

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

NPTEL : NOC:Designing Learner-Centric MOOCs (Multi-Disciplinary)

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Lecture 2 - Introduction to Fuzzy Sets (Continued...)

Lecture 3 - Introduction to Fuzzy Sets (Continued...)

Lecture 4 - Introduction to Fuzzy Sets (Continued...)

Lecture 5 - Introduction to Fuzzy Sets (Continued...)

Lecture 6 - Introduction to Fuzzy Sets (Continued...)

Lecture 7 - Applications of Fuzzy Sets

Lecture 8 - Applications of Fuzzy Sets (Continued...)

Lecture 9 - Applications of Fuzzy Sets (Continued...)

Lecture 10 - Applications of Fuzzy Sets (Continued...)

Lecture 11 - Applications of Fuzzy Sets (Continued...)

Lecture 12 - Applications of Fuzzy Sets (Continued...)

Lecture 13 - Applications of Fuzzy Sets (Continued...)

Lecture 14 - Applications of Fuzzy Sets (Continued...)

Lecture 15 - Applications of Fuzzy Sets (Continued...)

Lecture 16 - Applications of Fuzzy Sets (Continued...)

Lecture 17 - Optimization of Fuzzy Reasoning and Clustering Tool

Lecture 18 - Optimization of Fuzzy Reasoning and Clustering Tool (Continued...)

Lecture 19 - Optimization of Fuzzy Reasoning and Clustering Tool (Continued...)

Lecture 20 - Optimization of Fuzzy Reasoning and Clustering Tool (Continued...)

Lecture 21 - Some Examples of Neural Networks

Lecture 22 - Some Examples of Neural Networks (Continued...)

Lecture 23 - Some Examples of Neural Networks (Continued...)

Lecture 24 - Some Examples of Neural Networks (Continued...)

Lecture 25 - Some Examples of Neural Networks (Continued...)

Lecture 26 - Some Examples of Neural Networks (Continued...)

Lecture 27 - Some Examples of Neural Networks (Continued...)

Lecture 28 - Some Examples of Neural Networks (Continued...)

Lecture 29 - Some Examples of Neural Networks (Continued...)

Lecture 30 - Some Examples of Neural Networks (Continued...)

Lecture 31 - Optimal Designs of Neural Networks

[Lecture 32 - Optimal Designs of Neural Networks \(Continued...\)](#)

[Lecture 33 - Neuro-Fuzzy System](#)

[Lecture 34 - Neuro-Fuzzy System \(Continued...\)](#)

[Lecture 35 - Neuro-Fuzzy System \(Continued...\)](#)

[Lecture 36 - Neuro-Fuzzy System \(Continued...\)](#)

[Lecture 37 - Concepts of Soft Computing and Expert Systems](#)

[Lecture 38 - Concepts of Soft Computing and Expert Systems \(Continued...\)](#)

[Lecture 39 - A Few Applications](#)

[Lecture 40 - A Few Applications \(Continued...\)](#)

[Lecture 41 - A Few Applications \(Continued...\)](#)

[Lecture 42 - A Few Applications \(Continued...\)](#)

Lecture 1 - Economic Contributions of Entrepreneurs

Lecture 2 - Definition, Motivation and Types of Entrepreneurship

Lecture 3 - Vision, Mission and Values

Lecture 4 - Entrepreneurial Qualities

Lecture 5 - Two Inspiring Stories

Lecture 6 - Myths and Realities around Entrepreneurship

Lecture 7 - Causes of Failure of Startups

Lecture 8 - Why Startups Fail (Continued...)

Lecture 9 - Forms of Legal Entities

Lecture 10 - Factors Driving Competitive Advantages

Lecture 11 - Marketing for Startups - I

Lecture 12 - Marketing for Startups - II

Lecture 13 - Marketing for Startups - III

Lecture 14 - Marketing Research

Lecture 15 - Marketing Research (Continued...)

Lecture 16 - Business Model Canvas

Lecture 17 - Value Proposition Canvas

Lecture 18 - Illustration of Business Model Canvas

Lecture 19 - Features of Winning Business Models

Lecture 20 - Business Model Innovation

Lecture 21 - Identifying Opportunities Based on Trend

Lecture 22 - Circle of Competence and Effectuation

Lecture 23 - Lean Startup - I

Lecture 24 - Lean Startup - II

Lecture 25 - Lean Startup - III

Lecture 26 - Design and Innovation - I

Lecture 27 - Design and Innovation - II

Lecture 28 - Design and Innovation - III

Lecture 29 - Design and Innovation - IV

Lecture 30 - Design and Innovation - V

Lecture 31 - Introduction to Financial Statements

- [Lecture 32 - Introduction to Financial Statements \(Continued...\)](#)
- [Lecture 33 - Introduction to Financial Statements \(Continued...\)](#)
- [Lecture 34 - Introduction to Financial Statements \(Continued...\)](#)
- [Lecture 35 - Introduction to Financial Statements \(Continued...\)](#)
- [Lecture 36 - Introduction to Financial Statements \(Continued...\)](#)
- [Lecture 37 - Introduction to Financial Statements \(Continued...\)](#)
- [Lecture 38 - Depreciation and Amortization and Treatment of Capital Gain or Loss from Sale of Fixed Asset](#)
- [Lecture 39 - Cost, Volume, Profit: Break-Even Point Analysis - I](#)
- [Lecture 40 - Cost, Volume, Profit: Break-Even Point Analysis - II](#)
- [Lecture 41 - Founding Team and Early Recruits](#)
- [Lecture 42 - Business Plan - I](#)
- [Lecture 43 - Business Plan - II](#)
- [Lecture 44 - Pitching the Business Plan - I](#)
- [Lecture 45 - Pitching the Business Plan - II](#)
- [Lecture 46 - Funding New Venture - I](#)
- [Lecture 47 - Funding New Venture - II](#)
- [Lecture 48 - Funding New Venture - III](#)
- [Lecture 49 - Funding New Venture - IV](#)
- [Lecture 50 - Funding New Venture - V](#)
- [Lecture 51 - Some Dos and Dents](#)
- [Lecture 52 - Go-To-Market Strategies - I](#)
- [Lecture 53 - Go-To-Market Strategies - II](#)
- [Lecture 54 - Capital Budgeting Decisions](#)
- [Lecture 55 - Capital Budgeting Decisions \(Continued...\)](#)
- [Lecture 56 - Start up Valuation - I](#)
- [Lecture 57 - Start up Valuation - II](#)
- [Lecture 58 - Human Resource Management - I](#)
- [Lecture 59 - Human Resource Management - II](#)
- [Lecture 60 - Growth Strategies](#)

Lecture 1 - Roadmap for patent creation - Introduction

Lecture 2 - Roadmap for patent creation - Property and IP

Lecture 3 - Roadmap for patent creation - IPR

Lecture 4 - Roadmap for patent creation - IP and future areas

Lecture 5 - Roadmap for patent creation - Patent - Introduction

Lecture 6 - Patent searching and analysis

Lecture 7 - Patent-Definition

Lecture 8 - Novelty

Lecture 9 - Non obviousness

Lecture 10 - Industrial application

Lecture 11 - Parts of patent document

Lecture 12 - Terminologies and codes used in a patent document

Lecture 13 - How to read a patent ? - I

Lecture 14 - How to read a patent ? - II

Lecture 15 - How to read a patent ? - III

Lecture 16 - Roadmap for patent creation - IP identification tool

Lecture 17 - Roadmap for patent creation - Patentability tool

Lecture 18 - Roadmap for patent creation - IP audit framework

Lecture 19 - Roadmap for patent creation - Public patent databases

Lecture 20 - Roadmap for patent creation - Capsule version

Lecture 21 - Types of patent

Lecture 22 - Patent filing procedure in India

Lecture 23 - Patent timelines - India and PCT

Lecture 24 - Inventions not patent in India

Lecture 25 - Indicators for patentability

Lecture 26 - Use of patent database for research/project topic identification

Lecture 27 - Importance of laboratory notebook

Lecture 28 - In which technical category my invention falls - IPC

Lecture 29 - Patent - Statutory differences between India, Europe and USA

Lecture 30 - Identification of inventor and applicant and their rights

Lecture 31 - Developing your own IP system

[Lecture 32 - When to publish and when to patent \(confidentiality\)](#)

[Lecture 33 - Statutory exceptions \(anticipation\)](#)

[Lecture 34 - Procedure for patent filing \(Forms and fees\)](#)

[Lecture 35 - Interaction with IP attorney \(Initial drafting, FER reply and hearing\)](#)

[Lecture 36 - Research/project planning](#)

[Lecture 37 - Post patent filing requirements](#)

[Lecture 38 - Patent commercialization](#)

[Lecture 39 - Capsule version](#)

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

NPTEL : NOC:Accreditation and Outcome based Learning (Multi-Disciplinary)

Co-ordinators : Prof. Shyamal Kumar Das Mandal

Lecture 1 - Introduction

Lecture 2 - Challenges and Needs of 21st Century Education

Lecture 3 - Accreditation

Lecture 4 - Accreditation (Continued...)

Lecture 5 - Outcome based Learning

Lecture 6 - Important Steps in Outcome based education

Lecture 7 - Introduction to Taxonomies of Learning and Cognitive Domains of Learning

Lecture 8 - Psychomotor Domain and Affective Domain of Learning

Lecture 9 - Instructional Objectives or Outcome

Lecture 10 - Need and Use of Instructional Objectives or Outcome

Lecture 11 - Example of Different Instructional Objectives or Outcome and their Cognitive Level

Lecture 12 - Outcome-based Curriculum Design

Lecture 13 - Outcome-based Curriculum Design (Continued...)

Lecture 14 - Outcome-based Curriculum Design software framework

Lecture 15 - Course outcome, Module outcome and lecture/unit outcome and teaching learning process

Lecture 16 - Mapping of outcome based curriculum with Graduate attribute

Lecture 17 - Introduction to Assessment and Evaluation

Lecture 18 - Formative Assessment and Summative Assessments

Lecture 19 - Test Item analysis

Lecture 20 - Test Item analysis (Continued...)

Lecture 21 - Evaluation Rubrics

Lecture 22 - Mission and Vision, Program Educational Objectives (PEOs), Program Outcome (PO) and their Consistency

Lecture 23 - Mapping of course outcome and Program Outcome

Lecture 24 - Attainment of Program outcome and course outcome

Lecture 25 - Calculation of direct attainment

Lecture 26 - Calculation of Indirect Attainment

Lecture 27 - Introduction to Tutored Video Instruction (TVI)

Lecture 28 - TVI Learning Improvement Data - as reported in literature

Lecture 29 - Use of TVI as ELNET-3L program

Lecture 30 - Lessons on Good Teaching from ELNET-3L

Lecture 31 - Evaluation of Teaching Quality

- [Lecture 32 - Evaluation of Teaching Quality - A Research Proposal](#)
- [Lecture 33 - Evaluation of Teaching Quality - A Research Proposal \(Continued...\)](#)
- [Lecture 34 - Evaluation of Teaching Quality - A Research Proposal \(Continued...\)](#)
- [Lecture 35 - Assessment and Evaluation - to Improve Teaching](#)
- [Lecture 36 - Item Analysis - Theory and Practice](#)
- [Lecture 37 - Learning Styles and Learning Approaches](#)
- [Lecture 38 - Good Teaching Attributes and Characteristics](#)
- [Lecture 39 - Teacher Effectiveness Research](#)
- [Lecture 40 - Teacher Effectiveness Research \(Continued...\)](#)
- [Lecture 41 - Teaching Learning Process using Outcome based Education](#)

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

NPTEL : NOC:Introduction to Environmental Engineering and Science - Fundamental and Sustainability Concepts (Multi-Disciplinary)

Co-ordinators : Prof. Brajesh Kumar Dubey

- Lecture 1 - Sustainability Concepts - Innovations and Challenges
- Lecture 2 - Sustainability Concepts - Innovations and Challenges
- Lecture 3 - Basics and Sustainability Concepts and Evolution
- Lecture 4 - Engineering for Sustainability
- Lecture 5 - Life Cycle Thinking and Circular Economy
- Lecture 6 - Mass Concentration Units
- Lecture 7 - Partial Pressure Units
- Lecture 8 - Other Types of Units
- Lecture 9 - Units (Continued...), Qualitative and Quantitative Measurements
- Lecture 10 - Quantative Measurements Basics
- Lecture 11 - Ecology
- Lecture 12 - Energy Flow and Ecological Concepts
- Lecture 13 - Population
- Lecture 14 - Population, Consumption and Biodiversity
- Lecture 15 - Environmental Chemistry
- Lecture 16 - Mass Balance and Reactor Systems
- Lecture 17 - Mass Balance in Continuous Reactor / Continuous Stirred Tank Reactor (CSTR) and Plug Flow Reactor
- Lecture 18 - Plug Flow Reactor and Energy Flow
- Lecture 19 - Energy Balance and Earth Overshot Day
- Lecture 20 - Mass Transport Processes
- Lecture 21 - Oxygen Demand in Environmental Systems
- Lecture 22 - BOD Examples, Oxygen Levels in Surface Waters, COD
- Lecture 23 - Environmental Health Basics and SDGs
- Lecture 24 - Field Applications
- Lecture 25 - Nutrient Cycle
- Lecture 26 - Environmental Risk
- Lecture 27 - Risk Assessment Steps and EIA Introduction
- Lecture 28 - Environmental Risk Assessments with Concepts of EIA and LCA
- Lecture 29 - Environmental Risk Assessments with Concepts of EIA and LCA (Continued...)
- Lecture 30 - Environmental Risk Assessments with Concepts of EIA and LCA (Continued...)

