

# DIGIMAT - The No.1 Learning Management Platform for Creative Learning

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

**Co-ordinators : Prof.Sridhar Iyer, Prof.Sahana Murthy, Dr.Jayakrishnan M., Dr.Sameer Sahasrabudhe**

Lecture 1 - Course Introduction

Lecture 2 - Perspectives of the Teachers and Learners

Lecture 3 - Key Takeaways for Online Instruction

Lecture 4 - Evolution of MOOCs

Lecture 5 - Known Challenges

Lecture 6 - Need of LC in MOOCs Post Pandemic

Lecture 7 - Why LCM?

Lecture 8 - The LCM Model

Lecture 9 - What is an LeD?

Lecture 10 - Chunking a Lecture into LeD

Lecture 11 - Introducing Reflection Spot

Lecture 12 - Making Your Own LeD

Lecture 13 - Deciding Appropriateness of Various Mediums to Create LeDs

Lecture 14 - Example of Various Mediums from this course

Lecture 15 - What is an LbD?

Lecture 16 - Creating LbDs

Lecture 17 - Constructive Customized Feedback in LbDs

Lecture 18 - Giving Feedback for Open Ended Questions

Lecture 19 - What is an LxT?

Lecture 20 - Creating LxTs

Lecture 21 - Creating an Assimilation Quiz

Lecture 22 - Designing LxTs using LLMs

Lecture 23 - Licensing and Ethical usage

Lecture 24 - LeD : 5.1 Need of a Recap Week in a MOOC

Lecture 25 - Do's and Don'ts - Part 1

Lecture 26 - Do's and Don'ts - Part 2

Lecture 27 - LxT 5.2b- A Primer on Licensing Essentials

Lecture 28 - Recommendations for Effective LbDs

Lecture 29 - What is an LxI

Lecture 30 - Creating LxI with Reflection Quiz

Lecture 31 - LxI- Sharing Experiences

**HTML Links for 1,24,600+ NPTEL Video Lectures, Created by LinuXpert Systems, Chennai**

[Lecture 32 - LxI- How to Achieve Learner - Learner Interaction?](#)

[Lecture 33 - LxI- Types of Focus Questions - 1](#)

[Lecture 34 - LxI- Types of Focus Questions - 2](#)

[Lecture 35 - Orchestrating your MOOC](#)

[Lecture 36 - Orchestration Dynamics in LCM](#)

[Lecture 37 - Assessment](#)

[Lecture 38 - How to Elicit Peer-to-Peer Interaction?](#)

[Lecture 39 - Incentivizing Participation in the Forum](#)

[Lecture 40 - Course Design in MOOC](#)

[Lecture 41 - From Regular Course to LCM](#)

[Lecture 42 - LeD 8.3 LCM Lite](#)

[Lecture 43 - Adopting LCM Model: Prof. Mandar Bhanushe](#)

Lecture 1 - Introduction to Learning Analytics

Lecture 2 - LA, EDM and Academic Analytics

Lecture 3 - Types of Learning Analytics - I

Lecture 4 - Types of Learning Analytics - II

Lecture 5 - Data Collection

Lecture 6 - Data Collection in TELE

Lecture 7 - Data collection in MOOC

Lecture 8 - Multichannel Data

Lecture 9 - Ethics and Data Privacy in LA

Lecture 10 - Descriptive Analytics

Lecture 11 - Data Visualization

Lecture 12 - YouTube Analytics Dashboard

Lecture 13 - MOOCs Analytics Dashboard

Lecture 14 - Predictive Analytics

Lecture 15 - Linear Regression

Lecture 16 - Weka demo and how to read the results

Lecture 17 - MOOC data for Course Project

Lecture 18 - Summary of the Course

Lecture 1 - Course Preview

Lecture 2 - What is this course about?

Lecture 3 - Course Format\_ Learner Centric MOOC (LCM)

Lecture 4 - E-Learning in STEM

Lecture 5 - Making online Teaching Decisions

Lecture 6 - Challenges in e-learning

Lecture 7 - What is Learner-centric Approach?

Lecture 8 - Promoting Learner Engagement with Content

Lecture 9 - Why and How to Design Interactive Videos?

Lecture 10 - What is an LeD?

Lecture 11 - Learning by Doing (LbD)

Lecture 12 - Articulation and Reflection

Lecture 13 - Construct your Own Understanding

Lecture 14 - Contextualized Learning

Lecture 15 - Feedback to Learners

Lecture 16 - Collaboration and Peer Learning

Lecture 17 - Addressing Diversity

Lecture 18 - Putting it All Together

Lecture 19 - Selection and Analysis of Effective Technology

Lecture 20 - Effective Integration of Technology

Lecture 21 - Instructional Design in e-learning

Lecture 22 - ADDIE Process of Instructional Design

Lecture 23 - Constructive Alignment

Lecture 24 - Implementing constructive alignment

Lecture 25 - Multimedia Principle and Contiguity Principle

Lecture 26 - Modality Principle and Redundancy Principle

Lecture 27 - Coherence Principle

Lecture 28 - Segmenting and Personalization Principles

Lecture 29 - Visual Communication Strategies for E-content

Lecture 30 - Forms of Learning

Lecture 31 - Integrating LC Elements in E-content

[Lecture 32 - E-learning Design Process](#)

[Lecture 33 - Closing](#)

# DIGIMAT - The No.1 Learning Management Platform for Creative Learning

**NPTEL : NOC:Sustainable and Affordable Sanitation Solutions for Small Towns: Policy, Planning and Practice (Multi-Disciplinary)**

**Co-ordinators : Prof. N.C Narayanan**

Lecture 1 - Introduction to the Issue of Sanitation

Lecture 2 - Overview of Sanitation in the country

Lecture 3 - Centralised or Decentralised?

Lecture 4 - Need for Participatory Planning

Lecture 5 - Context setting for the Alappuzha Project

Lecture 6 - Environmental Policy

Lecture 7 - Environmental Impact Assessment 2006 and National Urban Sanitation Plan

Lecture 8 - Environmental Governance - Challenges and Alternatives

Lecture 9 - Municipal Solid Waste Management

Lecture 10 - MSWM - Status, Policy, governance structure

Lecture 11 - Integrated Municipal Solid Waste Management

Lecture 12 - Plastic Waste Management

Lecture 13 - Municipal Solid Waste Management in Alappuzha

Lecture 14 - Liquid Waste Management - an Overview

Lecture 15 - Introduction to Faecal Sludge Management

Lecture 16 - Faecal Sludge Management for Alappuzha town

Lecture 17 - Introduction to liquid waste treatment technologies

Lecture 18 - Decentralized Waste Water Treatment system - An Introduction

Lecture 19 - Case studies - Decentralised waste water treatment

Lecture 20 - Decentralized waste water treatment systems plan for Alappuzha

Lecture 21 - History of Sanitation in Alappuzha

Lecture 22 - Organic waste management in Alappuzha

Lecture 23 - Inorganic waste management - Role of Kudumbashree and Haritha Karma Sena

