video Course - Electrical Engineering - NOC:Advances in UHV Transmission and Distribution

Subject Co-ordinator - Prof Subba Reddy B

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Advantages of HVAC/DC Transmission, Introduction to Grid Management
Lecture 2 - Transmission system development, Important components of transmission system
Lecture 3 - Insulation coordination, over voltage in power systems
Lecture 4 - Design/selection of insulators, Importance of grading/cc rings
Lecture 5 - Non ceramic insulators performance-service experience
Lecture 6 - Failure of apparatus in the field, importance of reliability and testing
Lecture 7 - Pollution flashover phenomena, modeling etc
Lecture 8 - Planning of High Voltage laboratories
Lecture 9 - Importance of High Voltage testing and techniques employed
Lecture 10 - Basic philosophy of HV testing, tests for various HV apparatus
Lecture 11 - HV testing techniques for various apparatus
Lecture 12 - HV testing on Composite Insulators
Lecture 13 - Surface degradation studies on composite insulators
Lecture 14 - Surface morphological techniques for composite insulators
Lecture 15 - Conductors used for EHV/UHV transmission
Lecture 16 - Corona nad interference on transmission lines
Lecture 17 - Introduction of HTLS conductors and their advantages
Lecture 18 - Mechanical considerations for HV conductors
Lecture 19 - Introduction to Towers and importance of foundations
Lecture 20 - Selection/Design of clearances for HV towers
Lecture 21 - Design Optimization for UHV towers
Lecture 22 - Introduction to 1100kV HVDC
Lecture 23 - Introduction to HV Substations
Lecture 24 - Types of Substations, comparison
Lecture 25 - Insulation coordination, Components in a typical substation
Lecture 26 - Preventive maintenance of Substation
Lecture 27 - Electric and magnetic fields, mitigations techniques
Lecture 28 - Importance of Grounding, reducing Earthing resistance
Lecture 29 - Introduction to the use of Fiber optic cables, OPGW

Lecture 30 - Introduction to communication and SCADA
Lecture 31 - Precautions and safety measures in substation
Lecture 32 - Electrical hazards, minimum clearances in substation
Lecture 33 - Importance of Generation of HVDC in the laboratory
Lecture 34 - Importance of Generation of HVAC, Impulse Voltage and Currents in the laboratory
Lecture 35 - Measurements of High Voltages
Lecture 36 - Measurements of High Voltages (Continued...)
Lecture 37 - Introduction to digital recorders, measurement
Lecture 38 - Upgradation/uprating of transmission lines- advantages
Lecture 39 - Upgradation/uprating of transmission lines- advantages (Continued...)
Lecture 40 - Summary of the course

NPTEL Video Course - Electrical Engineering - NOC:Mathematical Methods and Techniques in Signal Processing

Subject Co-ordinator - Prof. Shayan Srinivasa Garani

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Problem on MAP Detection
Lecture 31 - Fourier transform of dirac comb sequence
Lecture 32 - Sampling theorem
Lecture 33 - Basics of multirate systems
Lecture 34 - Frequency representation of expanders and decimators
Lecture 35 - Decimation and interpolation filters
Lecture 36 - Fractional sampling rate alterations
Lecture 37 - Digital filter banks
Lecture 38 - DFT as filter bank
Lecture 39 - Noble Identities
Lecture 40 - Polyphase representation
Lecture 41 - Efficient architectures for interpolation and decimation filters
Lecture 42 - Problems on simplifying multirate systems using noble identities
Lecture 43 - Problem on designing synthesis bank filters
Lecture 44 - Efficient architecture for fractional decimator
Lecture 45 - Multistage filter design
Lecture 46 - Two-channel filter banks
Lecture 47 - Amplitude and phase distortion in signals
Lecture 48 - Polyphase representation of 2-channel filter banks, signal flow graphs and perfect reconstructio
Lecture 49 - M-channel filter banks
Lecture 50 - Polyphase representation of M-channel filter bank
Lecture 51 - Perfect reconstruction of signals
Lecture 52 - Nyquist and half band filters
Lecture 53 - Special filter banks for perfect reconstruction
Lecture 54 - Introduction to wavelets
Lecture 55 - Multiresolution analysis and properties
Lecture 56 - The Haar wavelet
Lecture 57 - Structure of subspaces in MRA
Lecture 58 - Haar decomposition - 1
Lecture 59 - Haar decomposition - 2
Lecture 60 - Wavelet Reconstruction
Lecture 61 - Haar wavelet and link to filter banks
Lecture 62 - Demo on wavelet decomposition
Lecture 63 - Problem on circular convolution
Lecture 64 - Time frequency localization
Lecture 65 - Basic analysis
Lecture 66 - Basic Analysis
Lecture 67 - Fourier series and notions of convergence
Lecture 68 - Convergence of Fourier series at a point of continuity