[Lecture 31 - Water Quantity](#)

[Lecture 32 - Water Availability and Usage](#)

[Lecture 33 - Population Forecasting](#)

[Lecture 34 - Water Quality](#)

[Lecture 35 - Water Quality \(Continued...\)](#)

[Lecture 36 - Plain Sedimentation](#)

[Lecture 37 - Coagulation](#)

[Lecture 38 - Review of Sedimentation and Rapid Sand Filtration](#)

[Lecture 39 - Disinfection and Water Supply](#)

[Lecture 40 - Water Treatment Plant Visit](#)

[Lecture 41 - Wastewater collection and characterization](#)

[Lecture 42 - Sewerage System and Sewage Characteristics](#)

[Lecture 43 - BOD Concepts and Preliminary Treatment of Wastewater](#)

[Lecture 44 - Wastewater Treatment - I](#)

[Lecture 45 - Activated Sludge Process and Sludge Disposal](#)

[Lecture 46 - Introduction to Solid Waste Management](#)

[Lecture 47 - Introduction to Solid Waste Management \(Continued...\)](#)

[Lecture 48 - Components of Solid Waste Management](#)

[Lecture 49 - Collection and Treatment](#)

[Lecture 50 - Waste Disposal and Summary](#)

[Lecture 51 - Basics of Air Pollution Issues - Global and Local](#)

[Lecture 52 - Air Pollutants and Air Pollution Index](#)

[Lecture 53 - Global Warming and Climate Change](#)

[Lecture 54 - Air Pollution Models](#)

[Lecture 55 - SDGs, Noise and Soil Pollution](#)

[Lecture 56 - Present Issues and Few Case Studies](#)

[Lecture 57 - Case Study - Solid Waste Management](#)

[Lecture 58 - Case Study - Industrial Pollution and Disasters](#)

[Lecture 59 - Case Study - Global Food Waste Initiatives](#)

[Lecture 60 - Case Study - Global Food Waste and Resource Recovery](#)

Lecture 1 - Introduction to Biophotonics - Part I

Lecture 2 - Introduction to Biophotonics - Part II

Lecture 3 - Introduction to Biophotonics - Part III

Lecture 4 - Nature of Light - Part I (As Wave)

Lecture 5 - Nature of Light - Part II (As Particle)

Lecture 6 - Fact of Matter - Part I

Lecture 7 - Fact of Matter - Part II

Lecture 8 - Basic of Light-Matter Interaction

Lecture 9 - Molecular Materials

Lecture 10 - Introduction to Fluorescence

Lecture 11 - The Cell

Lecture 12 - The Central Dogma

Lecture 13 - Genetic Code

Lecture 14 - Building Blocks

Lecture 15 - Remaining Topics

Lecture 16 - Light-Matter Interactions in Molecules (Basic of Spectroscopy)

Lecture 17 - Light-Matter Interactions in Molecules (Basic of Spectroscopy) (Continued...)

Lecture 18 - Interaction of Light with Cells

Lecture 19 - Interaction of Light with Tissues

Lecture 20 - Photoprocesses in Biopolymers

Lecture 21 - Laser Principles and Operation

Lecture 22 - Types of Lasers

Lecture 23 - Nonlinear Optical Processes

Lecture 24 - In Vivo Photoexcitation

Lecture 25 - Examples and Applications

Lecture 26 - Introduction

Lecture 27 - Microscopy Techniques

Lecture 28 - Near Field Microscopy and Optical Coherence Tomography

Lecture 29 - Fluorophores and Fluorescence Microscopy Techniques

Lecture 30 - The Future: AFM-IR

Lecture 31 - Biosensing Background

- Lecture 32 - Optical Fiber Sensors
- Lecture 33 - Metamaterials
- Lecture 34 - Metamaterials as Biosensors
- Lecture 35 - Biosensing with Optical Nano-antennas
- Lecture 36 - Introduction to Photodynamic Therapy (PDT)
- Lecture 37 - Application of Photodynamic Therapy (PDT)
- Lecture 38 - Light Irradiation for Photodynamic Therapy (PDT)
- Lecture 39 - Real Life Examples of Photodynamic Therapy (PDT)
- Lecture 40 - Future of PDT and Photothermal Therapy (PTT)
- Lecture 41 - Laser Based Tissue Engineering
- Lecture 42 - Laser Tissue Contouring: Dermatological Application
- Lecture 43 - Laser Tissue Welding and Tissue Regeneration
- Lecture 44 - Laser Tissue Contouring: Ophthalmic Application
- Lecture 45 - Laser in Dentistry
- Lecture 46 - Tools for Micromanipulation
- Lecture 47 - The Optical/Laser Tweezer
- Lecture 48 - Design of Optical Tweezers
- Lecture 49 - Optical Scissors
- Lecture 50 - Selected Examples of Application
- Lecture 51 - Introduction to nanotechnology
- Lecture 52 - Processes of Nanotechnology
- Lecture 53 - Nano-Lithography: The Art of Small
- Lecture 54 - Thin Film Deposition
- Lecture 55 - Bionanophotonics Applications
- Lecture 56 - Introduction to Optogenetics
- Lecture 57 - Controlling the Brain with Light
- Lecture 58 - Optical Neuroimaging and Tomography
- Lecture 59 - Functional Near Infrared Spectroscopy (fNIRS) of the Brain
- Lecture 60 - Summary and Revisiting Few topics

- Lecture 1 - Introduction to Vacuum, Natural Vacuum
- Lecture 2 - History of Vacuum Technology
- Lecture 3 - Kinetic Theory of Gases, Physical Parameters of Vacuum and Regions of Vacuum
- Lecture 4 - Vacuum Process Applications - I
- Lecture 5 - Vacuum Process Applications - II
- Lecture 6 - Pumping Speed and Throughput Concepts
- Lecture 7 - Rotary Vacuum Pump
- Lecture 8 - Diffusion Pump
- Lecture 9 - Roots Vacuum Pump
- Lecture 10 - Rotary Piston Pump
- Lecture 11 - Liquid Ring Pump
- Lecture 12 - Steam Jet Ejector
- Lecture 13 - Diaphragm Pump
- Lecture 14 - Claw Pump
- Lecture 15 - Screw Pump
- Lecture 16 - Scroll Pump, Sorption Concepts and Pumps
- Lecture 17 - Ion Pumping-Sputter Ion Pump
- Lecture 18 - Turbomolecular Pump
- Lecture 19 - Cryopumps
- Lecture 20 - Selection Criteria of Vacuum Pumps
- Lecture 21 - Primary vs Secondary Gauges, U Tube/McLeod gauges (Primary)
- Lecture 22 - Bourdon/Capacitance Gauges (Mechanical Deflection)
- Lecture 23 - Thermo-couple/Pirani gauges (Thermal Conductivity)
- Lecture 24 - Spinning Rotor/Ionization/Bayard Alpert Gauges
- Lecture 25 - Penning/ Inverted Magnetron gauges, Gauge calibration
- Lecture 26 - Vacuum Materials (Metals, Glasses, Ceramics, Greases and Oils)
- Lecture 27 - Vacuum Components (Flanges, Couplings, Seals, Valves)
- Lecture 28 - Vacuum Chamber Design
- Lecture 29 - Fabrication Techniques for Vacuum Systems
- Lecture 30 - Testing of Vacuum Systems for Mechanical Failures, Gas Leaks and Outgassing
- Lecture 31 - Gas Flow at Low Pressures, Conductance and Effective Pumping Speed Concepts

- Lecture 32 - Conductance Calculations in Viscous Flow Region
- Lecture 33 - Molecular Flow
- Lecture 34 - Transition and Choked Flows
- Lecture 35 - Conductance and Pump Down Calculations in Vacuum Systems
- Lecture 36 - Design Aspects of Vacuum Systems for Different Applications - Part I
- Lecture 37 - Design Aspects of Vacuum Systems for Different Applications - Part II
- Lecture 38 - Design of a Vacuum Furnace for Metallurgical Processing
- Lecture 39 - Leak Detection in Vacuum Systems
- Lecture 40 - Magnetic Deflection Leak Detector and Quadrupole Residual Gas Analyzer
- Lecture 41 - Vacuum Processes in Chemical and Pharmaceutical Industries
- Lecture 42 - Vacuum for Food Processing
- Lecture 43 - Vacuum Technology in the Packaging Industry
- Lecture 44 - Vacuum in Wood Industry
- Lecture 45 - Vacuum Systems for Medical and Dental Applications
- Lecture 46 - Vacuum for Desalination of Sea Water and Treatment of Waste Water
- Lecture 47 - Vacuum Technology for Power Sector
- Lecture 48 - Vacuum Technology In Oil and Gas Industries
- Lecture 49 - Vacuum Technology in LNG industry
- Lecture 50 - Vacuum Technology for Cryogenic Applications
- Lecture 51 - Vacuum Technology in High Speed Transportation (Hyperloop and Maglev)
- Lecture 52 - Vacuum technology for Metallurgical applications
- Lecture 53 - Vacuum Technology for Analytical Instruments
- Lecture 54 - Vacuum based coating units for thin film deposition
- Lecture 55 - Vacuum for solar energy (Thermal and PV)
- Lecture 56 - Vacuum Technology for semiconductor chip manufacturing
- Lecture 57 - Vacuum Technology for Display Systems
- Lecture 58 - Vacuum Technology for Nuclear Applications - Part I
- Lecture 59 - Vacuum Technology for Nuclear Applications - Part II
- Lecture 60 - Vacuum technology for Space Applications

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

NPTEL : NOC:Basics of Health Promotion and Education Intervention (Multi-Disciplinary)

Co-ordinators : Prof. Sweety Suman Jha, Prof.Chandrashekhar Taklikar, Prof. Madumita Dobe, Prof. Arista Lahiri

- Lecture 1 - Brief history of public health
- Lecture 2 - Scope and Evolution of Health Promotion and Education
- Lecture 3 - Ottawa Charter
- Lecture 4 - Principles of health promotion
- Lecture 5 - Settings and audiences for health promotion
- Lecture 6 - Concepts of Health Behavior
- Lecture 7 - Health Risk Behavior Vs Health Promotion Behavior
- Lecture 8 - Concepts of Health Communication - Part I
- Lecture 9 - Concepts of Health Communication - Part II
- Lecture 10 - Health Literacy
- Lecture 11 - Information Education and Communication (IEC)
- Lecture 12 - Behavior Change Communication (BCC) - Part I
- Lecture 13 - Behavior Change Communication (BCC) - Part II
- Lecture 14 - Social and Behavior Change Communication (SBCC) - Part I
- Lecture 15 - Social and Behavior Change Communication (SBCC) - Part II
- Lecture 16 - Need Assessment for Health Promotion
- Lecture 17 - Approaches for Health Promotion and Behavior Change
- Lecture 18 - Models of Individual Health Behavior
- Lecture 19 - Models of Inter-Personal Health Behaviour
- Lecture 20 - Community and Group Models of Health Behavior Change
- Lecture 21 - Planning HPE Intervention - Part I
- Lecture 22 - Planning HPE Intervention - Part II
- Lecture 23 - Implementing HPE Intervention - Part I
- Lecture 24 - Implementing HPE Intervention - Part II
- Lecture 25 - Monitoring HPE Intervention
- Lecture 26 - Principles of Designing Messages
- Lecture 27 - Processes and Approaches of Designing Messages - Part I
- Lecture 28 - Processes and Approaches of Designing Messages - Part II
- Lecture 29 - Overview of Pretesting
- Lecture 30 - Pretesting of Health Promotion and Education Tools
- Lecture 31 - Health Education Methods - Part I