Lecture 24 - Youth engagement for reclaiming canals

Lecture 25 - Significance of institution building in reclaiming canals

Lecture 1 - Introduction to Probability

Lecture 2 - Consequences of Axioms

Lecture 3 - Interpretation of Probability

Lecture 4 - Total Probability law and Baye's Theorem - I

Lecture 5 - Total Probability law and Baye's Theorem - II

Lecture 6 - Random variables and Cumulative Density Function

Lecture 7 - Discrete and Continuous random variables - I

Lecture 8 - Discrete and Continuous random variables - II

Lecture 9 - Expectation and Variance

Lecture 10 - Function of Random variables

Lecture 11 - Generating RVs, Joint Distribution of RVs

Lecture 12 - Joint Distribution of RVs and Marginal densities

Lecture 13 - Covariance of Random variables

Lecture 14 - Moment Generating Functions

Lecture 15 - Conditional PMF and PDF

Lecture 16 - Law of Large numbers, Central Limit Theorem

Lecture 17 - Application of Central Limit Theorem - I

Lecture 18 - Application of Central Limit Theorem - II

Lecture 19 - Gamma and Chi-square distributions

Lecture 20 - Beta distributions and Exponential families

Lecture 21 - Random Sampling, Sample mean and Sample variance

Lecture 22 - Sampling from Gaussian distribution and t-distribution

Lecture 23 - Student's t- distribution

Lecture 24 - F-distribution and its properties

Lecture 25 - Convergence of Random variables and Consistency

Lecture 26 - Order statistics, Median and Percentiles

Lecture 27 - Generating random sample-Direct method

Lecture 28 - Generating random sample-Indirect method

Lecture 29 - Introduction to python

Lecture 30 - Python- Loops and Numpy library

Lecture 31 - Sufficiency Principles and Sufficient Statistics

- Lecture 32 - Sufficient Statistics and Characterization of Sufficient Statistics
- Lecture 33 - Characterization of Sufficient Statistics and Factorization Theorem
- Lecture 34 - Example of Factorization Theorem, Minimal Sufficient Statistics
- Lecture 35 - Minimal sufficient statistics
- Lecture 36 - Test for minimal sufficient statistics with examples, Ancillary Statistics
- Lecture 37 - Likelihood Functions, Maximum Likelihood Estimator
- Lecture 38 - Method of moments, Baye's Estimator
- Lecture 39 - Evaluating Estimator, Cramer Rao Bound, Fisher Information
- Lecture 40 - Evaluating Estimator, Cramer Rao Bound, Fisher Information (Continued...)
- Lecture 41 - Hypothesis Testing, Likelihood Ratio Test
- Lecture 42 - Hypothesis Testing, Bayes Test
- Lecture 43 - Type I and II errors, Power Functions
- Lecture 44 - Type I and II errors, Power Functions (Continued...)
- Lecture 45 - Calculations of Power Functions
- Lecture 46 - Unbiased Test, Uniformly Most Powerful Test, Neyman- Pearson Lemma, Interval Estimation
- Lecture 47 - Interval Estimation
- Lecture 48 - Interval Estimation (Continued...)
- Lecture 49 - Construction of Confidence Intervals from tests
- Lecture 50 - Python- numpy and pandas functions II
- Lecture 51 - Tutology of tests and confidence intervals
- Lecture 52 - Tutology of tests and confidence intervals (Continued...)
- Lecture 53 - p-value, p-test of significance of a statistical test
- Lecture 54 - t-test and F-test, ANOVA
- Lecture 55 - Non-parametric test, Goodness of fit, Chi- squared test
- Lecture 56 - Distribution of Chi-squared test statistics
- Lecture 57 - Kolmogrov-Smirnov test
- Lecture 58 - Lilliefors's test and Explorator Data Analysis, Q-Q Plot and P-P Plot
- Lecture 59 - Generating random samples using Python, Hypothesis Testing using Python
- Lecture 60 - Generating random samples using Python, Hypothesis Testing using Python (Continued...)



- Lecture 1 - Understanding PID Control
- Lecture 2 - Process Model: Experimental Methods
- Lecture 3 - Model Reduction
- Lecture 4 - Disturbance Models and PID
- Lecture 5 - PID Tuning Methods
- Lecture 6 - PID Tuning Methods (Continued...)
- Lecture 7 - Selection of PID Controller
- Lecture 8 - Designing Controllers in a Jugaad Way
- Lecture 9 - To explain why jugaad works....
- Lecture 10 - Feedforward Design
- Lecture 11 - State-space methods - Feedforward Control
- Lecture 12 - Internal Model Control (IMC)
- Lecture 13 - Overview of Control Techniques
- Lecture 14 - Multivariable Control
- Lecture 15 - Multivariable Control (Continued...)
- Lecture 16 - Decoupler Design
- Lecture 17 - Feedback Decouplers and Centralized Controllers
- Lecture 18 - Large Scale MIMO Systems
- Lecture 19 - Understanding irreducible transfer functions
- Lecture 20 - Data Driven PID Control
- Lecture 21 - Data Driven PID Control (Continued...)
- Lecture 22 - Control and Learning
- Lecture 23 - Control using Reinforcement Learning (RL)
- Lecture 24 - Reinforcement learning based control for inverted pendulum
- Lecture 25 - Policy Gradient based Reinforcement Learning
- Lecture 26 - Using MATLAB for Reinforcement Learning
- Lecture 27 - Course Summary

- Lecture 1 - Story of proposal of the theory of natural selection
- Lecture 2 - Natural Selection; Patrick Matthew. History of life on earth
- Lecture 3 - Where did life come from ?
- Lecture 4 - Elements of theory of natural selection
- Lecture 5 - Limitations of Darwins proposal of theory of natural selection
- Lecture 6 - Natural selection in action in ecology
- Lecture 7 - Central Dogma of Molecular Biology
- Lecture 8 - Gene expression in biology
- Lecture 9 - Numbers in E. coli
- Lecture 10 - Growth and evolution in microbial populations
- Lecture 11 - Mutations and errors in DNA replication
- Lecture 12 - How does E. coli divide ?
- Lecture 13 - How does evolution take place in sexually reproducing organisms ?
- Lecture 14 - Growth in batch culture
- Lecture 15 - How to define fitness in a batch culture ?
- Lecture 16 - Model for growth in exponential growth
- Lecture 17 - Logistic model for growth
- Lecture 18 - Growth in a chemostat
- Lecture 19 - Modeling genotype competition in a chemostat
- Lecture 20 - Mutations and their selection coefficients
- Lecture 21 - Distribution of fitness effects (DFE)
- Lecture 22 - Sequence Space and Fitness Landscape
- Lecture 23 - Epistasis and structure of landscape
- Lecture 24 - Epistasis and structure of landscape
- Lecture 25 - Landscape of antibiotic resistance
- Lecture 26 - IPsec and Virtual Private Networks (VPNs) for Network-Layer Security - Part 1
- Lecture 27 - IPsec and Virtual Private Networks (VPNs) for Network-Layer Security - Part 2
- Lecture 28 - IPsec and Virtual Private Networks (VPNs) for Network-Layer Security - Part 3
- Lecture 29 - Securing Wireless LANs - Part 1
- Lecture 30 - Securing Wireless LANs - Part 2
- Lecture 31 - Marbles in a jar continued