Lecture 69 - Convergence of Fourier series for piecewise differentiable periodic functions
Lecture 70 - Uniform convergence of Fourier series of piecewise smooth periodic function
Lecture 71 - Convergence in norm of Fourier series
Lecture 72 - Convergence of Fourier series for all square integrable periodic functions
Lecture 73 - Problem on limits of integration of periodic functions
Lecture 74 - Matrix Calculus
Lecture 75 - KL transform
Lecture 76 - Applications of KL transform
Lecture 77 - Demo on KL Transform
Lecture 78 - Live Session
Lecture 79 - Live Session 2

NPTEL Video Course - Electrical Engineering - NOC:Electronics Enclosures Thermal Issues

Subject Co-ordinator - Prof. N. V Chalapathi Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Integrated Circuits, MOSFETs, Op-Amps and their Applicatior

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Hartley and Colpitts Oscillator using Op-amp
Lecture 31 - Working of Crystal Oscillators
Lecture 32 - Construction and Operation of UJT Relaxation Oscillators
Lecture 33 - Introduction to Noise and its Types
Lecture 34 - Analysis of Data Sheets of an Op-Amp
Lecture 35 - Analysis of Data Sheets of an Op-Amp (Continued...)
Lecture 36 - Analysis of Data Sheets of an Op-Amp (Continued...)
Lecture 37 - Experiment - Introduction to Laboratory Equipment
Lecture 38 - Experiment - Measurement of Active and Passive elements using Multimeter
Lecture 39 - Experiment - Working with Laboratory Equipment
Lecture 40 - Experiment - Working with Laboratory Equipment
Lecture 41 - Experiment - Op-Amp Characteristics
Lecture 42 - Experiment - Op-Amp Characteristics
Lecture 43 - Experiment - Op-Amp Characteristics
Lecture 44 - Experiment - Op-Amp as Inverting Amplifier
Lecture 45 - Experiment - Op-Amp as Non-Inverting Amplifier
Lecture 46 - Experiment - To study input and output voltage range of an Op-Amp
Lecture 47 - Experiment - Differential amplifier using op-amp
Lecture 48 - Experiment - To study the gain of instrumentation amplifier
Lecture 49 - Experiment - Summing amplifier using op-amp
Lecture 50 - Experiment - To study op-amp based comparator
Lecture 51 - Experiment - To study op-amp based integrator and differentiator
Lecture 52 - Experiment - Study of passive low pass filter
Lecture 53 - Experiment - Op-amp based active low pass filter
Lecture 54 - Experiment - Passive and active high pass filter
Lecture 55 - Experiment - Introduction to experimental set-up of band pass filter
Lecture 56 - Experiment - Passive and active band pass filter
Lecture 57 - Experiment - Introduction to experimental set-up for band reject filter
Lecture 58 - Experiment - Active band reject filter
Lecture 59 - Experiment - Peak detector circuit using Op-Amp

NPTEL Video Course - Electrical Engineering - NOC:Semiconductor Devices and Circuits