[Lecture 32 - Health Education Methods - Part II](#)

[Lecture 33 - Health Education Material - Part I](#)

[Lecture 34 - Health Education Material - Part II](#)

[Lecture 35 - Technology-based approaches to health behavior change](#)

[Lecture 36 - Evaluation of Theory-based HPE Interventions - Part I](#)

[Lecture 37 - Evaluation of Theory-based HPE Interventions - Part II](#)

[Lecture 38 - Analyzing Health Behavior Change Data](#)

[Lecture 39 - RE-AIM Framework for Health Promotion Program Evaluation](#)

[Lecture 40 - Health Impact Assessment](#)

Lecture 1 - Introduction to Neuroanatomy

Lecture 2 - Cerebellum

Lecture 3 - Basal Ganglia

Lecture 4 - Thalamus and Hypothalamus

Lecture 5 - Cerebral Cortex

Lecture 6 - Synapse and Neurotransmitters - 1

Lecture 7 - Synapse and Neurotransmitters - 2

Lecture 8 - Limbic System

Lecture 9 - Physiology of Emotions

Lecture 10 - Reticular Formation

Lecture 11 - Electrical activity of brain

Lecture 12 - Descriptive Psychopathology

Lecture 13 - Principles of Personality Development

Lecture 14 - Schizophrenia

Lecture 15 - Mood Disorders - 1

Lecture 16 - Mood Disorders - 2

Lecture 17 - Anxiety Disorders - I

Lecture 18 - Anxiety Disorders - II

Lecture 19 - Eating Disorders

Lecture 20 - Physiology of sleep

Lecture 21 - Sleep Disorders

Lecture 22 - Learning and Memory - 1

Lecture 23 - Learning and Memory - 2

Lecture 24 - Neurocognitive Disorders - I

Lecture 25 - Neurocognitive Disorders - II

Lecture 26 - Substance - I

Lecture 27 - Substance - II

Lecture 28 - Physiology of sensations

Lecture 29 - Psychosomatic Illness

Lecture 30 - Emergency Psychiatry

Lecture 31 - Child Psychiatry - I

[Lecture 32 - Child Psychiatry - II](#)

[Lecture 33 - Psychotherapy - I](#)

[Lecture 34 - Psychotherapy - II](#)

[Lecture 35 - Psychological Tests](#)

[Lecture 36 - Anti-psychotic drugs](#)

[Lecture 37 - Antidepressants](#)

[Lecture 38 - Mood Stabilizer](#)

[Lecture 39 - Anti-anxiety drugs](#)

[Lecture 40 - Forensic Psychiatry](#)

Lecture 1 - Introduction to Reliability Engineering

Lecture 2 - Introduction to Reliability Engineering

Lecture 3 - Introduction to Reliability Engineering

Lecture 4 - Probability Basics

Lecture 5 - Probability Basics (Continued...)

Lecture 6 - Constant Failure Rate Model - I

Lecture 7 - Constant Failure Rate Model - II

Lecture 8 - Constant Failure Rate Model - III

Lecture 9 - Two Parameter Exponential Distribution

Lecture 10 - Weibull Distribution (2 Parmeter)

Lecture 11 - Burn-in Screening for Weibull

Lecture 12 - Weibull Distribution

Lecture 13 - Normal Distribution

Lecture 14 - Lognormal Distribution

Lecture 15 - System Reliability Modelling

Lecture 16 - System Reliability Modelling (Continued...)

Lecture 17 - System Reliability Modelling (Continued...)

Lecture 18 - System Reliability Modelling (Continued...)

Lecture 19 - System Reliability Modelling (Continued...)

Lecture 20 - System Reliability Modelling (Continued...)

Lecture 21 - Markov Analysis

Lecture 22 - Markov Analysis (Continued...)

Lecture 23 - Markov Analysis (Continued...)

Lecture 24 - Markov Analysis (Continued...)

Lecture 25 - Markov Analysis (Continued...)

Lecture 26 - Failure Data Analysis: Non-Parametric Approach

Lecture 27 - Failure Data Analysis: Non-Parametric Approach (Continued...)

Lecture 28 - Failure Data Analysis: Non-Parametric Approach (Continued...)

Lecture 29 - Failure Data Analysis: Non-Parametric Approach (Continued...)

Lecture 30 - Failure Data Analysis (Parametric)

Lecture 31 - Failure data analysis (Parametric) (Continued...)

[Lecture 32 - Failure data analysis \(Parametric\) \(Continued...\)](#)

[Lecture 33 - Goodness of fit](#)

[Lecture 34 - Goodness of Fit \(GoF\) Tests](#)

[Lecture 35 - Goodness of Fit \(GoF\) Tests \(Continued...\)](#)

[Lecture 36 - Maintainability and Availability](#)

[Lecture 37 - Maintainability and Availability \(Continued...\)](#)

[Lecture 38 - Maintainability and Availability \(Continued...\)](#)

[Lecture 39 - Maintainability and Availability \(Continued...\)](#)

[Lecture 40 - Summary of the course Introduction to Reliability Engineering](#)

Lecture 1 - Introduction

Lecture 2 - Biosensors and its Application

Lecture 3 - Translational Research and Nano Biosensing

Lecture 4 - Nanomaterials for Healthcare Biosensing

Lecture 5 - Signal Amplification for Ultrasensitive Biosensors

Lecture 6 - Signal Amplification for Ultrasensitive Biosensors (Continued...)

Lecture 7 - Signal Amplification for Ultrasensitive Biosensors (Continued...)

Lecture 8 - Signal Amplification for Ultrasensitive Biosensors (Continued...)

Lecture 9 - Different Measurement Techniques for Electrochemical Biosensors

Lecture 10 - Limit of Detection and Wash-Free Detection for Biosensors

Lecture 11 - Wash-Free Detection for Biosensors (Continued...)

Lecture 12 - Label-Free Detection for Biosensors

Lecture 13 - Label-free detection and Multiplex Biosensors

Lecture 14 - Multiplex Biosensors (Continued...)

Lecture 15 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities

Lecture 16 - Enhanced electrocatalytic activity for biosensors

Lecture 17 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities

Lecture 18 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities

Lecture 19 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities

Lecture 20 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities

Lecture 21 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities

Lecture 22 - Strategy for Electrochemical Detection and Tuning of Electrocatalytic Activities

Lecture 23 - Effect of pretreatment on PCB and biosensor development

Lecture 24 - Impact of surface Roughness of PCB and PCB for Glucose sensors

Lecture 25 - Tutorial on Biosensors Fabrication

Lecture 26 - Tutorial on Biosensors Fabrication (Continued...)

Lecture 27 - Tutorial on Biosensors Fabrication (Continued...)

Lecture 28 - Tutorial on Biosensors Fabrication (Continued...)

Lecture 29 - Tutorial on Biosensors Fabrication (Continued...)

Lecture 30 - Tutorial on Biosensors Fabrication (Continued...)

Lecture 31 - Self-Powered Biosensors

[Lecture 32 - Biosensors for Safety and Security](#)

[Lecture 33 - Research Proposal and Ethical Clearance](#)

[Lecture 34 - Special Chemistry for Biosensing](#)

[Lecture 35 - Tutorial - 2](#)

[Lecture 36 - Tutorial - 3](#)

[Lecture 37 - Tutorial - 4](#)

[Lecture 38 - Lab Demonstration - 1](#)

[Lecture 39 - Lab Demonstration - 2](#)

[Lecture 40 - Lab Demonstration - 3](#)

- Lecture 1 - Adolescent Health Statistics
- Lecture 2 - Introduction to Nutrition and Dietetics
- Lecture 3 - Role of Macronutrients
- Lecture 4 - Role of Micronutrients
- Lecture 5 - Basics of Adolescent Mental Health
- Lecture 6 - Physiological and Psychological changes during Adolescence
- Lecture 7 - Special Nutritional Requirements in Adolescents
- Lecture 8 - Malnutrition in Adolescents and their effects in Adult life
- Lecture 9 - Adolescent Immunization
- Lecture 10 - High risk behaviour in Adolescents
- Lecture 11 - Nutrition Care Process
- Lecture 12 - Dietary Counseling and Nutrition Planning
- Lecture 13 - Common Micronutrient Deficiency in Adolescents
- Lecture 14 - Eating Disorders in Adolescents
- Lecture 15 - National Initiatives related to Adolescents
- Lecture 16 - Behavior Modification for Weight Management
- Lecture 17 - Adolescents And Physical Activity
- Lecture 18 - Combating Special Situations
- Lecture 19 - Legislations for Adolescents
- Lecture 20 - Innovations for Holistic Well-being of Adolescents

- Lecture 1 - Basics of Health Promotion
- Lecture 2 - Basic Principles of Health Promotion
- Lecture 3 - The Health Promotion Research Process
- Lecture 4 - Process of Health Promotion Research: Integrity and Rigor
- Lecture 5 - Ethics in Health Promotion Research
- Lecture 6 - Health Behavior and Health Behavior Change
- Lecture 7 - Theory, Research and Behavior Change Techniques
- Lecture 8 - Intervention Mapping
- Lecture 9 - Ecological Models of Health Behavior
- Lecture 10 - Social Science Techniques
- Lecture 11 - Precede-Proceed Model
- Lecture 12 - Models of Individual Health Behavior - I
- Lecture 13 - Models of Individual Health Behavior - II
- Lecture 14 - Models of Interpersonal Health Behavior
- Lecture 15 - Community and Group Models of Health Behavior Change
- Lecture 16 - Research design and techniques
- Lecture 17 - Observational research designs
- Lecture 18 - Experimental Research Designs
- Lecture 19 - Experimental Research Designs: Issues and Challenges
- Lecture 20 - Measurements in Health promotion
- Lecture 21 - Qualitative methods in Health Promotion - Part I
- Lecture 22 - Qualitative Methods in Health Promotion - Part II
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- Lecture 26 - Introduction to Mixed Methods Research
- Lecture 27 - The Convergent Design
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- Lecture 32 - Formulating an appropriate study tool (Quantitative data collection tools)
- Lecture 33 - Validity and reliability of study tools in quantitative research - Part I
- Lecture 34 - Validity and reliability of study tools in quantitative research - Part II
- Lecture 35 - Formulating an appropriate study tool(Qualitative data collection tools)
- Lecture 36 - Designing messages - Part I
- Lecture 37 - Designing messages - Part II
- Lecture 38 - Materials and Methods of Intervention Delivery - Part I
- Lecture 39 - Materials and Methods of Intervention Delivery - Part II
- Lecture 40 - Pretesting of an intervention tool
- Lecture 41 - BCC and SBCC - Part I
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- Lecture 43 - BCC and SBCC - Part III
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- Lecture 46 - Community-Based Participatory Research in context to Health Promotion - Part I
- Lecture 47 - Community-Based Participatory Research in context to Health Promotion - Part II
- Lecture 48 - Community-Based Participatory Research in context to Health Promotion - Part III
- Lecture 49 - Community-Based Participatory Research in context to Health Promotion - Part IV
- Lecture 50 - Community-Based Participatory Research in context to Health Promotion - Part V
- Lecture 51 - Quantitative analytical methods - Part I
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- Lecture 53 - Quantitative analytical methods - Part III
- Lecture 54 - Analysis of Qualitative data
- Lecture 55 - Analyzing Mixed Methods data
- Lecture 56 - Developing a research proposal in health promotion
- Lecture 57 - Report writing in health Promotion: An Overview
- Lecture 58 - Report writing: quantitative research in health promotion - Part I
- Lecture 59 - Report writing: quantitative research in health promotion - Part II
- Lecture 60 - Report Writing: Qualitative and Mixed Methods research

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Lecture 3 - Historical Urban Landscape (HUL) - Approach, Toolkit, and Actions

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Lecture 5 - SDG(s) 11(.4) - Transdisciplinary Possibilities, Pathways, and Actions

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Lecture 7 - Urban environmentalisms - lake-based and rights-based

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Lecture 12 - Kolkata and EKW - conveying the co-evolutionary narrative

Lecture 13 - Living Systems infrastructure of Kolkata

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Lecture 15 - Case study 2: Baro Chaynavi Cooperative

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Lecture 3 - Experimentation I

Lecture 4 - Experiment 1: Teaching of Serial Manipulator (Continued...)