[Lecture 32 - Moran Process](#)

[Lecture 33 - Transition probability in Moran process](#)

[Lecture 34 - Fixation probability](#)

[Lecture 35 - Fixation probability of a neutral mutation](#)

[Lecture 36 - Fixation probability of a beneficial mutation](#)

[Lecture 37 - Fixation probability of a beneficial mutation \(Continued...\)](#)

[Lecture 38 - Fixation probability of a beneficial mutation \(Continued...\)](#)

[Lecture 39 - Time of occurrence of mutations](#)

[Lecture 40 - Graphical representation of evolving populations](#)

[Lecture 41 - Time of fixation of mutations](#)

[Lecture 42 - Estimating  \$t\_{wait}\$](#)

[Lecture 43 - Traveling wave model of microbial evolution](#)

[Lecture 44 - Deriving traveling wave model equations](#)

[Lecture 45 -  \$dN/dS\$](#)

[Lecture 46 -  \$dN/dS\$  \(Continued...\), and how to do an evolution experiment in lab ?](#)

[Lecture 47 - Serial Subculture Experiment](#)

[Lecture 48 - Evolution in Chemostat and Mutation Accumulation Experiment](#)

[Lecture 49 - Megaplate Experiment](#)

[Lecture 50 - Long Term Evolution Experiment \(LTEE\)](#)

[Lecture 51 - Fitness trajectory with number of generations](#)

[Lecture 52 - Second order selection - mutation rate](#)

[Lecture 53 - Do fitness landscapes have a peak ?](#)

[Lecture 54 - Do fitness landscapes have a peak ? \(Continued...\)](#)

[Lecture 55 - Metabolic innovation in a lab evolution experiment ?](#)

[Lecture 56 - Selection vs. Drift](#)

[Lecture 57 - Historical Contingency in evolution](#)

[Lecture 58 - Unicellularity to Multicellularity](#)

[Lecture 59 - Adaptive diversification in microbial populations](#)

[Lecture 60 - Synonymous mutations have fitness effects. Mutation Accumulation Experiments](#)

[Lecture 1](#)

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Lecture 1 - Introduction

Lecture 2 - Fluid Mechanics and Chemical Engineering

Lecture 3 - Biomedical Applications of Fluid Mechanics

Lecture 4 - Vectors: A review

Lecture 5 - Introductory Concepts - 1

Lecture 6 - Introductory Concepts - 2

Lecture 7 - Flow Visualisation

Lecture 8 - Dimensional Analysis - Pi Theorem

Lecture 9 - Dimensional Analysis- Ipsen Method

Lecture 10 - Similitude

Lecture 11 - Pressure Distribution in a Static Fluid

Lecture 12 - Force of Submerged Surfaces

Lecture 13 - Buoyancy

Lecture 14 - Surface Tension

Lecture 15 - Reynolds Transport Theorem

Lecture 16 - Mass Conservation

Lecture 17 - Momentum Conservation - I

Lecture 18 - Momentum Conservation - II

Lecture 19 - Energy Conservation

Lecture 20 - Fluid Translation

Lecture 21 - Fluid Rotation and Deformation

Lecture 22 - Mass Conservation: Derivation

Lecture 23 - Mass Conservation: Cylindrical Coordinates

Lecture 24 - Navier Stokes Equations: Derivation

Lecture 25 - Flow Between Two Parallel Plates

Lecture 26 - Flow in a Falling Liquid Film

Lecture 27 - Fully-developed flow in a circular channel

Lecture 28 - Flow between two concentric cylinders

Lecture 29 - Lubrication Approximation

Lecture 30 - Creeping Flows

Lecture 31 - Equation of Motion in Streamline Coordinates

[Lecture 32 - Irrotational Flow](#)

[Lecture 33 - Bernoulli's Equation and Flow Measurement](#)

[Lecture 34 - Boundary Layers](#)

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[Lecture 37 - Introduction to Turbulence](#)

[Lecture 38 - Turbulent Flow in a Pipe](#)

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[Lecture 40 - Flow in Pipes: Major Losses](#)

[Lecture 41 - Flow in Pipes: Minor Losses](#)

[Lecture 42 - Flow in Pipes: Types of Problems](#)

[Lecture 43 - Cavitation and NPSH](#)

Lecture 1 - Introductory lecturer

Lecture 2 - Fundamentals of solar thermal collector

Lecture 3 - Low temperature solar thermal power plant

Lecture 4 - Medium and high temperature solar thermal power plant

Lecture 5 - Thermal analysis of solar thermal power plant

Lecture 6 - Fundamentals and concept of solar PV power plant

Lecture 7 - Offgrid solar photovoltaic systems

Lecture 8 - Offgrid solar photovoltaic systems design

Lecture 9 - Grid connected solar photovoltaic systems

Lecture 10 - Performance of grid connected solar photovoltaic systems

Lecture 11 - Introduction to wind power generation

Lecture 12 - Wind data analysis

Lecture 13 - Performance parameters and blade geometry

Lecture 14 - Betz limit and optimum tip speed ratio

Lecture 15 - Design of wind farm

Lecture 16 - Fundamentals and working principle

Lecture 17 - Analysis of small hydro power generation

Lecture 18 - Introduction to biomass power generation

Lecture 19 - Biochemical conversion for electricity generation

Lecture 20 - Thermochemical conversion of solid fuels and gasification system

Lecture 21 - Hydrogen energy

Lecture 22 - Fuel cells technologies - Part I

Lecture 23 - Fuel cells technologies - Part II

Lecture 24 - Hydrogen energy tutorial

Lecture 25 - Fundamentals and methods of geothermal energy harvesting

Lecture 26 - Analysis of geothermal plant and resources

Lecture 27 - Fundamentals and working of ocean thermal energy conversion systems

Lecture 28 - Analysis of close rankine cycle OTEC system

Lecture 29 - Fundamentals and working of tidal energy conversion systems

Lecture 30 - Fundamentals and working of wave energy conversion systems

Lecture 31 - Overview and analysis of thermal energy storage

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[Lecture 32 - Fundamentals and analysis of mechanical energy storage system](#)

[Lecture 33 - Fundamentals and analysis of electro chemical energy storage system](#)

[Lecture 34 - Summary and numerical exercise](#)

[Lecture 35 - Fundamentals and methodology of evaluation of energy economics](#)

[Lecture 36 - Case study involving energy economics of biomass power generation system and LCA](#)

[Lecture 37 - Course Summary](#)



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Lecture 2 - Discussion on Course