Subject Co-ordinator - Prof. Sanjiv Sambandan

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - BJT
Lecture 31 - BJT
Lecture 32 - Metal Oxide Semiconductor Capacitor (MOSCAP)
Lecture 33 - MOSCAP (Continued...)
Lecture 34 - MOSCAP
Lecture 35 - MOSCAP
Lecture 36 - MOSFET
Lecture 37 - MOSFET
Lecture 38 - MOSFET
Lecture 39 - MOSFET
Lecture 40 - Subthreshold swing, Additional concepts
Lecture 41 - Trapped charge, Body-bias
Lecture 42 - Scaling of MOSFETs
Lecture 43 - Scaling of MOSFETs (Continued...), Leakage currents in MOSFETs
Lecture 44 - MOSFET characterization
Lecture 45 - MOSFET characterization
Lecture 46 - MOSFET as a switch
Lecture 47 - MOSFET as a switch (Continued...)
Lecture 48 - Amplifiers using MOSFET
Lecture 49 - Amplifiers using MOSFET (Continued...)
Lecture 50 - Circuits
Lecture 51 - Introduction
Lecture 52 - Thin Film Transistors
Lecture 53 - Tutorials Session - 1
Lecture 54 - Tutorials Session - 2
Lecture 55 - Tutorials Session - 3

NPTEL Video Course - Electrical Engineering - NOC:Fabrication Techniques for MEMs-based Sensors: Clinical Per

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Smart Catheter
Lecture 31 - Smart Catheter
Lecture 32 - Smart Catheter
Lecture 33 - Tissue and Cell Culture Techniques
Lecture 34 - Clean Room
Lecture 35 - GLP
Lecture 36 - Introduction to Equipments
Lecture 37 - Gowning Procedure for using Biological Lab Setup
Lecture 38 - Introduction to Equipments
Lecture 39 - Introduction to Equipments
Lecture 40 - Introduction to Equipments
Lecture 41 - Function generator, Multimeter, Sampling, LabVIEW, NI-CDAQ
Lecture 42 - Introduction to Equipments
Lecture 43 - Introduction to Equipments
Lecture 44 - Introduction to Equipments
Lecture 45 - Introduction to Equipments
Lecture 46 - Introduction to Equipments
Lecture 47 - Introduction to Equipments
Lecture 48 - Introduction to Equipments
Lecture 49 - Introduction to Equipments
Lecture 50 - Introduction to Equipments
Lecture 51 - PDMS Moulding
Lecture 52 - 3D Printing
Lecture 53 - Introduction to Fabricated Sensors
Lecture 54 - Simulation
Lecture 55 - Simulation

NPTEL Video Course - Electrical Engineering - NOC:Op-Amp Practical Applications: Design, Simulation and Imple

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Experiment
Lecture 31 - Introduction to ECG Experiment
Lecture 32 - Desing and Implementation of ECG Preprocessing Stage - Part 1
Lecture 33 - Desing and Implementation of ECG Preprocessing Stage - Part 2
Lecture 34 - Desing and Implementation of ECG Preprocessing Stage - Part 3
Lecture 35 - Desing and Implementation of ECG Preprocessing Stage - Part 4
Lecture 36 - Desing and Implementation of Peak Detetor and Thresholding Circuit for ECG Signal Conditioning
Lecture 37 - Live Demonstration on ECG Signal Acquistion, Conditioning and Measurement of BPM
Lecture 38 - Understanding Analog Multipliers using Development Board
Lecture 39 - Application
Lecture 40 - Introdution to Data-Acquisition
Lecture 41 - Analog to Digital Conversion Circuits and Experiment on 2-bit Flash Type ADC
Lecture 42 - Digital to Analog Conversion Circuits and Experiment on 4-bit R-2R DAC
Lecture 43 - DAC Basics using Development Board - Introduction
Lecture 44 - Understanding DAC 7821 Datasheet
Lecture 45 - Basic DAC Experiment on Variable Gain Amplifier
Lecture 46 - Understanding DAC
Lecture 47 - Introduction to CDAQ (Compact DAQ)
Lecture 48 - Software-in-Loop based Temperature Controller using CDAQ and LabVIEW

NPTEL Video Course - Electrical Engineering - NOC:Physical Modelling for Electronics Enclosures using Rapid p

Subject Co-ordinator - Prof. N. V Chalapathi Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Recent Advances in Transmission Insulators

Subject Co-ordinator - Prof Subba Reddy B

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Fundamentals of Semiconductor Devices