Lecture 5 - Experiment 2: Control of Tracked Mobile Manipulator

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Lecture 7 - Experiment 2: Control of Tracked Mobile Manipulator (Continued...)

Lecture 8 - Experiment 3: Path and Gait Planning of Six-legged Robot

Lecture 9 - Experimentation III

Lecture 10 - Experiment 3: Path and Gait Planning of Six-legged Robot (Continued...)

Lecture 11 - Experiment 4: Navigation of Drone

Lecture 12 - Experimentation IV

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Lecture 14 - Experiment 5: Path and Gait Planning of 25 dof NAO Humanoid Robot

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- Lecture 3 - Dos and Don'ts of Doctors
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- Lecture 5 - Knowledge exchange between Medical and Legal Practitioners
- Lecture 6 - Consent in Law
- Lecture 7 - Types of Consent in Medical Field
- Lecture 8 - Ethics in Medical Profession
- Lecture 9 - Importance of Documentation in Medical practice
- Lecture 10 - Legal Implications of Improper Documentation
- Lecture 11 - Legal Responsibilities of Medical Practitioners
- Lecture 12 - Medical Negligence and Legal Implications
- Lecture 13 - Legal Implications of Medical Malpractice
- Lecture 14 - Landmark Judgments on Medical Negligence
- Lecture 15 - Testimony of Doctors in Medical Negligence
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- Lecture 17 - Clinical Establishment Law
- Lecture 18 - Legal liability of Hospitals/Clinical Establishments
- Lecture 19 - Legal responsibility in Diagnostics
- Lecture 20 - Penalties for non-compliance
- Lecture 21 - Role of IPR in promoting medical innovation and technologies
- Lecture 22 - Health Policy formulation and Role of IPR
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- Lecture 2 - Anatomy of Vulva or pudendum
- Lecture 3 - Anatomy of Vagina
- Lecture 4 - Anatomy of Cervix and Uterus
- Lecture 5 - Anatomy of Uterus
- Lecture 6 - Anatomy of fallopian tubes and ovary
- Lecture 7 - Anatomy of plvic floor and perineum
- Lecture 8 - Gametogenesis
- Lecture 9 - Fertilisation and Embryogenesis
- Lecture 10 - Implantation
- Lecture 11 - Placentation (normal and abnormal)
- Lecture 12 - Placentation (normal and abnormal) (Continued...)
- Lecture 13 - Umbilical cord and Fetal membranes - Part 1
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- Lecture 15 - FETUS (physiology and circulation)
- Lecture 16 - Physiological changes in pregnancy - Part 1
- Lecture 17 - Physiological changes in pregnancy - Part 2
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- Lecture 19 - Hormones in pregnancy
- Lecture 20 - Hormones in pregnancy (Continued...)
- Lecture 21 - Diagnosis of pregnancy - 1
- Lecture 22 - Diagnosis of Pregnancy - 2
- Lecture 23 - Obstetrical Examination
- Lecture 24 - Obstetrical Examinationon antenatal mother (Clinical Study)
- Lecture 25 - Maternal Pelvis \$ Foetal Skill - Part 1
- Lecture 26 - Fetal Skull
- Lecture 27 - Pre-conceptional counselling and care
- Lecture 28 - Nutrition in Pregnancy
- Lecture 29 - Antenatal Care - Part 1
- Lecture 30 - Antenatal Care - Part 2
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- Lecture 32 - Antenatal Assessment of Fetal Well-Being - Part 1
- Lecture 33 - Antenatal Assessment of Fetal Well-Being - Part 2
- Lecture 34 - Antenatal Assessment of Fetal Well-Being - Part 3
- Lecture 35 - Prenatal Screening and Diagnosis of aneuploidies
- Lecture 36 - Invasive and non-invasive Prenatal Diagnostic Test
- Lecture 37 - Invasive and non-invasive Prenatal Diagnostic Test (Continued...)
- Lecture 38 - Fetal Imaging and Amniotic Fluid Study
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- Lecture 40 - Teratology, Teratogens and feto-toxic agents - Part 1
- Lecture 41 - Teratology, Teratogens and feto-toxic agents - Part 2
- Lecture 42 - Normal Labour - Stages and cause of onset
- Lecture 43 - Physiology of Labor
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- Lecture 54 - Intrapartum Fetal Monitoring - Cardiotocography (CTG)
- Lecture 55 - Intrapartum Fetal Monitoring - Cardiotocography (CTG) (Continued...)
- Lecture 56 - Induction and Augmentation of Labour
- Lecture 57 - WHO Labour Guide
- Lecture 58 - Episiotomy
- Lecture 59 - Instrumental Vaginal Delivery
- Lecture 60 - Obstetric anal sphincter injuries OASIS
- Lecture 61 - Lower Segment Caesarean Section
- Lecture 62 - Normal Puerperal changes
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- Lecture 4 - Data Collection
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- Lecture 7 - Dimensionality Reduction
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- Lecture 16 - Association rule based model
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Lecture 20 - Epigenetics and DNA methylation analysis

Lecture 21 - DNA Sequencing - Part 1 - Maxam Gilbert Sequencing

Lecture 22 - DNA Sequencing - Part 2 - Sanger Sequencing

Lecture 23 - Next Generation Sequencing - Part 1

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- Lecture 32 - Label-based Protein Quantification Technologies - Part 2
- Lecture 33 - Label free methods of protein quantification
- Lecture 34 - Next Generation Proteomics
- Lecture 35 - Proteomic Data Analysis and Bioinformatic Tools
- Lecture 36 - Syndromic Panels and Multiplex Assay : Molecular identification of Microorganism
- Lecture 37 - Molecular Diagnostics in Antimicrobial Resistance Testing
- Lecture 38 - RNA Sequencing: Role in Infectious diseases - I
- Lecture 39 - RNA Sequencing: Role in Infectious diseases - II
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- Lecture 41 - Molecular genetics in tumorigenesis
- Lecture 42 - Liquid biopsies in cancer detection
- Lecture 43 - Digital PCR in Cancer detection
- Lecture 44 - Mutation Detection Methods
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- Lecture 46 - Genetic Testing and Inherited Disorders - Part 1
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- Lecture 49 - Reproductive genetics and genetic counselling
- Lecture 50 - Genetic counselling and patient education
- Lecture 51 - Serial Analysis of Gene Expression
- Lecture 52 - Metabolomics in Molecular Diagnostics
- Lecture 53 - Immunoassay and Luminex Multiplex Assay
- Lecture 54 - Molecular diagnostics in Metabolic, Cardiovascular and Gastrointestinal disorders
- Lecture 55 - Molecular diagnostics in Endocrine, Neurodegenerative and Transplantation disorders
- Lecture 56 - Pharmacogenomics and Personalized Medicine
- Lecture 57 - Quality control (QC) in molecular diagnostics
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- Lecture 60 - Integration of Multiomics Data in Molecular Diagnostics

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Lecture 3 - Nernst Equation

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Lecture 2 - Epidemiology of TB-Session - 1

Lecture 3 - Epidemiology of TB-Session - 2

Lecture 4 - Pathogenesis of TB-Session - 1

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Lecture 9 - Bacteriological Diagnosis of Tuberculosis - Smear and Culture

Lecture 10 - Demonstration of processing of sputum specimen for culture for diagnosis of tuberculosis

Lecture 11 - Demonstration of sputum smear examination for diagnosis of tuberculosis

Lecture 12 - Demonstration of solid culture method for diagnosis of tuberculosis

Lecture 13 - Demonstration of liquid culture method for diagnosis of tuberculosis in sputum

Lecture 14 - Phenotypic drug susceptibility testing in Tuberculosis

Lecture 15 - Demonstration of drug susceptibility testing of first line anti-TB drugs by liquid culture

Lecture 16 - Molecular Diagnosis of Tuberculosis-Session - 1

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Lecture 18 - Demonstration of Xpert MTB-RIF assay for diagnosis of tuberculosis from sputum specimens

Lecture 19 - Demonstration of Line Probe Assay (LPA) (Direct detection of tuberculosis and resistance to isoniazid and rifampicin) in sputum

Lecture 20 - Radiology in diagnosis of Tuberculosis-Session - 1

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Lecture 24 - Approach to diagnosis of Pulmonary TB

Lecture 25 - Case Discussion-Approach to diagnosis of TB in a person with presumptive pulmonary TB

Lecture 26 - Case Discussion-Approach to diagnosis of pulmonary TB in a patient with negative sputum smear for AFB

Lecture 27 - Approach to diagnosis of Extra-pulmonary TB

Lecture 28 - Case Discussion-Approach to diagnosis of TB in a person with swelling in the neck

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Lecture 30 - Diagnosis of Childhood Tuberculosis-Session - 1

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Lecture 45 - Management of patients with HIV-TB coinfection-Session - 1

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Lecture 54 - Case discussion-Approach to management of jaundice during anti-TB treatment

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Lecture 3 - Dams

Lecture 4 - Adayar River

Lecture 5 - Adayar River

Lecture 6 - Urbanisation in Western Ghats and Biodiesel

Lecture 7 - Use And Throw Plastic

Lecture 8 - Nano Materials Information Technology

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Lecture 11 - Assesment of Risk

Lecture 12 - Remediation and Liability

Lecture 13 - Remendiation and Liability

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Lecture 23 - Drinking Water Supply: Need and Challenges

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[Lecture 2 - C1 - Introduction Assorted Interviews](#)

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Lecture 2 - Overview of Learning Modules

Lecture 3 - Course Plan

Lecture 4 - Tutorial: Excel

Lecture 5 - Errors and Approximations

Lecture 6 - Truncation and Round-Off Errors

Lecture 7 - Binary Numbers: Introduction

Lecture 8 - Floating Point: Real numbers in decimal system

Lecture 9 - Floating Point in Binary system

Lecture 10 - Iterative Method

Lecture 11 - Direct Method

Lecture 12 - Sequential Method

Lecture 13 - Linear Algebra: Basics

Lecture 14 - Introduction to Linear Equations

Lecture 15 - Rank Condition for Solving Linear Equations

Lecture 16 - Motivating Gauss Elimination

Lecture 17 - Gauss Elimination

Lecture 18 - Tutorial Recap: Gauss Elimination

Lecture 19 - Back Substitution to find solution

Lecture 20 - Gauss Jordan and LU Decomposition

Lecture 21 - Partial Pivoting in Gauss Elimination

Lecture 22 - Analysis of Gauss Elimination

Lecture 23 - Tri-Diagonal Systems: Practical Relevance

Lecture 24 - Thomas Algorithm for Tri-Diagonal Systems

Lecture 25 - Gauss Siedel Method

Lecture 26 - Analysis of Gauss Siedel Method

Lecture 27 - Gauss Siedel vs. Jacobi Methods

Lecture 28 - Bonus: Example using MS Excel

Lecture 29 - Summary: Linear Equations

Lecture 30 - Introduction to Nonlinear Equations

Lecture 31 - Bisection Method

- Lecture 32 - Analysis of Bisection Method
- Lecture 33 - Bonus: Excel Solution for Bisection Method
- Lecture 34 - Regula-Falsi Method
- Lecture 35 - Bonus: Excel Solution for Regula-Falsi Method
- Lecture 36 - Regula-Falsi vs. Secant Method
- Lecture 37 - Bonus: Excel Solution for Secant Method
- Lecture 38 - Some special cases
- Lecture 39 - Fixed-Point Iteration
- Lecture 40 - Newton-Raphson Method
- Lecture 41 - Analysis of Fixed-Point Iteration
- Lecture 42 - Analysis of Newton-Raphson
- Lecture 43 - Problems with Newton-Raphson
- Lecture 44 - Multi-Variable Fixed-Point Iteration
- Lecture 45 - Multi-Variable Newton-Raphson
- Lecture 46 - Out of Syllabus: Improvements to NR Methods
- Lecture 47 - Out of Syllabus: Roots of a polynomial
- Lecture 48 - Summary
- Lecture 49 - Introduction: Regression and Interpolation
- Lecture 50 - Linear Regression in One Variable
- Lecture 51 - Recap: Formula for Linear Regression
- Lecture 52 - Bonus: Linear Regression using MS-Excel
- Lecture 53 - Linear Regression in Multiple Variables
- Lecture 54 - Matrix Method for Multi-Linear Regression
- Lecture 55 - Polynomial Regression
- Lecture 56 - Functional Regression
- Lecture 57 - Bonus: X-Y versus Y-X data (Using MS Excel)
- Lecture 58 - Interpolation: Introduction and A Na^{ve} Extension
- Lecture 59 - Bonus: MS-Excel for Na^{ve} Interpolation
- Lecture 60 - Lagrange Interpolating Polynomials
- Lecture 61 - Newton's Forward Difference Polynomial
- Lecture 62 - Newton's Divided Differences: Derivation
- Lecture 63 - Interpolation Examples
- Lecture 64 - Bonus: MS-Excel for Newton's Polynomial