Lecture 3 - Faculty Intro: Dr. Geeta Joshi and Dr. Piyush Gupta

Lecture 4 - Faculty Intro: Dr. Abhijit Dam

Lecture 5 - Principles of Palliative Care

Lecture 6 - Integrating Science

Lecture 7 - Growth of Palliative Care

Lecture 8 - Holistic Care

Lecture 9 - Palliative Care Concepts - Interview

Lecture 10 - National Scenario of Palliative Care

Lecture 11 - National Scenario

Lecture 12 - WHO Perspective

Lecture 13 - Allopathy

Lecture 14 - Ayush Ministry

Lecture 15 - Ayurveda

Lecture 16 - Ayur Siddha Nature Yoga

Lecture 17 - Naturopathy

Lecture 18 - NHAM

Lecture 19 - Ayush Modules

Lecture 20 - Unani

Lecture 21 - Homeopathy

Lecture 22 - PC Delivery

Lecture 23 - PC Delivery

Lecture 24 - Practicing PC

Lecture 25 - Home Based PC

Lecture 26 - Home Care

Lecture 27 - Home Nursing

Lecture 28 - Hospice

Lecture 29 - Caregiver

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[Lecture 35 - Siddha](#)

[Lecture 36 - Intro Yoga](#)

[Lecture 37 - Yoga](#)

[Lecture 38 - Yoga and Stress](#)

[Lecture 39 - Introduction Pain](#)

[Lecture 40 - Classification Pain](#)

[Lecture 41 - Pain Assessment](#)

[Lecture 42 - Total Pain](#)

[Lecture 43 - Hospice Total Pain](#)

[Lecture 44 - WHO 3 Step Ladder](#)

[Lecture 45 - Pain Management](#)

[Lecture 46 - Cancer Pain](#)

[Lecture 47 - Pain Assessment](#)

[Lecture 48 - Symptom Assessment](#)

[Lecture 49 - Holistic Symptom Management](#)

[Lecture 50 - Constipation](#)

[Lecture 51 - Delirium](#)

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[Lecture 53 - Hygiene Bedsores](#)

[Lecture 54 - Pressure Sore](#)

[Lecture 55 - Secretions](#)

[Lecture 56 - Fungating](#)

[Lecture 57 - Fungating Wound](#)

[Lecture 58 - Fungating pdf](#)

[Lecture 59 - Oral NGT Catheter](#)

[Lecture 60 - Oral NGT Cathe pdf](#)

[Lecture 61 - Nutrition](#)

[Lecture 62 - Communication](#)

[Lecture 63 - Communications](#)

[Lecture 64 - Communication in PC](#)

- Lecture 65 - Body Language
- Lecture 66 - Communicating Patients
- Lecture 67 - Good and Bad Communication
- Lecture 68 - Good and Bad Communication
- Lecture 69 - Communication Bridging Gap
- Lecture 70 - Overview of Psychological Reactions
- Lecture 71 - Psychological Reactions
- Lecture 72 - Psychological Aspects
- Lecture 73 - Communicating with Patient
- Lecture 74 - Breaking Bad News
- Lecture 75 - Distress and Denial
- Lecture 76 - BBN Collusion Denial
- Lecture 77 - Emotional Reactions Breaking Denial
- Lecture 78 - Communication Interview
- Lecture 79 - Psychological Aspects
- Lecture 80 - Anxiety Depression Distress
- Lecture 81 - Counsellor in PC
- Lecture 82 - Caregiver Burnout Yoga
- Lecture 83 - PC in Elderly
- Lecture 84 - Spirituality
- Lecture 85 - Spirituality and Religion
- Lecture 86 - Laws of Karma
- Lecture 87 - Last Days of Life
- Lecture 88 - Care of Dying and Bereavement
- Lecture 89 - Quality of Death
- Lecture 90 - Death
- Lecture 91 - Grief and Bereavement
- Lecture 92 - Ethics in PC
- Lecture 93 - Volunteering
- Lecture 94 - Volunteers
- Lecture 95 - Volunteers
- Lecture 96 - Community
- Lecture 97 - Community Based PC

[Lecture 98 - Community Based PC](#)

[Lecture 99 - Network Neighborhood](#)

[Lecture 100 - Nurse in Home Care](#)

[Lecture 101 - Care of Dying](#)

[Lecture 102 - Safety Precaution](#)

[Lecture 103 - Self Care](#)

[Lecture 104 - Respite Care](#)

[Lecture 105 - IT in PC](#)

[Lecture 106 - COC](#)

[Lecture 107 - Sandhi](#)

[Lecture 108 - Cancer Aid Society](#)

[Lecture 109 - Alpha](#)

[Lecture 110 - PC Services in Punjab](#)

# DIGIMAT - The No.1 Learning Management Platform for Creative Learning

## NPTEL : NOC:Multi-Criteria Decision Making and Applications (Multi-Disciplinary)

**Co-ordinators : Prof. Raghu Nandan Sengupta**

Lecture 1 - Example 01, 02, 03

Lecture 2 - Example 03, 04, 05, 06

Lecture 3 - Example 04, 05, 06 (Continued...)

Lecture 4 - Example 06 (Continued...), Example 07

Lecture 5 - Example 06 (Continued...), Example 07

Lecture 6 - MCDM: Definitions, Theory of Choice, MCDM Axioma, Condorcet Paradox

Lecture 7 - Theory of Choice, MCDM Axioms, Condorcet Paradox

Lecture 8 - MCDM Axioms, Condorcet Paradox, Utility Theory

Lecture 9 - Utility Theory, Expected value of Utility Function, Lotteries, Rational Choice, Properties of Utility Function

Lecture 10 - Rational Choice, Properties of Utility Function, Risk Aversion, Neutrality, Seeking Properties, Marginal Utility, Absolute Risk Aversion, Relative Risk Aversion

Lecture 11 - Utility Theory Examples, Properties of Utility Function, Risk Aversion, Neutrality, Seeking Properties, Marginal Utility, Absolute Risk Aversion, Relative Risk Aversion

Lecture 12 - Properties of Utility Function, Risk Aversion, Neutrality, Seeking Properties, Marginal Utility, Absolute Risk Aversion, Relative Risk Aversion, Example of Utility Functions

Lecture 13 - Example of Utility Functions, Certainty Equivalent, Geometric Mean Methods, Safety First Principle, Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function

Lecture 14 - Example of Utility Functions, Certainty Equivalent, Geometric Mean Methods, Safety First Principle, Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function

Lecture 15 - Certainty Equivalent, Geometric Mean Methods, Safety First Principle, Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function

Lecture 16 - Geometric Mean Methods, Safety First Principle, Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function

Lecture 17 - Safety First Principle, Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function

Lecture 18 - Safety First Principle, Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function

Lecture 19 - Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function

Lecture 20 - Stochastic Dominance, Hyperbolic Absolute Risk Aversion Function

Lecture 21 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karush Kuhn Tucker Condition, Scales of Measurements: Nominal Scale, Ordinal Scale, Interval Scale, Ratio Scale, Goal Programming

Lecture 22 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karush Kuhn Tucker Condition, Scales of Measurements: Nominal Scale, Ordinal Scale, Interval Scale, Ratio Scale, Goal Programming

Lecture 23 - Pareto Optimality, Property of Dominance, Strong Pareto Optimality, Weak Pareto Optimality, Concepts of Pareto Optimality in 2D Space, Effective versus Inefficient Solutions

Lecture 24 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karush Kuhn Tucker Condition, Scales of Measurements: Nominal Scale, Ordinal Scale, Interval Scale, Ratio Scale, Goal Programming

Lecture 25 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karush Kuhn Tucker Condition, Scales of Measurements: Nominal Scale, Ordinal Scale, Interval Scale, Ratio Scale, Goal Programming