Subject Co-ordinator - Prof. Digbijoy N. Nath

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - MOS
Lecture 31 - MOS
Lecture 32 - Ideal MOS system
Lecture 33 - MOS C-V in more details
Lecture 34 - MOSFET - An introduction
Lecture 35 - Gradual Channel Approximation
Lecture 36 - Substrate bias effect and subthreshold conduction in MOSFET
Lecture 37 - Short Channel Effects in MOSFET
Lecture 38 - Introduction to compound semiconductors
Lecture 39 - Basics of heterojunctions
Lecture 40 - Band diagram of heterojunctions
Lecture 41 - Heterojunctions (Continued....)
Lecture 42 - Heterojunction transistors
Lecture 43 - III-nitrides
Lecture 44 - Solar cell basics
Lecture 45 - Solar cell (Continued...)
Lecture 46 - Solar cell
Lecture 47 - Basics of photodetectors
Lecture 48 - Photodetectors
Lecture 49 - Junction photodetectors
Lecture 50 - Basics of recombination
Lecture 51 - Basics of LED
Lecture 52 - LED
Lecture 53 - Visible LED
Lecture 54 - Transistors for power electronics
Lecture 55 - Transistors for power electronics (Continued...) and for RF electronics
Lecture 56 - Transistors for RF (Continued...) and transistors for Memory
Lecture 57 - Basics of microelectronic fabrication
Lecture 58 - Microelectronic fabrication (Continued...)
Lecture 59 - Summary

NPTEL Video Course - Electrical Engineering - NOC:Advanced IOT Applications

Subject Co-ordinator - Prof. T V Prabhakar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Device Security - Part 3
Lecture 31 - Need for air quality monitoring
Lecture 32 - Air quality
Lecture 33 - Introduction to air quality sensors
Lecture 34 - Calibration techniques for IoT air quality sensors
Lecture 35 - Sensor types
Lecture 36 - Air quality
Lecture 37 - Air quality
Lecture 38 - Air quality
Lecture 39 - Air quality
Lecture 40 - Introduction to First Responder networks
Lecture 41 - First Responders - Applications - Part 1
Lecture 42 - First Responders - Applications - Part 2
Lecture 43 - Cargo monitoring for tamper detection - Part 1
Lecture 44 - Cargo monitoring for tamper detection - Part 2

NPTEL Video Course - Electrical Engineering - NOC:Electronic Systems for Cancer Diagnosis

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 69 - Demonstration of Thermal Acutator and Understanding of Application Builder
Lecture 70 - Closed loop control of temperature sensor
Lecture 71 - Experimental Set-up of closed loop control of temperature sensor

NPTEL Video Course - Electrical Engineering - NOC:Electronic Modules for Industrial Applications using Op-Amp

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Sensors and Actuators

Subject Co-ordinator - Prof. Hardik Jeetendra Pandya

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Signal Conditioning Circuit for Temperature Sensors
Lecture 31 - Demonstration of Microheaters in COMSOL Multiphysics
Lecture 32 - Introduction to Cleanroom facilities for biomedical applications
Lecture 33 - Physical Deposition Techniques
Lecture 34 - Demonstration on peristaltic pump in cleanroom
Lecture 35 - Installation of Oxygen Plasma System
Lecture 36 - Demonstration of IR Based Sensor using Arduino
Lecture 37 - Illustration of fabricated Microfluidic Device for biochips with PDMS moulding
Lecture 38 - Photolithography - Part 2
Lecture 39 - Photolithography - Part 3
Lecture 40 - Introduction and Demonstration of Shape Memory Alloy
Lecture 41 - Applications of Shape Memory Alloy as a light weight actuators
Lecture 42 - Discussion on Fabricated Sensor with Silicon as Substrate
Lecture 43 - Discussion and Microscopic Inspection of Fabricated Sensor with Silicon as a Substrate
Lecture 44 - Tissue Deparaffinization for Biosensors
Lecture 45 - Clean room guidelines and Cancer Dianostic tool
Lecture 46 - Basics of Pressure Sensor and Demonstration using Arduino Microcontroller
Lecture 47 - Basics of Stepper Motor and Demonstration using Arduino Microcontroller
Lecture 48 - Microscopic Inspection of Diced wafers and CNT Sensing Layer for fabricated sensor
Lecture 49 - Process flow for Microcantilever for Mechanical Phenotyping of breast cancer tissues
Lecture 50 - Applications of microcantilever for Mechanical Phenotyping of breast cancer tissues
Lecture 51 - Installation and Introduction to Physical Vapour Deposition System
Lecture 52 - Human Machine Interface for Controlling Deposition System
Lecture 53 - Flexible MEMS for phenotyping tissue properties - I
Lecture 54 - Flexible MEMS for phenotyping tissue properties - II
Lecture 55 - System Demonstration for Physical Vapor Deposition
Lecture 56 - Introduction to CAD Modelling - I
Lecture 57 - Introduction to CAD Modelling - II
Lecture 58 - Biosensors for ETM Phenotyping of breast cancer tissues for better prognosis
Lecture 59 - Biosensors for Electrothermal sensor
Lecture 60 - MEMS based sensor for catheter contact force measurement
Lecture 61 - Microfluidics based Drug Screening
Lecture 62 - Basic aspects of 3D Printing
Lecture 63 - 3D Printing Materials and Demonstration of Remote 3D Printing