- Lecture 65 - Summary: Regression and Interpolation
- Lecture 66 - Numerical Differentiation: Introduction
- Lecture 67 - Numerical Differentiation Formula and Analysis
- Lecture 68 - Derivation using Method of undetermined coefficients
- Lecture 69 - Three-point differentiation formulae
- Lecture 70 - Bonus: Differentiation using MS-Excel
- Lecture 71 - Truncation vs. Round-Off Errors
- Lecture 72 - Numerical Differentiation Examples
- Lecture 73 - Summary of Numerical Differentiation
- Lecture 74 - Numerical Integration: Introduction
- Lecture 75 - Trapezoidal rule and Derivation
- Lecture 76 - Simpson's Rules for Integration
- Lecture 77 - Bonus: MS-Excel for Numerical Integration
- Lecture 78 - Error Analysis for Simpson's Rules
- Lecture 79 - Numerical Integration Examples
- Lecture 80 - Bonus: Integration using MS-Excel
- Lecture 81 - Summary of Newton Cotes Formulae
- Lecture 82 - Richardson's Extrapolation
- Lecture 83 - Gauss Quadrature
- Lecture 84 - Summary of Numerical Integration
- Lecture 85 - Introduction to ODE-IVP
- Lecture 86 - Motivation using an Example (Bonus)
- Lecture 87 - Euler's Methods and Second-Order Methods
- Lecture 88 - Second-Order Runge-Kutta Methods
- Lecture 89 - Summary of RK-2
- Lecture 90 - Higher order RK Methods
- Lecture 91 - Bonus: ODE-IVP using MS-Excel
- Lecture 92 - Bonus: RK-2 and RK-4 Methods using MS-Excel
- Lecture 93 - Summary and Recap
- Lecture 94 - Introduction to Predictor-Corrector Methods
- Lecture 95 - Stability of Implicit Methods: Overview
- Lecture 96 - Stability Analysis of Euler's Methods
- Lecture 97 - Extension to multiple variables

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[Lecture 102 - Adaptive step-sizing and Embedded Methods](#)

[Lecture 103 - Bonus: Errors and Extrapolation using MS-Excel](#)

[Lecture 104 - Summary and Recap \(Weeks 10 and 11\)](#)

[Lecture 105 - Introduction to ODE-BVP](#)

[Lecture 106 - Shooting Method: An Overview](#)

[Lecture 107 - Finite Difference Method: An Overview](#)

[Lecture 108 - Solution using Shooting Method](#)

[Lecture 109 - Algorithm for Shooting Method](#)

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[Lecture 113 - Recap of Week-12 \(ODE-BVP\)](#)

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- Lecture 2 - Formulating research question
- Lecture 3 - Literature review
- Lecture 4 - Measures of disease frequency
- Lecture 5 - Descriptive study designs
- Lecture 6 - Analytical study designs
- Lecture 7 - Experimental study designs: Clinical trials
- Lecture 8 - Validity of epidemiological studies
- Lecture 9 - Qualitative research methods: An overview
- Lecture 10 - Measurement of study variables
- Lecture 11 - Sampling methods
- Lecture 12 - Calculating sample size and power
- Lecture 13 - Selection of study population
- Lecture 14 - Study plan and project management
- Lecture 15 - Designing data collection tools
- Lecture 16 - Principles of data collection
- Lecture 17 - Data management
- Lecture 18 - Overview of data analysis
- Lecture 19 - Ethical framework for health research
- Lecture 20 - Conducting clinical trails
- Lecture 21 - Preparing a concept paper for research projects
- Lecture 22 - Elements of a protocol for research studies

Lecture 1 - Basic concepts and definitions - Part 1

Lecture 2 - Basic concepts and definitions - Part 2

Lecture 3 - Basic concepts and definitions - Part 3

Lecture 4 - Tutorial problems on exact and inexact differential

Lecture 5 - Basic concepts and definitions - Part 4

Lecture 6 - Work - Part 1

Lecture 7 - Work - Part 2

Lecture 8 - Work - Part 3

Lecture 9 - Work - Part 4

Lecture 10 - Work - Part 5

Lecture 11 - Tutorial problem on 'Work' - Part 1

Lecture 12 - Tutorial problem - Part 2

Lecture 13 - Tutorial problem on 'Work' - Part 3

Lecture 14 - Tutorial problem on 'Work' - Part 4

Lecture 15 - Zeroth law of thermodynamics

Lecture 16 - Methods of temperature measurement

Lecture 17 - Modes of heat transfer

Lecture 18 - Tutorial problem on 'Modes of heat transfer'

Lecture 19 - Tutorial problem on 'Methods of temperature measurement'

Lecture 20 - First law of thermodynamics

Lecture 21 - Tutorial problem - Part 1

Lecture 22 - Tutorial problem - Part 2

Lecture 23 - Heat and work interactions for a system

Lecture 24 - Tutorial problem - Part 1

Lecture 25 - Pure substance

Lecture 26 - Tutorial problem - Part 2

Lecture 27 - Ideal gas - Part 1

Lecture 28 - Ideal gas - Part 2

Lecture 29 - Tutorial problem - Part 3

Lecture 30 - Tutorial problem - Part 4

Lecture 31 - Tutorial problem - Part 5

- Lecture 32 - Specific heats at constant pressure and constant volume
- Lecture 33 - Tutorial problem - Part 6
- Lecture 34 - Tutorial problem - Part 7
- Lecture 35 - Ideal gas - Part 3
- Lecture 36 - Ideal gas - Part 4
- Lecture 37 - Ideal gas - Part 5
- Lecture 38 - Tutorial problem - Part 1
- Lecture 39 - Tutorial problem - Part 2
- Lecture 40 - Tutorial problem - Part 3
- Lecture 41 - Tutorial problem - Part 4
- Lecture 42 - Beyond ideal gases - Part 1
- Lecture 43 - Beyond ideal gases - Part 2
- Lecture 44 - Two phase system - Part 1
- Lecture 45 - Two phase system - Part 2
- Lecture 46 - Two phase system: water and steam
- Lecture 47 - Tutorial problems (2 numbers)
- Lecture 48 - Tutorial problem - Part 1
- Lecture 49 - Tutorial problem - Part 2
- Lecture 50 - Tutorial problem - Part 3
- Lecture 51 - Tutorial problems on two-phase systems (2 numbers)
- Lecture 52 - Tutorial problem (1 number)
- Lecture 53 - Rate equation of the first law of thermodynamics for a control mass and a control volume
- Lecture 54 - Energy equation for a steady-state, steady-flow process in selected engineering devices
- Lecture 55 - Tutorial problems (3 numbers)
- Lecture 56 - Tutorial problem - Part 1
- Lecture 57 - Tutorial problem - Part 2
- Lecture 58 - Quasi-static process revisited: Work against an external force
- Lecture 59 - Second law of thermodynamics: limitations of the first law of thermodynamics
- Lecture 60 - Second law of thermodynamics: direct and reverse heat engine
- Lecture 61 - Second law of thermodynamics: Kelvin-Planck and Clausius statements
- Lecture 62 - Second law of thermodynamics: reversible process
- Lecture 63 - Second law of thermodynamics: Carnot's cycle and theorems
- Lecture 64 - Second law of thermodynamics: absolute temperature scale

- Lecture 65 - Tutorial problems (2 numbers)
- Lecture 66 - Tutorial problem (1 number)
- Lecture 67 - Tutorial problem (1 number)
- Lecture 68 - Tutorial problem (2 numbers)
- Lecture 69 - Second law of thermodynamics: Clausius's inequality
- Lecture 70 - Entropy - Part 1
- Lecture 71 - Tutorial problem (1 number)
- Lecture 72 - Entropy - Part 2
- Lecture 73 - Entropy - Part 3
- Lecture 74 - Entropy - Part 4
- Lecture 75 - Tutorial problem (1 number)
- Lecture 76 - Tutorial problem (1 number)
- Lecture 77 - Tutorial problems (2 numbers)
- Lecture 78 - Entropy - Part 5
- Lecture 79 - Entropy - Part 6
- Lecture 80 - Entropy - Part 7
- Lecture 81 - Exergy - Part 1
- Lecture 82 - Exergy - Part 2
- Lecture 83 - Exergy - Part 3
- Lecture 84 - Thermodynamics cycles: Rankine cycle
- Lecture 85 - Tutorial problem (1 number)
- Lecture 86 - Thermodynamics cycles: Brayton cycle
- Lecture 87 - Tutorial problem (1 number)
- Lecture 88 - Thermodynamics cycles: vapor compression refrigeration cycle
- Lecture 89 - Tutorial problem (1 number)

Lecture 1 - Courses Overview

Lecture 2 - Medical device and in vitro diagnostics: Introduction and types of devices including combination devices

Lecture 3 - Medical Device Rules, 2017: Implications on medical devices

Lecture 4 - Classification of medical devices

Lecture 5 - Labelling of medical devices and in vitro diagnostics

Lecture 6 - Standards of medical device, quality assurance and testing

Lecture 7 - Regulatory requirements of biocompatibility of medical devices and ISO 10993

Lecture 8 - Clinical investigation of medical devices, regulation of investigational medical devices

Lecture 9 - Quality assurance and quality management system

Lecture 10 - How to obtain a licence to manufacture a medical device?

Lecture 11 - ISO 14971 (Medical devices: Application of risk management to medical devices)

Lecture 12 - Inspection of medical device and IVD establishments

Lecture 13 - Import and export of medical devices and IVDs

Lecture 14 - Medical device regulation: International practices

**NPTEL : NOC:Current Regulatory Requirements for Conducting Clinical Trials in India for Investigational New Drugs
(Version 2.0) (Multi-Disciplinary)**

Co-ordinators : Prof. Nandini K Kumar, Prof. Y. K. Gupta, Prof. D. K. Sable, Prof. Arun B. Ramteke, Prof. Rubina Bose, Prof. Sucheta Banerjee Kurundkar, Prof. Vishnu Rao

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Lecture 2 - Overview of Indian regulatory system

Lecture 3 - Overview of Drugs and Cosmetics Act and Rules thereunder

Lecture 4 - Overview of New Drugs and Clinical Trials Rules, 2019

Lecture 5 - Pre-Clinical Data Requirements

Lecture 6 - Rules Governing Clinical Trials

Lecture 7 - Phases of clinical trial, forms, and fees

Lecture 8 - Regulatory pathway and data requirements for NDCT, 2019

Lecture 9 - BA/BE study and study centers: Legal provisions

Lecture 10 - Guidelines to conduct BA/BE studies

Lecture 11 - Ethics Committee registration and re-registration

Lecture 12 - Ethical Considerations

Lecture 13 - Good Clinical Practice

Lecture 14 - Requirements for import/manufacture of new drug/IND for conducting clinical trials in India

Lecture 15 - Requirements for import/manufacture of new drug/IND for sale/ distribution and unapproved new drug for patients

Lecture 16 - Important issues

Lecture 17 - Special concern

Lecture 18 - Clinical trial related guidelines (NDCT Rules)

Lecture 19 - Content of Proposed Clinical Trial Protocol

Lecture 20 - Content of a Clinical Trial Report

Lecture 21 - Post Marketing Assessment and Clinical Trial Compensation

Lecture 22 - Common observations during submission of CT/BA/BE protocol

Lecture 23 - Common observations during CT/BA/BE centre inspections

Lecture 24 - Drug development process: Overview

Lecture 25 - Salient feature of NDCT 2019 - what's new in NDCT?