# DIGIMAT - The No.1 Learning Management Platform for Creative Learning

Lecture 26 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karush Kuhn Tucker Condition, Scales of Measurements: Nominal Scale, Ordinal Scale, Interval Scale, Ratio Scale, Goal Programming

Lecture 27 - Concept of Pareto Optimality in 2D Space, Effective Versus Inefficient Solutions, Karush Kuhn Tucker Condition, Scales of Measurements: Nominal Scale, Ordinal Scale, Interval Scale, Ratio Scale, Goal Programming

Lecture 28 - Scales of Measurements: Nominal Scale, Ordinal Scale, Interval Scale, Ratio Scale, Goal Programming

Lecture 29 - Pareto Optimality, Concept of Pareto Optimality, Goal Programming

Lecture 30 - Pareto Optimality, Pareto Curves, Goal Programming

Lecture 31 - Goal Programming, Concepts of Pareto Optimality in 2D Space for LP, Concepts of Pareto Optimality in 3D Space for QP

Lecture 32 - Concepts of Pareto Optimality in 2D Space for LP, Concepts of Pareto Optimality in 3D Space for QP

Lecture 33 - LP Example of Goal Programming/MCDM, NLP Example of Goal Programming/MCDM

Lecture 34 - LP Example of Goal Programming/MCDM, NLP Example of Goal Programming/MCDM (Continued...)

Lecture 35 - LP Example of Goal Programming/MCDM, NLP Example of Goal Programming/MCDM (Continued...)

Lecture 36 - LP Example of Goal Programming/MCDM, NLP Example of Goal Programming/MCDM (Continued...)

Lecture 37 - Quadratic Programming, Goal Programming

Lecture 38 - Multi Attribute Utility Theory, TOPSIS

Lecture 39 - Multi Attribute Utility Theory, TOPSIS

Lecture 40 - Technique For Order Preference by Similarity to Ideal Solutions (TOPSIS)

Lecture 41 - Technique For Order Preference by Similarity to Ideal Solutions (TOPSIS)

Lecture 42 - Technique For Order Preference by Similarity to Ideal Solutions (TOPSIS)

Lecture 43 - Technique For Order Preference by Similarity to Ideal Solutions (TOPSIS), Elimination and Choice Translating Reality (ELECTRE)

Lecture 44 - Elimination and Choice Translating Reality (ELECTRE)

Lecture 45 - Elimination and Choice Translating Reality (ELECTRE)

Lecture 46 - Elimination and Choice Translating Reality (ELECTRE)

Lecture 47 - Elimination and Choice Translating Reality (ELECTRE)

Lecture 48 - Elimination and Choice Translating Reality (ELECTRE), e-ELECTRE

Lecture 49 - Elimination and Choice Translating Reality (ELECTRE), e-ELECTRE

Lecture 50 - Elimination and Choice Translating Reality (ELECTRE), e-ELECTRE, VIKOR

Lecture 51 - VIKOR (VIsekriterijumska Optimizacija I Kompromisno Resenje)

Lecture 52 - VIKOR (VIsekriterijumska Optimizacija I Kompromisno Resenje)

Lecture 53 - Analytical Hierarchy Process (AHP)

Lecture 54 - Analytical Hierarchy Process (AHP) (Continued...)

Lecture 55 - Analytical Hierarchy Process (AHP) (Continued...)

Lecture 56 - Data Envelopment Analysis (DEA)

Lecture 57 - Data Envelopment Analysis (DEA)

[Lecture 58 - Decision Tree Analysis](#)

[Lecture 59 - Decision Tree Analysis \(Continued...\)](#)

[Lecture 60 - Example in Multi Objective Decision Making](#)

Lecture 1 - Prelude

Lecture 2 - Prologue BCPC

Lecture 3 - Introductory Dialogue - Week 1

Lecture 4 - Basics of Palliative Care

Lecture 5 - Community Participation

Lecture 6 - Communication Skills in Palliative Care - Part I

Lecture 7 - Communication Skills in Palliative Care - Part II

Lecture 8 - Introductory Dialogue - Week 2

Lecture 9 - What is Active Listening ?

Lecture 10 - Are You Really Listening ?

Lecture 11 - Active Listening Skills

Lecture 12 - Communication Skills for Health Professionals

Lecture 13 - Communication Competency in Health Professional

Lecture 14 - Talking About Death

Lecture 15 - Introductory Dialogue - Week 3

Lecture 16 - Psychological Aspects in PC

Lecture 17 - What is Psychological Distress ?

Lecture 18 - Types of Psychological Distress

Lecture 19 - Kessler Psychological Distress Scale

Lecture 20 - Generalized Anxiety Disorder (GAD)

Lecture 21 - Guilt and Regret

Lecture 22 - Introductory Dialogue - Week 4

Lecture 23 - Cultural Aspects in Palliative Care

Lecture 24 - Spirituality (FAQs)

Lecture 25 - Spiritual Distress

Lecture 26 - Ways to Lead Spiritual Life !

Lecture 27 - Introductory Dialogue - Week 5

Lecture 28 - What is Stress and Burnout

Lecture 29 - Some Tips to Manage Stress

Lecture 30 - Burnout in Health Care Professionals

Lecture 31 - Avoiding Burnout in Health Care Professionals



Lecture 32 - Voluteers to Prevent Burnout !

Lecture 33 - Self Care

Lecture 34 - Introductory Dialogue - Week 6

Lecture 35 - Ethical Aspects of End of Life

Lecture 36 - Impact of Bereavement on Family

Lecture 37 - Kubler-Ross Model

Lecture 38 - Theoretical Models of Grief and Bereavement

Lecture 39 - Psychology of Grief and Bereavement

Lecture 40 - Management of Grief and Bereavement

Lecture 41 - Introductory Dialogue - Week 7

Lecture 42 - Metastatic Bone Pain Management

Lecture 43 - How to Prescribe ENDS ?

Lecture 44 - Safe Use of ENDS

Lecture 45 - Neuropathic Pain and Its Management

Lecture 46 - Introduction to Intervention Pain Management

Lecture 47 - Introductory Dialogue - Week 8

Lecture 48 - Gastrointestinal Symptoms

Lecture 49 - Respiratory Symptoms Management - Part I

Lecture 50 - Respiratory Symptoms Management - Part II

Lecture 51 - Delirium and Dementia

Lecture 52 - Emergencies in Palliative Medicine

Lecture 53 - Recent Advances in Nausea and Vomiting

Lecture 54 - Introductory Dialogue - Week 9

Lecture 55 - Nursing Care Plans: Case Scenario

Lecture 56 - Bladder and Bowel Care

Lecture 57 - Stoma Care - Part I

Lecture 58 - Stoma Care - Part II

Lecture 59 - Skin Care in Colostomy

Lecture 60 - Introductory Dialogue - Week 10

Lecture 61 - Importance of Prognostication

Lecture 62 - Diagnosing the Dying !

Lecture 63 - Facing Death: How to Help ?