NPTEL Video Course - Electrical Engineering - NOC:Neural Networks for Signal Processing-I

Subject Co-ordinator - Prof. Shayan Srinivasa Garani

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Electronics Equipment Integration and Prototype Building

Subject Co-ordinator - Prof. N.V.Chalapathi Rao

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Electronics to Mechanical interfacing
Lecture 31 - Complexity of 3D assemblies with wiring
Lecture 32 - Illustrative simple design
Lecture 33 - Practical detailing
Lecture 34 - Rendered on screen
Lecture 35 - Fastenings and hardware
Lecture 36 - Fastener representation, deatiling
Lecture 37 - Practical detailing.
Lecture 38 - Recapitulation, context of course
Lecture 39 - Low cost is the key

NPTEL Video Course - Electrical Engineering - NOC:Design and Simulation of Power Conversion using Open Source

Subject Co-ordinator - Prof. L. Umanand

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Flyback converter - simulation
Lecture 31 - Pushpull converter - review
Lecture 32 - Pushpull converter - simulation
Lecture 33 - Half bridge converter - review
Lecture 34 - Half bridge converter - simulation
Lecture 35 - Full bridge converter - review
Lecture 36 - Full bridge converter - simulation
Lecture 37 - Close loop operation
Lecture 38 - Close loop with feed forward control
Lecture 39 - NgSpice simulation of close loop control
Lecture 40 - Battery charging with current control
Lecture 41 - Slope compensation for current control
Lecture 42 - NgSpice simulation of battery charging
Lecture 43 - Single phase PWM for single phase inverter
Lecture 44 - NgSpice simulation of single phase PWM
Lecture 45 - 2-axes theory for 3-phase systems
Lecture 46 - Transformations for 2 and 3 axes systems
Lecture 47 - Maximum power point tracking - NgSpice
Lecture 48 - Space vector PWM - digital
Lecture 49 - Space vector PWM - analog
Lecture 50 - SVPWM analog - NgSpice simulation
Lecture 51 - Induction motor model
Lecture 52 - Induction motor simulation in Octave
Lecture 53 - V/F control of induction motor - NgSpice

NPTEL Video Course - Electrical Engineering - NOC:Introductory Neuroscience and Neuro-Instrumentation

Subject Co-ordinator - Prof. Mahesh Jayachandra

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Signal Conditioning Circuit for EEG Bioamplifiers
Lecture 31 - Basics of BCI Experimentation
Lecture 32 - Different Brain Computer Interfaces
Lecture 33 - Introduction to EEGLAB, ERPLAB and AEP Demonstration (1)
Lecture 34 - Introduction to EEGLAB, ERPLAB and AEP Demonstration (2)
Lecture 35 - Introduction to Photolithography
Lecture 36 - Basics of BCI Experimentation
Lecture 37 - MMN Demonstration with EEGLAB and ERPLAB (1)
Lecture 38 - MMN Demonstration with EEGLAB and ERPLAB (2)
Lecture 39 - Introduction to Photolithography (2)
Lecture 40 - Basics of Instrumentation Amplifier and Online Simulation
Lecture 41 - Basics of BCI Experimentation
Lecture 42 - P300 Demonstration with EEGLAB/ERPLAB (1)
Lecture 43 - P300 Demonstration with EEGLAB/ERPLAB (2)
Lecture 44 - Wavelet Analysis with VEP (1)
Lecture 45 - Details of Lithography, E-beam Lithography and Mask Aligner
Lecture 46 - Basics of BCI Experimentation
Lecture 47 - Wavelet Analysis with VEP (2)
Lecture 48 - Demonstration
Lecture 49 - Demonstration
Lecture 50 - Photoresist (SU-8) and soft lithography
Lecture 51 - Physical Vapour Deposition
Lecture 52 - Introduction to Epilepsy and Classification
Lecture 53 - Epileptogenisis
Lecture 54 - Demonstration
Lecture 55 - Demonstration
Lecture 56 - Demonstration
Lecture 57 - Demonstration
Lecture 58 - Physical Vapour Deposition
Lecture 59 - Physical Vapour Deposition
Lecture 60 - Recent Trends
Lecture 61 - Demonstration
Lecture 62 - Basics of EEG, ERP and acquisition
Lecture 63 - Photolithography with example
Lecture 64 - Stress Tissue Analysis using COMSOL Multiphysics
Lecture 65 - Recent Trends