Lecture 26 - Online Submission 23A: Sugam

Lecture 27 - Online Submission (CTRI)

Lecture 28 - Tables Given in NDCT 2019 and its Content

Lecture 1 - Course Background: Model Predictive Control

Lecture 2 - Course Outline

Lecture 3 - Additional MATLAB Video - Array Operations

Lecture 4 - Additional MATLAB Video - Array Operations

Lecture 5 - Recap: Linear Algebra

Lecture 6 - Recap: Differential and Difference Equations

Lecture 7 - Recap: Process Control Basics

Lecture 8 - Introduction to Model Predictive Control

Lecture 9 - MPC: Salient Features

Lecture 10 - MPC: Historical Perspective

Lecture 11 - Vectors and Matrices

Lecture 12 - Vector Spaces

Lecture 13 - Linear Operation

Lecture 14 - Null and Image Spaces

Lecture 15 - Eigenvalues and Eigenvectors

Lecture 16 - Eigenvalue Decomposition and Tutorial

Lecture 17 - Recap of Week-2

Lecture 18 - Model Classification

Lecture 19 - Discrete-Time Models Overview

Lecture 20 - Discrete-Time Models

Lecture 21 - Finite Impulse Response Models

Lecture 22 - Finite Step Response Models

Lecture 23 - Recap and Plan for Week-4

Lecture 24 - State Space and Step Response Models

Lecture 25 - Nonlinear Models and Model Linearization

Lecture 26 - Model Types and Model Conversion

Lecture 27 - Model Conversion - 2

Lecture 28 - Model Conversion: TF to SS

Lecture 29 - How to handle MIMO systems

Lecture 30 - Discretization of State-Space Models

Lecture 31 - Introduction to Dynamic Matrix Control (DMC)

[Lecture 32 - The DMC Algorithm: Future Predictions](#)

[Lecture 33 - The DMC Algorithm: Objective and Constraints](#)

[Lecture 34 - The DMC Algorithm: Optimization](#)

[Lecture 35 - Coding for DMC Algorithm: Setup](#)

[Lecture 36 - Coding for DMC Algorithm: Populate Matrices](#)

[Lecture 37 - Recap of DMC Algorithm](#)

[Lecture 38 - Extensions of DMC Algorithm](#)

[Lecture 39 - LTI Models and Coordinate Transform](#)

[Lecture 40 - LTI Models: Stability](#)

[Lecture 41 - LTI Models: Controllability](#)

[Lecture 42 - LTI Models: Conditions for controllability](#)

[Lecture 43 - Tutorial by Arvind \(Recap of Controllability\)](#)

[Lecture 44 - LTI Models: Observability](#)

[Lecture 45 - Linear Control: Introduction](#)

[Lecture 46 - Pole Placement Controller](#)

[Lecture 47 - Linear Quadratic Regulator: Batch Solution](#)

[Lecture 48 - LQR: Dynamic Programming Solution](#)

[Lecture 49 - State Estimation: Introduction](#)

[Lecture 50 - Stochastic Processes and Random Variables](#)

[Lecture 51 - State Estimation: Pole Placement Observer](#)

[Lecture 52 - Kalman Filter: Terminology](#)

[Lecture 53 - Kalman Filter: Derivation](#)

[Lecture 54 - Recap of Modules 7-9](#)

[Lecture 55 - Recap and Plan for this week](#)

[Lecture 56 - Linear Quadratic Gaussian](#)

[Lecture 57 - LQG Derivation and Separation Principle](#)

[Lecture 58 - Setpoint Tracking in LQ Control](#)

[Lecture 59 - Disturbance Rejection in LQ Control](#)

[Lecture 60 - Disturbance Modeling for Estimation](#)

[Lecture 61 - Estimation with Disturbance Modeling](#)

[Lecture 62 - Recap and Plan for this week](#)

[Lecture 63 - State-Space MPC: Deterministic case](#)

[Lecture 64 - Extension to Measured Disturbances](#)

[Lecture 65 - Offset-Free State Space MPC](#)

[Lecture 66 - Comparison of State-Space MPC with DMC](#)

[Lecture 67 - State-Space MPC: Disturbance Modeling](#)

[Lecture 68 - Disturbance Modeling: Background and Setup](#)

[Lecture 69 - Stochastic Output-Feedback State-Space MPC](#)

[Lecture 70 - Bonus Video: Disturbance Modeling for State Space MPC](#)

[Lecture 71 - Self-Guided Tutorial of MPC Toolbox](#)

[Lecture 72 - Help Session: Using MPC Toolbox](#)

[Lecture 73 - Recap of LQ Control and Linear MPC](#)

[Lecture 74 - Linear MPC - Key Features and Results](#)

[Lecture 75 - Practical Issues: Inferential Control](#)

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[Lecture 78 - Some Classical Examples of MPC](#)

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Lecture 2 - What is Science? - Part 2

Lecture 3 - Subjective Thinking Versus Objective Thinking

Lecture 4 - Idealism Versus Materialism

Lecture 5 - Causality - Part 1

Lecture 6 - Causality - Part 2

Lecture 7 - Logical Reasoning: Inductive Logic

Lecture 8 - Logical Reasoning: Deductive Logic - Part 1

Lecture 9 - Logical Reasoning: Deductive Logic - Part 2

Lecture 10 - Logical Reasoning: Syllogistic Logic - Part 1

Lecture 11 - Logical Reasoning: Syllogistic Logic - Part 2

Lecture 12 - Logical Reasoning: Syllogism Logic, Truth and Validity

Lecture 13 - Historical Perspective: Emergence of Materialism and Idealism - Part 1

Lecture 14 - Historical Perspective: Emergence of Materialism and Idealism - Part 2

Lecture 15 - Historical Perspective:Renaissance to the Development of Mechanical Materialism - Part 1

Lecture 16 - Historical Perspective:Renaissance to the Development of Mechanical Materialism - Part 2

Lecture 17 - Historical Perspective: The Advent of Empiricism and the Idea of Evolution

Lecture 18 - Historical Perspective: Science in Ancient India

Lecture 19 - Historical Perspective: The Advent of Scientific Materialism - Part 1

Lecture 20 - Historical Perspective: The Advent of Scientific Materialism - Part 2

Lecture 21 - Historical Perspective: The Rise and Fall of Positivism - Part 1

Lecture 22 - Historical Perspective: The Rise and Fall of Positivism - Part 2

Lecture 23 - What Scientists Actually Do - Part 1

Lecture 24 - What Scientists Actually Do - Part 2

Lecture 25 - Falsifiability and Reproducibility - Part 1

Lecture 26 - Falsifiability and Reproducibility - Part 2

Lecture 27 - Proposing a Hypothesis - Part 1

Lecture 28 - Proposing a Hypothesis - Part 2

Lecture 29 - Elements of Scientific Measurement - Part 1

Lecture 30 - Elements of Scientific Measurement - Part 2

Lecture 31 - The Central Limit Theorem and its Applications - Part 1

- Lecture 32 - The Central Limit Theorem and its Applications - Part 2
- Lecture 33 - Error Bars and Confidence Interval - Part 1
- Lecture 34 - Error Bars and Confidence Interval - Part 2
- Lecture 35 - Measurement of a Proportion - Part 1
- Lecture 36 - Measurement of a Proportion - Part 2
- Lecture 37 - Examples of Proportion Measurement
- Lecture 38 - Box and Whisker Plot
- Lecture 39 - Propagation of Errors - Part 1
- Lecture 40 - Propagation of Errors - Part 2
- Lecture 41 - Issues in Hypothesis Testing - Part 1
- Lecture 42 - Issues in Hypothesis Testing - Part 2
- Lecture 43 - Statistical Methods in Hypothesis Testing: Z-Test and T-Test - Part 1
- Lecture 44 - Statistical Methods in Hypothesis Testing: Z-Test and T-Test - Part 2
- Lecture 45 - Hypothesis Testing: The Chi-Square Test - Part 1
- Lecture 46 - Hypothesis Testing: The Chi-Square Test - Part 2
- Lecture 47 - Hypothesis Testing: The Chi-Square Test - Part 3
- Lecture 48 - Hypothesis Testing: The Chi-Square Test - Part 4
- Lecture 49 - Theoretical Research: Functional Relationships from Experimental Data - Part 1
- Lecture 50 - Theoretical Research: Functional Relationships from Experimental Data - Part 2
- Lecture 51 - Theoretical Research: Mathematical Models of Physical Systems
- Lecture 52 - Order of Magnitude Calculations
- Lecture 53 - Theoretical Research: Modeling Using Dimensional Analysis - Part 1
- Lecture 54 - Theoretical Research: Modeling Using Dimensional Analysis - Part 2
- Lecture 55 - An Example of Mathematical Modeling
- Lecture 56 - Importance of Theory-Building in Science
- Lecture 57 - Scientific Writing: Journal Papers - Part 1
- Lecture 58 - Scientific Writing: Journal Papers - Part 2
- Lecture 59 - Scientific Writing: Journal Papers - Part 3
- Lecture 60 - Scientific Writing: Journal Papers - Part 4
- Lecture 61 - Scientific Writing: PhD Thesis
- Lecture 62 - Scientific Writing: Text Stylistics
- Lecture 63 - Presentation in Scientific Conferences - Part 1
- Lecture 64 - Presentation in Scientific Conferences - Part 2

[Lecture 65 - Writing Grant Proposals - Part 1](#)

[Lecture 66 - Writing Grant Proposals - Part 2](#)

[Lecture 67 - Ethical Conduct in Science: Aspects of Scientific Ethics](#)

[Lecture 68 - Ethical Conduct in Science: Research Misconduct](#)

[Lecture 69 - Ethical Conduct in Science: Ethics in Scientific Publication - Part 1](#)

[Lecture 70 - Ethical Conduct in Science: Ethics in Scientific Publication - Part 2](#)

[Lecture 71 - Ethical Conduct in Science: Cases of Scientific Misconduct - Part 1](#)

[Lecture 72 - Ethical Conduct in Science: Cases of Scientific Misconduct - Part 2](#)

Lecture 1 - Vasovagal Syncope

Lecture 2 - Vasovagal Syncope - Clinical Scenario

Lecture 3 - Postural Hypotension

Lecture 4 - Postural Hypotension - Clinical Scenario

Lecture 5 - Hyperventilation

Lecture 6 - Hyperventilation - Clinical Scenario

Lecture 7 - Asthma - Status Asthmaticus - Part 1

Lecture 8 - Asthma - Status Asthmaticus - Part 2

Lecture 9 - Asthma - Clinical Scenario

Lecture 10 - Chest Pain Of Cardiac Origin - Myocardial Infarction And Anigina Pectoris - Part 1

Lecture 11 - Chest Pain Of Cardiac Origin - Myocardial Infarction And Anigina Pectoris - Part 2

Lecture 12 - Chest Pain - Clinical Scenario

Lecture 13 - Acute Adrenal Insufficiency

Lecture 14 - Acute Adrenal Insufficiency - Clinical Scenario

Lecture 15 - Diabetes Mellitus

Lecture 16 - Diabetes Mellitus - Clinical Scenario

Lecture 17 - Throid Dysfunction

Lecture 18 - Allergies/Hypersensitivity Reaction - Part 1

Lecture 19 - Allergies/Hypersensitivity Reaction - Part 2

Lecture 20 - Epilepsy- Status Epilepticus

Lecture 21 - Chronic Kidney Disease

Lecture 22 - Hepatic Dysfunction

Lecture 23 - Basic Life Support - Part 1

Lecture 24 - Basic Life Support - Part 2

Lecture 1 - Introduction to Ornithology

Lecture 2 - Diversity and Classification - Part 1

Lecture 3 - Diversity and Classification - Part 2

Lecture 4 - Evolution and Speciation - Part 1

Lecture 5 - Evolution and Speciation - Part 2

Lecture 6 - Anatomy

Lecture 7 - Physiology

Lecture 8 - Colour

Lecture 9 - Life History

Lecture 10 - Foraging Behaviour

Lecture 11 - Mating and Breeding Behaviour

Lecture 12 - Social Behaviour

Lecture 13 - Methods of Science and Research Questions

Lecture 14 - Vocal Behaviour: Mechanisms - Part 1

Lecture 15 - Vocal Behaviour: Mechanisms - Part 2

Lecture 16 - Vocal Behaviour: Ecology and Evolution - Part 1

Lecture 17 - Vocal Behaviour: Ecology and Evolution - Part 2

Lecture 18 - Vocal Mimicry in Birds

Lecture 19 - Basics of Research Design

Lecture 20 - Bird Migration - LIVE Guest Lectuer

Lecture 21 - Bird Populations: Concepts

Lecture 22 - Bird Communities: Concepts - Part 1

Lecture 23 - Bird Communities: Concepts - Part 2

Lecture 24 - Interactive Session by Dr Mousumi Ghosh (NCF) and Dr Umesh Srinivasan (IISc)