Lecture 64 - Subcutaneous Route

[Lecture 65 - Introductory Dialogue - Week 11](#)

[Lecture 66 - National Health Mission \(NHM\)](#)

[Lecture 67 - Aushman Bharat](#)

[Lecture 68 - Government Schemes for Palliative Care](#)

[Lecture 69 - NDPS Rules 2015](#)

[Lecture 70 - Delivery Models of Palliative Care](#)

[Lecture 71 - Introductory Dialogue - Week 12](#)

[Lecture 72 - Availability of ENDS and Advocacy](#)

[Lecture 73 - Availability of ENDS and Advocacy](#)

[Lecture 74 - Euthanasia](#)

[Lecture 75 - Advance Directive](#)

[Lecture 76 - History of Opium - Part I](#)

[Lecture 77 - History of Opium - Part II](#)

[Lecture 78 - Panel Discussion](#)

Lecture 1 - Prologue CIPC

Lecture 2 - Introductory Dialogue

Lecture 3 - Basics of Palliative Care

Lecture 4 - Integrative Palliative Care

Lecture 5 - Complementary Medicine

Lecture 6 - Community Participation in PC

Lecture 7 - Communication Skills in Palliative Care - Part I

Lecture 8 - Communication Skills in Palliative Care - Part II

Lecture 9 - Introductory Dialogue

Lecture 10 - What is Naturopathy?

Lecture 11 - Naturopathy Basic Concepts and Principles

Lecture 12 - Air Therapy

Lecture 13 - Helio Therapy

Lecture 14 - Hydro Therapy

Lecture 15 - Mud Therapy

Lecture 16 - Fasting Therapy

Lecture 17 - Massage Therapy

Lecture 18 - Magnet Therapy

Lecture 19 - Introduction (The Integrative Role of Yoga in Palliative Care)

Lecture 20 - Overview of Yoga in Palliative Care, Challenges and Therapeutic Role of Yoga

Lecture 21 - Concept of Ashtang Yoga for Enhancing QOL

Lecture 22 - Health and Diseases According to Yoga

Lecture 23 - Role of Yoga as Preventive and Curative Approach in Palliative Care

Lecture 24 - Ganesh Asana, Chair Surya Namaskar Practical

Lecture 25 - Sukshma Asana Practical

Lecture 26 - Therapeutic Role of Mudra for Mental and Emotional Health

Lecture 27 - Yoga Interventions for Physical and Mental Health

Lecture 28 - Role of Pratyahara in Palliative Care

Lecture 29 - Relaxation Technique of Yoga Nidra for Palliative Care

Lecture 30 - Yoga Intervention for Enhancing Spiritual Health

Lecture 31 - Understanding Cancer and Yoga Practices for Dealing with Cancer

- Lecture 32 - Introduction (Pranic Healing)
- Lecture 33 - Role of Pranic Healing in Palliative Care
- Lecture 34 - Pranic Healing Five Elements
- Lecture 35 - Chakaras
- Lecture 36 - Twin Heart Meditation
- Lecture 37 - Forgiveness
- Lecture 38 - Gratitude
- Lecture 39 - Introductory Dialogue (Energy Healing)
- Lecture 40 - Remote Energy Healing
- Lecture 41 - Reiki
- Lecture 42 - Reiki: Symbols and Meaning
- Lecture 43 - Reiki and Pranic Healing
- Lecture 44 - Qigong
- Lecture 45 - Tai Chi
- Lecture 46 - Emotional Freedom Technique (EFT)
- Lecture 47 - Introduction (Acupressure and Acupuncture)
- Lecture 48 - Meridians - A System of Pathway !
- Lecture 49 - Acupressure: A Beginner's Guide
- Lecture 50 - Popular Acupressure Points
- Lecture 51 - Acupuncture Miracle Remedy for Everything ?
- Lecture 52 - Acupressure and Acupuncture, What is the Difference ?
- Lecture 53 - Auricular Acupuncture
- Lecture 54 - Introduction (Aroma Therapy)
- Lecture 55 - Introduction to Aroma Therapy
- Lecture 56 - Essential Oils
- Lecture 57 - Clinical Aromatherapy in Palliative Care
- Lecture 58 - Aroma Therapy - Incorporating into Daily Life !
- Lecture 59 - Aroma Therapy - Myths and FAQs
- Lecture 60 - Introduction
- Lecture 61 - Music Therapy
- Lecture 62 - Music Therapy - History and Benefits
- Lecture 63 - Music Therapy (Palliative Care)
- Lecture 64 - Tools and Activities

- [Lecture 65 - Interventions and Raga](#)
- [Lecture 66 - Introduction](#)
- [Lecture 67 - Diet Therapy](#)
- [Lecture 68 - Nutrition - Does it Really Matter ?](#)
- [Lecture 69 - Eat Natural Food! Boot Your Energy Naturally!](#)
- [Lecture 70 - Stop Eating Junk Food!](#)
- [Lecture 71 - Role of Nutrition Palliative Care](#)
- [Lecture 72 - Dispelling Nutrition Myths! Unveiling the Truth for Better Health](#)
- [Lecture 73 - Nutrition At the End of Life!](#)
- [Lecture 74 - Introduction \(Expressive Art Therapy\)](#)
- [Lecture 75 - Expressive Art Therapy](#)
- [Lecture 76 - Art Therapy](#)
- [Lecture 77 - Sand Play Therapy: A Healing Journey](#)
- [Lecture 78 - Colour Therapy](#)
- [Lecture 79 - Writing Therapy](#)
- [Lecture 80 - Introduction](#)
- [Lecture 81 - Religiosity, Spirituality and Palliative Medicine](#)
- [Lecture 82 - Exploring the Science Behind Spirituality](#)
- [Lecture 83 - Loving Yourself](#)
- [Lecture 84 - Spiritual Distress](#)
- [Lecture 85 - Panel Discussion: Death and Dying](#)
- [Lecture 86 - Introduction \(First Aid\)](#)
- [Lecture 87 - Introduction to First Aid](#)
- [Lecture 88 - Purpose of First Aid Training](#)
- [Lecture 89 - Emergency Procedure](#)
- [Lecture 90 - Cardiopulmonary Resuscitation CPR](#)
- [Lecture 91 - Making a Splint](#)
- [Lecture 92 - Recovery Position](#)
- [Lecture 93 - Emergency Scene Management \(ESM\)](#)

Lecture 1 - Introduction to Fuzzy Sets

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 Donts](#)

[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](#)

**NPTEL : NOC:Roadmap for Patent Creation (Multi-Disciplinary)**

**Co-ordinators : Prof. Gouri Gargate**

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

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[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](#)

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](#)

**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

- 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](#)

**NPTEL : NOC:Introduction to Reliability Engineering (Multi-Disciplinary)**

**Co-ordinators : Prof. Neeraj Kumar Goyal**

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 Parameter)

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
- Lecture 23 - Qualitative Methods in Health Promotion - Part III
- Lecture 24 - Qualitative Methods in Health Promotion - Part IV
- Lecture 25 - Qualitative Methods in Health Promotion - Part V
- Lecture 26 - Introduction to Mixed Methods Research
- Lecture 27 - The Convergent Design
- Lecture 28 - The Explanatory Sequential Design
- Lecture 29 - The Exploratory Sequential Design (Continued...)
- Lecture 30 - The Embedded Design
- Lecture 31 - Different study tools and their application in health promotion research