NPTEL Video Course - Electrical Engineering - NOC:Information Theory

Subject Co-ordinator - Prof. Himanshu Tyagi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - What is information?
Lecture 2 - How to model uncertainty?
Lecture 3 - Basic concepts of probability
Lecture 4 - Estimates of random variables
Lecture 5 - Limit theorems
Lecture 6 - Review
Lecture 7 - Source model
Lecture 8 - Motivating examples
Lecture 9 - A compression problem
Lecture 10 - Shannon entropy
Lecture 11 - Random hash
Lecture 12 - Review 2
Lecture 13 - Uncertainty and randomness
Lecture 14 - Total variation distance
Lecture 15 - Generating almost random bits
Lecture 16 - Generating samples from a distribution using uniform randomness
Lecture 17 - Typical sets and entropy
Lecture 18 - Review 3
Lecture 19 - Hypothesis testing and estimation
Lecture 20 - Examples
Lecture 21 - The log-likelihood ratio test
Lecture 22 - Kullback-Leibler divergence and Stein's lemma
Lecture 23 - Properties of KL divergence
Lecture 24 - Review 4
Lecture 25 - Information per coin-toss
Lecture 26 - Multiple hypothesis testing
Lecture 27 - Error analysis of multiple hypothesis testing
Lecture 28 - Mutual information
Lecture 29 - Fano's inequality

Lecture 30 - Measures of information
Lecture 31 - Chain rules
Lecture 32 - Shape of measures of information
Lecture 33 - Data processing inequality
Lecture 34 - Midyear Review
Lecture 35 - Proof of Fano's inequality
Lecture 36 - Variational formulae
Lecture 37 - Capacity as information radius
Lecture 38 - Proof of Pinsker's inequality
Lecture 39 - Continuity of entropy
Lecture 40 - Lower bound for compression
Lecture 41 - Lower bound for hypothesis testing
Lecture 42 - Review 7
Lecture 43 - Lower bound for random number generation
Lecture 44 - Strong converse
Lecture 45 - Lower bound for minmax statistical estimation
Lecture 46 - Variable length source codes
Lecture 47 - Review 8
Lecture 48 - Kraft's inequality
Lecture 49 - Shannon code
Lecture 50 - Huffman code
Lecture 51 - Minmax Redundancy
Lecture 52 - Type based universal compression
Lecture 53 - Review 9
Lecture 54 - Arithmetic code
Lecture 55 - Online probability assignment
Lecture 56 - Compression of databases
Lecture 57 - Compression of databases
Lecture 58 - Repetition code
Lecture 59 - Channel capacity
Lecture 60 - Sphere packing bound for BSC
Lecture 61 - Random coding bound for BSC
Lecture 62 - Random coding bound for general channel
Lecture 63 - Review 11
Lecture 64 - Converse proof for channel coding theorem
Lecture 65 - Additive Gaussian Noise channel
Lecture 66 - Mutual information and differential entropy
Lecture 67 - Channel coding theorem for Gaussan channel
Lecture 68 - Parallel channels and water-filling