Lecture 25 - Studying bird populations and communities - Part 1

Lecture 26 - Studying bird populations and communities - Part 2

Lecture 27 - Mixed Species Flocks - Live Session

Lecture 28 - Interactive session with Dr. Priti Bangal (NCF) and Dr. Umesh Srinivasan (IISc)

Lecture 29 - Introduction to Data Visualisation Analysis - Part 1

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

[Lecture 31 - Basic Course in Ornithology - Guest Session on Avian Diseases](#)

[Lecture 32 - Biogeography](#)

[Lecture 33 - Macroecology](#)

[Lecture 34 - Macroecology - Case Study - LIVE](#)

[Lecture 35 - Week 10 Interactive session with Dr VV Robin and Dr Umesh Srinivasan](#)

[Lecture 36 - Bird Conservation - Concepts](#)

[Lecture 37 - Avian Conservation: Case study 1](#)

[Lecture 38 - Avian Conservation: Case study 2](#)

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[Lecture 41 - Avian Conservation: Case study 5](#)

[Lecture 42 - LIVE - Citizen Science - Guest faculty by Dr Ashwin Viswanathan \(NCF\)](#)

[Lecture 43 - Molecular Techniques - Part 1](#)

[Lecture 44 - Molecular Techniques - Part 2](#)

- Lecture 1 - Craniofacial anatomy - Part 1
- Lecture 2 - Craniofacial anatomy - Part 2
- Lecture 3 - Tooth and It's Supporting Structures - Part 1
- Lecture 4 - Tooth and It's Supporting Structures - Part 2
- Lecture 5 - Specialised mucosa
- Lecture 6 - Saliva-Composition and functions
- Lecture 7 - Saliva Diagnostics
- Lecture 8 - Stem cells in the oro-dental region
- Lecture 9 - Stem cell isolation
- Lecture 10 - Mineralization dynamics - Part 1
- Lecture 11 - Mineralization dynamics - Part 2
- Lecture 12 - TMJ Anatomy and Function
- Lecture 13 - Oral defense mechanisms
- Lecture 14 - Mucosal and regional immunology
- Lecture 15 - Oral microbiome
- Lecture 16 - Evaluation of Oral microbiome
- Lecture 17 - Dysbiosis
- Lecture 18 - Molecular mechanisms in oral cancer
- Lecture 19 - Flow cytometry in cell and molecular biology
- Lecture 20 - Basics of Biomaterial science and engineering
- Lecture 21 - Biomimetics - Part 1
- Lecture 22 - Biomimetics - Part 2
- Lecture 23 - Biomaterials - Polymers
- Lecture 24 - Biomaterials - Metals
- Lecture 25 - Biomaterials - Ceramics and Colloids
- Lecture 26 - 3-D Bioprinting
- Lecture 27 - Protein mediated biomaterials
- Lecture 28 - Immune response to biomaterials
- Lecture 29 - Biomaterial Applications
- Lecture 30 - Biocompatible assays
- Lecture 31 - Immunoassay

Lecture 1 - Course overview

Lecture 2 - What is biomimicry ?

Lecture 3 - Why is biomimicry important ?

Lecture 4 - Nature's unifying patterns - Introduction

Lecture 5 - Case study

Lecture 6 - How to do biomimicry ?

Lecture 7 - Learning resources - Biomimicry Institute

Lecture 8 - Skills, attitudes and mindset for a biomimic

Lecture 9 - Course activity

Lecture 10 - Recap of Week 1

Lecture 11 - What are we mimicking ?

Lecture 12 - Function and Strategy

Lecture 13 - Approaches to biomimicry

Lecture 14 - From Problem to Solution

Lecture 15 - Using the UNSDG to identify challenges

Lecture 16 - Recap of Week 2

Lecture 17 - Step 1 - Define the problem

Lecture 18 - Step 2 - Biologize the problem

Lecture 19 - Step 3 - Discover strategies in nature

Lecture 20 - Applying the Biomimicry Design Spiral

Lecture 21 - Step 4 - Abstract design strategies from nature

Lecture 22 - Step 5 - Emulate nature's strategies in your solution

Lecture 23 - Step 6 - Evaluate feasibility

Lecture 24 - How to apply the biomimicry process ?

Lecture 25 - Recap of Week 4

Lecture 26 - Nature's Unifying Patterns I

Lecture 27 - Systems Thinking - Introduction

Lecture 28 - Systems Thinking - Understanding consequences

Lecture 29 - Nature's Unifying Patterns II

Lecture 30 - Tools - Mind mapping

Lecture 31 - Using biomimicry to design a solution

[Lecture 32 - Recap of Week 6](#)

[Lecture 33 - Developing creative confidence](#)

[Lecture 34 - Learning from the biomimicry process](#)

[Lecture 35 - The need for creativity in our lives](#)

[Lecture 36 - Unlocking your creativity](#)

[Lecture 37 - Taking your biomimicry ideas to market](#)

[Lecture 38 - The journey so far](#)

[Lecture 39 - Finding the hero in you](#)

[Lecture 40 - Course wrap-up](#)

Lecture 1 - Introduction - Electrocardiogram - Interpretation and application in clinical practice

Lecture 2 - Basic Conduction of Heart

Lecture 3 - ECG Lead system

Lecture 4 - Recording of a Standard ECG (Lead placements and measurements)

Lecture 5 - Waveforms, Intervals and Segments

Lecture 6 - Vector Electrocardiography

Lecture 7 - From Action Potentials to Arrhythmias

Lecture 8 - Pathophysiology, Myocardial Ischemia / Injury

Lecture 9 - Myocardial Infarction (MI), Pathophysiology

Lecture 10 - Drug effects on ECG

Lecture 11 - Patient identification, preparation and interpretation of ECG

Lecture 12 - Sinus rhythms and Bradyarrhythmias

Lecture 13 - Approach to tachyarrhythmias

Lecture 14 - AV Blocks and Bundle Branch Block

Lecture 15 - Chamber enlargement and Heart Failure

Lecture 16 - Electrolyte Abnormalities on ECG

Lecture 17 - Recognizing signs and ECG changes in Myocardial Ischemia/Injury

Lecture 18 - ECG changes in myocardial infarction

Lecture 19 - Miscellaneous ECG findings and cardiac arrest

Lecture 20 - Pacemaker Rhythms

Lecture 1 - Introduction to the One Health Concept and National and International health/public health agencies

Lecture 2 - Global Health vs One Health

Lecture 3 - Basics of Research Ethics

Lecture 4 - Integrated human and animal disease surveillance systems

Lecture 5 - Emerging infectious diseases

Lecture 6 - Process of disease emergence and assessment of the risk factors

Lecture 7 - Mechanisms of pathogen cross over across species boundaries

Lecture 8 - Importance of disease detection, Identification and monitoring in public health

Lecture 9 - Introduction to disease vectors and basics of Medical Entomology

Lecture 10 - The factors influencing an emerging disease

Lecture 11 - Antimicrobial resistance a global threat and Importance of antibiotic stewardship program

Lecture 12 - Introduction of Food safety and food borne diseases

Lecture 13 - What are zoonotic diseases and its role in our changing world

Lecture 14 - The integration of human, animal and ecosystem health in control and prevention of these diseases

Lecture 15 - Community engagement for zoonotic disease control in humans and animals through One Health

Lecture 16 - Basics of Epidemiological Studies

Lecture 17 - Rapid Response system, Disaster Management and Outbreak Investigation Plans

Lecture 18 - Basic statistical methods and their application and the measurement of disease frequency

Lecture 19 - Principles of survey design and the concepts of sampling and Mixed method research

Lecture 20 - Introduction to health policy

Lecture 21 - Risk Communication and Pandemic Preparedness

Lecture 22 - Role of community in disease control and ways for community engagement

Lecture 23 - Uses of different types of media for communication

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

NPTEL : NOC:Canning Technology, Value Addition of Seafood (Fish Processing) (Multi-Disciplinary)

Co-ordinators : Dr. Abhilash Sasidharan, Dr. Maya Raman

- Lecture 1 - Course overview Canning technology and Value addition of sea food
- Lecture 2 - Introduction and the concept of canning technology
- Lecture 3 - History of canning technology - Part 1
- Lecture 4 - History of canning technology - Part 2
- Lecture 5 - Canning Technology and Value Addition Containers and their Properties - Part 1
- Lecture 6 - Canning Technology and Value Addition Containers and their Properties - Part 2
- Lecture 7 - Canning Technology and Value Addition Containers and their Properties - Part 3
- Lecture 8 - Canning Technology and Value Addition Containers and their Properties - Part 4
- Lecture 9 - Canning Technology and Value Addition - Canning process - Part 1
- Lecture 10 - Canning Technology and Value Addition - Canning process - Part 2
- Lecture 11 - Canning Technology and Value Addition - Thermal process calculations - Part 1
- Lecture 12 - Canning Technology and Value Addition - Thermal process calculations - Part 2
- Lecture 13 - Microbiology and spoilage of canned food - Part 1
- Lecture 14 - Microbiology and spoilage of canned food - Part 2
- Lecture 15 - Process of seafood canning - Part 1
- Lecture 16 - Process of seafood canning - Part 2
- Lecture 17 - Seafood pre-processing - Part 1
- Lecture 18 - Seafood pre-processing - Part 2
- Lecture 19 - Additives - Part 1
- Lecture 20 - Additives - Part 2
- Lecture 21 - SOP for seafood canning - Part 1
- Lecture 22 - SOP for seafood canning - Part 2
- Lecture 23 - SOP for seafood canning - Part 3
- Lecture 24 - Nutritional quality of seafood
- Lecture 25 - Muscle structure of seafood
- Lecture 26 - Spoilage in seafood
- Lecture 27 - Preservation methods
- Lecture 28 - Value addition in thermally processed foods
- Lecture 29 - Quality standards for seafood value added products - Part 1
- Lecture 30 - Quality standards for seafood value added products - Part 2
- Lecture 31 - Quality standards for seafood value added products - Part 3

Lecture 1 - Course overview

Lecture 2 - Introduction

Lecture 3 - Paper as packaging material - Part 1

Lecture 4 - Paper as packaging material - Part 2

Lecture 5 - Paper as packaging material - Part 3

Lecture 6 - Glass as packaging material

Lecture 7 - Metal as packaging material - Part 1

Lecture 8 - Metal as packaging material - Part 2

Lecture 9 - Plastic as packaging material - Part 1

Lecture 10 - Plastic as packaging material - Part 2

Lecture 11 - Introduction to packaging system

Lecture 12 - Product characteristics and packaging requirements

Lecture 13 - Rigid, semi-rigid, flexible packaging forms - Part 1

Lecture 14 - Rigid, semi-rigid, flexible packaging forms - Part 2

Lecture 15 - Designing of packaging material

Lecture 16 - Testing of packaging material - Part 1

Lecture 17 - Testing of packaging material - Part 2

Lecture 18 - Testing of packaging material - Part 3

Lecture 19 - Testing of packaging material - Part 4

Lecture 20 - Testing of package performance

Lecture 21 - Principles developing safe and protective packing

Lecture 22 - Transport worthiness test - Part 1

Lecture 23 - Transport worthiness test - Part 2

Lecture 24 - Transport worthiness test - Part 3

Lecture 25 - Safety aspects of food packaging

Lecture 26 - Packaging accessories and advances in packaging

Lecture 27 - Active packaging - Part 1

Lecture 28 - Active packaging - Part 2

Lecture 29 - MA and Aseptic packaging

Lecture 30 - Edible packaging - Part 1

Lecture 31 - Edible packaging - Part 2

[Lecture 32 - Vacuum packing machine](#)