- 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
- Lecture 42 - BCC and SBCC - Part II
- Lecture 43 - BCC and SBCC - Part III
- Lecture 44 - BCC and SBCC - Part IV
- Lecture 45 - BCC and SBCC - Part V
- 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
- Lecture 52 - Quantitative analytical methods - Part II
- 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

# DIGIMAT - The No.1 Learning Management Platform for Creative Learning

## **NPTEL : NOC:Urban Ecological Heritagescapes through Interactive Governance: Theories and Applications (Multi-Disciplinary)**

**Co-ordinators : Prof. Jenia Mukherjee**

Lecture 1 - Introduction

Lecture 2 - Urban Heritage - Global Conventions and Declarations

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

Lecture 4 - Urban Heritage - The Indian Context

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

Lecture 6 - Historicizing lakes of Bangalore - social-ecological perspectives

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

Lecture 8 - Example 1: The Jakkur Lake

Lecture 9 - Example 2: The Puttenahalli Lake

Lecture 10 - Example 3: The Kaikondrahalli Lake

Lecture 11 - Kolkata's heritage - Applying the urban ecological heritage lens

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

Lecture 13 - Living Systems infrastructure of Kolkata

Lecture 14 - Case study 1: The Nalban and Goltala Fisheries

Lecture 15 - Case study 2: Baro Chaynavi Cooperative

Lecture 16 - Case study 3: Jhagrashisha

Lecture 17 - EKW as heritage - Lessons from a Practical Empirical Implementation Project - I

Lecture 18 - EKW as heritage - Lessons from a Practical Empirical Implementation Project - I

Lecture 19 - Conclusions

Lecture 1 - Introduction

Lecture 2 - Experiment 1: Teaching of Serial Manipulator

Lecture 3 - Experimentation I

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

Lecture 5 - Experiment 2: Control of Tracked Mobile Manipulator

Lecture 6 - Experimentation II

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

Lecture 13 - Experimentation IV (Continued...)

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

Lecture 15 - Experimentation V

Lecture 16 - Experiment 5: Path and Gait Planning of 25 dof NAO Humanoid Robot (Continued...)

Lecture 17 - Current Trends in Robotics Research

Lecture 18 - Summary of the Course



**NPTEL : NOC:Medical Law (Multi-Disciplinary)**

**Co-ordinators : Prof. Narendran Thiruthy, Prof. Chaitanya Mittal**

- Lecture 1 - Interface between Medical Profession and Law
- Lecture 2 - Role of Medical practitioners in Justice Administration
- Lecture 3 - Dos and Don'ts of Doctors
- Lecture 4 - Dos and Don'ts for Legal Practitioners
- 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
- Lecture 16 - Healthcare Policy and Law
- 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
- Lecture 23 - Intellectual Property and Access to Medicine
- Lecture 24 - Neglected diseases and Role of IPR
- Lecture 25 - Patenting Therapeutic Practices and Techniques
- Lecture 26 - Duties of Doctor in Courts
- Lecture 27 - Evidence Law and Medical experts
- Lecture 28 - Admissibility of Forensic Evidence
- Lecture 29 - Various Legal procedures in Medical practice
- Lecture 30 - Collection, preservation and dispatch of Forensic Evidence
- Lecture 31 - Ethical insight into different aspects of Surrogacy practice

[Lecture 32 - Surrogacy Regulation in India](#)

[Lecture 33 - Assisted Reproductive Technology Regulation in India](#)

[Lecture 34 - Pre-Conception and Pre-Natal Diagnostic](#)

[Lecture 35 - Penalties for non-compliance](#)

[Lecture 36 - Ethical Issues in Organ Transplantation](#)

[Lecture 37 - Law governing organ transplantation](#)

[Lecture 38 - Comparative Law on Organ Transplantation](#)

[Lecture 39 - Medico-Legal Issues in Clinical Trials](#)

[Lecture 40 - Regulatory Law for Clinical Trials in India](#)

- Lecture 1 - Overview of Obstetrics
- 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
- Lecture 14 - Umbilical cord and Fetal membranes - Part 2
- Lecture 15 - FETUS (physiology and circulation)
- Lecture 16 - Physiological changes in pregnancy - Part 1
- Lecture 17 - Physiological changes in pregnancy - Part 2
- Lecture 18 - Physiological changes in pregnancy - Part 3
- 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
- Lecture 31 - Antenatal Care - Part 3

- [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](#)
- [Lecture 39 - Fetal Imaging and Amniotic Fluid Study](#)
- [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](#)
- [Lecture 44 - Events of Normal Labour](#)
- [Lecture 45 - Mechanism of Normal Labour](#)
- [Lecture 46 - Mechanism of Normal Labour \(Continued...\)](#)
- [Lecture 47 - Clinical course of Labour](#)
- [Lecture 48 - Monitoring of Normal Labour - Part 1](#)
- [Lecture 49 - Monitoring of Normal Labour - Part 2](#)
- [Lecture 50 - Labour Analgesia](#)
- [Lecture 51 - Labour Analgesia \(Continued...\)](#)
- [Lecture 52 - Abnormal Labour](#)
- [Lecture 53 - Intrapartum Fetal Monitoring - Partogram](#)
- [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](#)
- [Lecture 63 - Management of Puerperium](#)
- [Lecture 64 - Post-Natal care and postpartum contraception](#)

[Lecture 65 - Maternal Health Indicators and demographic scenario](#)

[Lecture 66 - Government health programmes related to Maternal Health](#)

[Lecture 67 - Government health programmes related to Maternal Health \(Continued...\)](#)

[Lecture 68 - Comprehensive Abortion Care \(MTP Amendment Act 2021\)](#)

- Lecture 1 - Recommender system and its business value
- Lecture 2 - Types of recommender system - I
- Lecture 3 - Types of recommender system - II
- Lecture 4 - Data Collection
- Lecture 5 - Data Description
- Lecture 6 - Data preprocessing
- Lecture 7 - Dimensionality Reduction
- Lecture 8 - Introduction to machine learning - I
- Lecture 9 - Introduction to machine learning - II
- Lecture 10 - Introduction to machine learning - III
- Lecture 11 - Distance and Similarity
- Lecture 12 - Distance and Similarity (Continued...)
- Lecture 13 - User-Based Approach
- Lecture 14 - Item-Based Approach
- Lecture 15 - Additional Topics in Neighbourhood Based Approach
- Lecture 16 - Association rule based model
- Lecture 17 - UV Decomposition
- Lecture 18 - The latent factor model
- Lecture 19 - Basic latent factor models
- Lecture 20 - Other advanced models
- Lecture 21 - Introduction to content based recommender system: Foundations
- Lecture 22 - Feature Engineering - I
- Lecture 23 - Feature Engineering - II
- Lecture 24 - Feature Engineering - III
- Lecture 25 - Feature Engineering - IV
- Lecture 26 - Decision Trees for content based recommendation
- Lecture 27 - Naïve Bayes classifier for content based recommendation
- Lecture 28 - kNN Classifier for Recommender System
- Lecture 29 - Rule based classification
- Lecture 30 - Regression methods and conclusions
- Lecture 31 - Introduction to evaluation of recommender system