NPTEL Video Course - Electrical Engineering - NOC:Photonic Integrated Circuit

Subject Co-ordinator - Prof. Shankar Kumar Selvaraja

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Multi-Mode Interference coupler
Lecture 31 - MZI
Lecture 32 - Micro-Ring Resonators
Lecture 33 - Light-chip coupling
Lecture 34 - End-fire coupling
Lecture 35 - Light Modulator introduction
Lecture 36 - Electro-Optic effect
Lecture 37 - Waveguide modulator
Lecture 38 - Optical transition in semiconductors
Lecture 39 - Transition rates
Lecture 40 - Absorption and gain in semiconductors
Lecture 41 - Semiconductor Light Emitting Diodes
Lecture 42 - Semiconductor Light Emitting Diodes (Continued...)
Lecture 43 - Semiconductor Lasers
Lecture 44 - Semiconductor photodetector
Lecture 45 - Semiconductor photodetector noise
Lecture 46 - Fabrication process - 1
Lecture 47 - Fabrication process - 2
Lecture 48 - PIC technology - Building a simple circuit
Lecture 49 - PIC for communication
Lecture 50 - PIC for sensing - 1
Lecture 51 - PIC for sensing - 2

NPTEL Video Course - Electrical Engineering - NOC:Design for Internet of Things (2021)

Subject Co-ordinator - Prof. T V Prabhakar

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Introduction to low power software
Lecture 31 - ADC driver design and development
Lecture 32 - Power optimization
Lecture 33 - Introduction to protocols
Lecture 34 - MQTT - 1
Lecture 35 - MQTT - 2
Lecture 36 - COAP - 1
Lecture 37 - COAP - 2
Lecture 38 - Websockets
Lecture 39 - Introduction to low power wireless - 1
Lecture 40 - Introduction to low power wireless - 2
Lecture 41 - Bluetooth low energy (BLE) - 1
Lecture 42 - Bluetooth low energy (BLE) - 2
Lecture 43 - IEEE 802.15.4e - 1
Lecture 44 - IEEE 802.15.4e - 2
Lecture 45 - IEEE 802.15.4e - 3
Lecture 46 - Wi-Fi
Lecture 47 - Introduction to Wide area technologies
Lecture 48 - LoRa - 1
Lecture 49 - LoRa - 2
Lecture 50 - NBIoT, LTEM1
Lecture 51 - BLE mesh technology
Lecture 52 - Course conclusion

NPTEL Video Course - Electrical Engineering - NOC:Mathematical Aspects of Biomedical Electronic System Desigr

Subject Co-ordinator - Prof. Chandramani Singh

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Concentration Inequalities

Subject Co-ordinator - Prof. Himanshu Tyagi

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Real-Time Digital Signal Processing

Subject Co-ordinator - Prof. Rathna G N

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Lab: Overlap Add and Save Method using MATLAB
Lecture 31 - Correlation
Lecture 32 - Lab: Different ways of implementing FFT in CCS
Lecture 33 - Adaptive Filter
Lecture 34 - Lab: LMS Algorith in MATLAB
Lecture 35 - LMS Algorithm
Lecture 36 - Lab: Error surface and error contour
Lecture 37 - Adaptive Filter Applications
Lecture 38 - Lab: Application of adaptive filter in MATLAB
Lecture 39 - Adaptive Echo Cancellation
Lecture 40 - Lab: Application of adaptive filter in CCS, Echo, scrambling and graphic equilizer in MATLAB
Lecture 41 - Graphic Equalizer
Lecture 42 - Lab: Adaptive filters (MATLAB)
Lecture 43 - Speech Coding - I
Lecture 44 - Speech Coding - II
Lecture 45 - Speech Coding - III
Lecture 46 - Lab: LPC for speech synthesis
Lecture 47 - Discrete Cosine Transform - 1
Lecture 48 - Discrete Cosine Transform - 2
Lecture 49 - Discrete Cosine Transform - 3
Lecture 50 - Discrete Cosine Transform - 4
Lecture 51 - Lab: Adaptive filters (CCS) - 1
Lecture 52 - Lab: Adaptive filters (CCS) - 2
Lecture 53 - Lab: Discrete Cosine Transformation
Lecture 54 - Lab: Echogeneration
Lecture 55 - Lab: Using JiDSP
Lecture 56 - Summary

NPTEL Video Course - Electrical Engineering - NOC:Advanced Neural Science for Engineers