[Lecture 33 - CA and MA packing machine](#)

[Lecture 34 - Gas packing machine](#)

[Lecture 35 - Seal and shrink packing machine](#)

[Lecture 36 - Form fill sealing machine](#)

[Lecture 37 - Aseptic packaging systems](#)

[Lecture 38 - Retort pouches](#)

[Lecture 39 - Bottling machine - Part 1](#)

[Lecture 40 - Bottling machine - Part 2](#)

[Lecture 41 - Carton making machine](#)

[Lecture 42 - Package printing machines - Part 1](#)

[Lecture 43 - Package printing machines - Part 2](#)

Lecture 1 - Introduction

Lecture 2 - Fragility

Lecture 3 - Resilience

Lecture 4 - Interpreting Vulnerability, precarity of work and Access Equality for Equal Opportunity - Part I

Lecture 5 - Interpreting Vulnerability, precarity of work and Access Equality for Equal Opportunity - Part II

Lecture 6 - Social Vulnerability and Group Vulnerability

Lecture 7 - Willed Vulnerability - Endurance Sports

Lecture 8 - Illness, Storytelling and Embodiment

Lecture 9 - Illness, Storytelling and Embodiment Reading - Audre Lorde's : The Cancer Journals

Lecture 10 - Group Discussion - Vulnerable Bodies

Lecture 11 - The Aesthetics of Vulnerability - I

Lecture 12 - The Aesthetics of Vulnerability - II Traumatic Materialism

Lecture 13 - The Aesthetics of Vulnerability - III Melodrama

Lecture 14 - Vulnerability Aesthetics The Sublime

Lecture 15 - The Aesthetics of Vulnerability - Discussion

Lecture 16 - Biopolitics, biopower and vulnerability - I

Lecture 17 - Biopolitics, biopower and vulnerability - II

Lecture 18 - Pandemics and Biopolitics

Lecture 19 - Biopolitics and vulnerable populations in Contemporary Literature

Lecture 20 - Discussion on Biopolitics

Lecture 21 - Ecoprecarity

Lecture 22 - Ecodystopia - I

Lecture 23 - Ecodystopia - II

Lecture 24 - Discussion on Ecoprecarity and Ecodystopias - I

Lecture 25 - Discussion on Ecoprecarity and Ecodystopias - II

Lecture 26 - Aging and Vulnerability in Literature

Lecture 27 - Aging and Vulnerability - 2

Lecture 28 - Aging and Vulnerability - 3

Lecture 29 - Discussion on Vulnerability and Aging - 1

Lecture 30 - Discussion on Vulnerability and Aging - 2

Lecture 31 - Childhood and Vulnerability - 1

[Lecture 32 - Childhood and Vulnerability - 2](#)

[Lecture 33 - Childhood and Vulnerability - 3](#)

[Lecture 34 - Discussion on Childhood and Vulnerability - I](#)

[Lecture 35 - Discussion on Childhood and Vulnerability - II](#)

[Lecture 36 - Imperial Vulnerability - I](#)

[Lecture 37 - Imperial Vulnerability - II](#)

[Lecture 38 - Posthuman Vulnerability](#)

[Lecture 39 - Contemporary Genres of Resilience - The Graphic Novel - I](#)

[Lecture 40 - Contemporary Genres of Resilience - The Graphic Novel - II](#)

Lecture 1 - Functional Anatomy of the Respiratory Tract

Lecture 2 - Mechanics of Respiration - Section 1

Lecture 3 - Mechanics of Respiration - Section 2

Lecture 4 - Ventilation, Perfusion Ventilation Perfusion Relationship

Lecture 5 - Essential Principles of Spirometer

Lecture 6 - Types of Pulmonary function tests

Lecture 7 - Obstructive Lung Diseases: Pathophysiology

Lecture 8 - Restrictive lung Diseases: Pathophysiology

Lecture 9 - Drug Effects on Pulmonary Function

Lecture 10 - Lung Disorders in Children

Lecture 11 - Assessment of Lung Functions in Children

Lecture 12 - Static and Dynamic lung function tests

Lecture 13 - Interpretation of Normal Pulmonary Function Tests

Lecture 14 - Indications for Pulmonary Function Testing

Lecture 15 - Obstructive Airway Diseases - Approach

Lecture 16 - Clinical Diagnosis of Restrictive Lung Disease - Part 1

Lecture 17 - Clinical Diagnosis of Restrictive Lung Disease - Part 1

Lecture 18 - Essential Criteria For a Good Pulmonary Function Testing

Lecture 19 - Interpretation of pulmonary function tests in Restrictive lung disease

Lecture 20 - Interpretation of PFT in Obstructive lung diseases

Lecture 21 - Diffusion Capacity of Lungs for Carbon Monoxide DLCO

Lecture 22 - Radiological assessment of obstructive and restrictive lung disorders

Lecture 23 - Laboratory Video - Pulmonary Function tests - Interpretation and application in clinical practice

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

NPTEL : NOC:Teaching and Learning in Engineering (TALE) (Multi-Disciplinary)

Co-ordinators : Prof. N.J. Rao

Lecture 1 - Overview of TALE and Good Engineer

Lecture 2 - Education and Teaching

Lecture 3 - Learning, Instruction and Assessment

Lecture 4 - What is OBE?

Lecture 5 - Accreditation

Lecture 6 - Outcomes

Lecture 7 - Program Outcomes - 1

Lecture 8 - Program Outcomes - 2

Lecture 9 - Taxonomy of Learning

Lecture 10 - Cognitive Levels

Lecture 11 - General Categories of Knowledge

Lecture 12 - Metacognitive Knowledge

Lecture 13 - Vincenti Categories of Engineering Knowledge

Lecture 14 - Affective and Psychomotor Domains

Lecture 15 - Taxonomy Table

Lecture 16 - Course Outcomes - 1

Lecture 17 - Course Outcomes - 2

Lecture 18 - Course Outcomes - POs and PSOs

Lecture 19 - Attainment of COs

Lecture 20 - Attainment of POs and PSOs

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

NPTEL : NOC:Teaching and Learning in General Programs (Multi-Disciplinary)

Co-ordinators : Prof. N.J. Rao

Lecture 1 - Teaching and Learning in General Programs (TALG)

Lecture 2 - Education and Teaching

Lecture 3 - Learning, Assessment and Instruction

Lecture 4 - Outcome Based Education (OBE)

Lecture 5 - Accreditation

Lecture 6 - Program Outcomes

Lecture 7 - POs and PSOs

Lecture 8 - Taxonomy of Learning: Cognitive Levels - 1

Lecture 9 - Taxonomy of Learning: Cognitive Levels - 2

Lecture 10 - Taxonomy of Learning: Knowledge Categories

Lecture 11 - Taxonomy of Learning: Metacognitive Knowledge

Lecture 12 - Affective Domain

Lecture 13 - Psychomotor Domain

Lecture 14 - Taxonomy Tables

Lecture 15 - Course Outcomes - 1

Lecture 16 - Course Outcomes - 2

Lecture 17 - Tagging the Course Outcomes

Lecture 18 - Attainment of Course Outcomes

Lecture 19 - Attainment of POs and PSOs

Lecture 1 - Engineering Programs, NBA Accreditation and Engineering Courses

Lecture 2 - Course Design

Lecture 3 - ISD and ADDIE

Lecture 4 - Analysis Phase - 1

Lecture 5 - Analysis Phase - 2

Lecture 6 - Design Phase

Lecture 7 - Technology and Targets

Lecture 8 - Assessment Pattern and Assessment Instruments

Lecture 9 - Item Banks

Lecture 10 - Development Phase

Lecture 11 - Instruction Material and Learning Material

Lecture 12 - Implement Phase - 1

Lecture 13 - Implement Phase - 2

Lecture 14 - Evaluate Phase

Lecture 15 - Course Exit Survey

Lecture 16 - Evaluating Laboratories and Electives

Lecture 17 - Exit Surveys for Projects

Lecture 18 - Summary Feedback

Lecture 19 - Instruction: An Overview

Lecture 20 - Instructional Situations

Lecture 21 - How Brains Learn - 1

Lecture 22 - How Brains Learn - 2

Lecture 23 - How Brains Learn - 3

Lecture 24 - Instructional Components - 1

Lecture 25 - Instructional Components - 2

Lecture 26 - Merrill's Principles of Learning

Lecture 27 - ID based on Merrill's Principles

Lecture 28 - Direct Approach to Instruction

Lecture 29 - Project Based Approach to Instruction

Lecture 30 - Problem Based Approach to Instruction

Lecture 31 - Experiential Approach to Instruction

[Lecture 32 - Simulation Approach to Instruction](#)

[Lecture 33 - Instruction for Design](#)

[Lecture 34 - Instruction for Metacognitive Learning](#)

[Lecture 35 - So, what should a teacher do?](#)

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

NPTEL : NOC:NBA Accreditation and Teaching Learning in Engineering (NATE) (Multi-Disciplinary)

Co-ordinators : Prof. N J Rao, Prof. K. Rajanikanth

Lecture 1 - NATE

Lecture 2 - NBA Accreditation

Lecture 3 - Outcome Based Education

Lecture 4 - Self Assessment Report

Lecture 5 - Education, Teaching, Learning, Instruction, and Assessment

Lecture 6 - PEOs and POs (1-5)

Lecture 7 - POs (6-9)

Lecture 8 - POs (10-12)

Lecture 9 - PSOs

Lecture 10 - Taxonomy of Learning

Lecture 11 - Cognitive Processes - 1

Lecture 12 - Cognitive Processes - 2

Lecture 13 - Categories of Knowledge - 1

Lecture 14 - Categories of Knowledge - 2

Lecture 15 - Taxonomy Table

Lecture 16 - Affective and Psychomotor Domains

Lecture 17 - Course Outcomes - 1

Lecture 18 - Course Outcomes - 2

Lecture 19 - Tagging Course Outcomes

Lecture 20 - Computing Attainment of COs

Lecture 21 - Computing PO and PSO Attainment

Lecture 22 - Course Design Component of Teaching as per Fink's Model

Lecture 23 - ISD and ADDIE Models

Lecture 24 - ADDIE - Analysis Phase 1

Lecture 25 - ADDIE - Analysis Phase 2

Lecture 26 - ADDIE - Design Phase

Lecture 27 - Technology for Assessment; Setting Targets

Lecture 28 - Assessment Plan and Assessment Instruments

Lecture 29 - Item Banks

Lecture 30 - ADDIE- Development Phase

Lecture 31 - ADDIE - Implement Phase 1

- Lecture 32 - ADDIE - Implement Phase 2
- Lecture 33 - Exit Surveys - 1
- Lecture 34 - Exit Surveys - 2
- Lecture 35 - ADDIE - Evaluate Phase
- Lecture 36 - Instruction An Overview
- Lecture 37 - Instructional Situations
- Lecture 38 - How Brains Learn
- Lecture 39 - Instructional Components
- Lecture 40 - Principles of Instruction Design
- Lecture 41 - Direct Instruction - 1
- Lecture 42 - Direct Instruction - 2
- Lecture 43 - Project Based Approach to Instruction
- Lecture 44 - Problem Based Approach to Instruction
- Lecture 45 - Instruction for Design thinking
- Lecture 46 - Simulation Approach to Instruction
- Lecture 47 - Instruction for Metacognitive Learning
- Lecture 48 - So, What Should the teacher do?
- Lecture 49 - NBA Criterion 1 Vision, Mission, PEOs - 1
- Lecture 50 - NBA Criterion 1 Vision, Mission, PEOs - 2
- Lecture 51 - NBA Criterion 2 Teaching-Learning Processes - 1
- Lecture 52 - NBA Criterion 2 Teaching-Learning Processes - 2
- Lecture 53 - NBA Criterion 3 COs and POs - 1
- Lecture 54 - NBA Criterion 3 COs and POs - 2
- Lecture 55 - NBA Criterion 4 Students' Performance
- Lecture 56 - NBA Criterion 5 Faculty Information and Contributions
- Lecture 57 - NBA Criterion 6 Facilities and Technical Support
- Lecture 58 - NBA Criterion 7 Continuous Improvement
- Lecture 59 - NBA Criterion 8 First Year Academics
- Lecture 60 - NBA Criterion 9 Student Support Systems
- Lecture 61 - NBA Criterion 10 Governance, Institutional Support and Financial Resources
- Lecture 62 - Summary