Subject Co-ordinator - Prof. Vikas V

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Fabrication of Neural Implants
Lecture 31 - Introduction to Packaging for Neural Systems
Lecture 32 - Lab 9 - 3D Printing for neural devices
Lecture 33 - Introduction to Biopotentials
Lecture 34 - EEG: Introduction, Demonstration and Applications
Lecture 35 - Neural Implants: Fabrication and Characterization
Lecture 36 - Design of Wireless Biphasic Pulse Generator
Lecture 37 - Basics of EEG/ERP Experimental Desing
Lecture 38 - Micromachining and Etching
Lecture 39 - Epileptic Seizure Detection and Classification
Lecture 40 - Newborn Hearing Screening - I
Lecture 41 - Newborn Hearing Screening - II
Lecture 42 - Applications of EEG/ERP Experimental Design
Lecture 43 - Flexible MEA for Electrocorticography Signal Acquisition
Lecture 44 - Flexible biodegradable MEAs
Lecture 45 - Microneedle Electrode Array
Lecture 46 - Neurosurgery-based MEA Implantation - I
Lecture 47 - Neurosurgery-based MEA Implantation - II
Lecture 48 - Neurosurgery-based MEA Implantation - III
Lecture 49 - Neurosurgery-based MEA Implantation - IV
Lecture 50 - Deep Brain Stimulation/Recording for Parkinson's - I
Lecture 51 - Deep Brain Stimulation/Recording for Parkinson's - II
Lecture 52 - Computational Neuroscience Fundamentals
Lecture 53 - Mathematical Analysis in Neural Science
Lecture 54 - Neuroanatomy for Neural Engineering

NPTEL Video Course - Electrical Engineering - NOC:Design of Electric Motors

Subject Co-ordinator - Dr. Prathap Reddy

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

NPTEL Video Course - Electrical Engineering - NOC:Basics of Semiconductor Microwave Devices

Subject Co-ordinator - Prof Digbijoy N Nath

Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - AlGaN/GaN HEMT: device basics, current collapse and passivation
Lecture 31 - AlGaN/GaN HEMT: gate process, field-plate and trade-offs in design
Lecture 32 - AlGaN/GaN HEMT: Practical aspects and commercial HEMTs
Lecture 33 - GaN RF HEMT on eval board, and emerging topics of research
Lecture 34 - Linearity in GaN HEMTs - A device perspective
Lecture 35 - Nanoscale MOSFETs and short channel effects
Lecture 36 - Parasitic resistances and capacitances in nanoscale MOSFETs
Lecture 37 - RF MOSFET Layout and RF Silicon-on-insulator
Lecture 38 - Noise in MOSFETs and Introduction to LDMOS
Lecture 39 - Working of LDMOS and VDMOS
Lecture 40 - LDMOS: Parasitics, and the concept of RESURF
Lecture 41 - LDMOS: HCI, snapback, finger layout and some aspects of commercial devices
Lecture 42 - BJT: common base and common emitter from the device point of view
Lecture 43 - BJT: Kirk effect, Ebers-Moll model and base transit time
Lecture 44 - BJT: small-signal model, gain and cut-off frequency
Lecture 45 - BJT: Emitter and base designs and drift transistor
Lecture 46 - Collector design in modern BJT and Introduction to HBTs
Lecture 47 - HBT: base current and collapse of the current gain
Lecture 48 - High-frequency HBT and Introduction to SiGe HBT
Lecture 49 - SiGe HBT: various resistances and capacitances, scaling and aspects of BiCMOS
Lecture 50 - Basics of microwave: transmission line theory
Lecture 51 - Waveguides, T-lines and introduction to 2-port networks
Lecture 52 - S-parameters and the basics of Smith Chart
Lecture 53 - Smith chart and matching
Lecture 54 - Impedance matching using Smith Chart and stub line
Lecture 55 - Passives in microwave circuits
Lecture 56 - Inductors in microwave circuits
Lecture 57 - More on passive elements in microwave circuits
Lecture 58 - On-wafer measurement and S-parameters
Lecture 59 - On-wafer de-embedding
Lecture 60 - On-wafer and fixture-based measurements and calibration
Lecture 61 - More on fixtures and basic transistor concepts for power amplifiers