[Lecture 32 - Resampling methods](#)

[Lecture 33 - Evaluation metrics for accuracy](#)

[Lecture 34 - Drawing reliable conclusions - I](#)

[Lecture 35 - Drawing reliable conclusions - II](#)

[Lecture 36 - Hybrid recommender systems](#)

[Lecture 37 - Knowledge based recommender systems](#)

[Lecture 38 - Context-Sensitive recommender systems](#)

[Lecture 39 - Structural Recommendations in Networks](#)

[Lecture 40 - Trust aware recommender systems](#)

Lecture 1 - Foundation of Molecular Biology

Lecture 2 - DNA Replication and Repair Mechanism

Lecture 3 - Transcription (RNA Synthesis)

Lecture 4 - Protein Synthesis (Translation)

Lecture 5 - Nucleic Acid Isolation and Detection Methods

Lecture 6 - PCR (Polymerase Chain Reaction) Fundamentals

Lecture 7 - Realtime PCR - Part 1

Lecture 8 - Realtime PCR - Part 2

Lecture 9 - Variations of the PCR - Part 1

Lecture 10 - Variations of the PCR - Part 2

Lecture 11 - DNA Cloning and Recombinant DNA technology - I

Lecture 12 - DNA Cloning and Recombinant DNA technology - II

Lecture 13 - DNA Cloning and Recombinant DNA technology - III

Lecture 14 - Genome Editing Technologies - I

Lecture 15 - Genome Editing Technologies - II

Lecture 16 - DNA Microarray

Lecture 17 - FISH (Fluorescence in situ Hybridization)

Lecture 18 - Methods to study DNA-protein interaction - I

Lecture 19 - Methods to study DNA-protein interaction - II

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

Lecture 24 - Next Generation Sequencing - Part 2

Lecture 25 - Next Generation Sequencing - Part 3

Lecture 26 - Overview, Importance, Methods in Proteomics

Lecture 27 - Proteomic Techniques - High performance liquid chromatography (HPLC)

Lecture 28 - Proteomic Techniques - Mass Spectrometry

Lecture 29 - Proteomic Techniques - Differential in-gel electrophoresis

Lecture 30 - Proteomic Techniques - Protein Microarray

Lecture 31 - Label-based Protein Quantification Technologies - Part 1



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

Lecture 40 - Point of Care (POC) diagnostics in Infectious diseases

Lecture 41 - Molecular genetics in tumorogenesis

Lecture 42 - Liquid biopsies in cancer detection

Lecture 43 - Digital PCR in Cancer detection

Lecture 44 - Mutation Detection Methods

Lecture 45 - Isothermal Nucleic Acid Amplification

Lecture 46 - Genetic Testing and Inherited Disorders - Part 1

Lecture 47 - Genetic Testing and Inherited Disorders - Part 2

Lecture 48 - Prenatal diagnostics and NIPT

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

Lecture 58 - Ethical concerns in molecular diagnostics

Lecture 59 - Artificial Intelligence and Machine learning in Genomics

Lecture 60 - Integration of Multiomics Data in Molecular Diagnostics

Lecture 1 - General Introduction

Lecture 2 - Thin Film Materials and Components

Lecture 3 - Semiconductor Films and Heterostructures

Lecture 4 - Chemical Methods

Lecture 5 - Physical Vapor Deposition (PVD) : Thermal Evaporation

Lecture 6 - Thermal Evaporation

Lecture 7 - Sources of Thermal Evaporation

Lecture 8 - Evaporation of Elements and Compounds

Lecture 9 - Compound Evaporation and Thickness Uniformity

Lecture 10 - Film Thickness Monitoring and Control

Lecture 11 - Pulsed Laser Deposition

Lecture 12 - Sputtering Process and Mechanism

Lecture 13 - Plasma Discharge and DC Sputtering

Lecture 14 - RF Sputtering Process

Lecture 15 - Magnetron Sputtering

Lecture 16 - Sputtering of Binary Alloys and Compounds

Lecture 17 - Ion Beam and Hybrid Deposition

Lecture 18 - Introduction to CVD Process

Lecture 19 - Thermal CVD Process

Lecture 20 - Gas Transport and Growth Kinetics

Lecture 21 - CVD Processes and Systems

Lecture 22 - Plasma Enhanced CVD (PECVD)

Lecture 23 - Liquid Phase Epitaxy

Lecture 24 - Vapor Phase Epitaxy - Compound Semiconductors

Lecture 25 - Metal-Organic CVD (MOCVD)

Lecture 26 - Introduction and Film Purity

Lecture 27 - MBE System and Growth Mechanism

Lecture 28 - Effusion Source and Growth Rate

Lecture 29 - Insitu Growth Monitoring - RHEED Oscillation

Lecture 30 - Atomic Layer Deposition / Atomic Layer Epitaxy

Lecture 31 - Thin Film Growth Modes

- Lecture 32 - Homogeneous Nucleation
- Lecture 33 - Heterogenous Nucleation
- Lecture 34 - Stranski-Krastanov (2D-3D) Growth Mode
- Lecture 35 - SiGe Strained Layer Epitaxy (2D) and Ge Islands (3D)
- Lecture 36 - Thickness Measurement
- Lecture 37 - Thickness Measurement - Interference Method
- Lecture 38 - Thickness and Optical Constants - Ellipsometry
- Lecture 39 - Mechanical Properties - Film Porosity and Adhesion
- Lecture 40 - Mechanical Properties â€“ Residual Stress
- Lecture 41 - Electron Beam Techniques - SEM
- Lecture 42 - Scanning Electron Microscopy
- Lecture 43 - Microprobe and Transmission Electron Microscopy
- Lecture 44 - Transmission Electron Microscopy
- Lecture 45 - Scanning Probe Microscopy
- Lecture 46 - X-ray Photoelectron Spectroscopy
- Lecture 47 - Auger Electron Spectroscopy
- Lecture 48 - Secondary Ion Mass Spectrometry (SIMS)
- Lecture 49 - Different SIMS Techniques and Depth Profile Analysis
- Lecture 50 - Rutherford Backscattering Spectrometry (RBS)
- Lecture 51 - Basic Device Fabrication Techniques
- Lecture 52 - Metal-Oxide-Semiconductor (MOS) Capacitor
- Lecture 53 - n-MOSFET and CMOS FET Devices
- Lecture 54 - Scaled Si MOSFET Devices
- Lecture 55 - Heterostructure FET and Bipolar Transistors
- Lecture 56 - Optoelectronic Materials and Devices
- Lecture 57 - Light Emitting Devices
- Lecture 58 - Photodetector Devices
- Lecture 59 - Photovoltaic Devices
- Lecture 60 - Nanotechnology and Photonic Devices

**NPTEL : NOC:An Integrated Approach to Common Childhood Diseases and Developmental Disorders in India (Multi-Disciplinary)**

**Co-ordinators : Prof. Nabarun Karmakar, Prof. Soumi Kundu, Prof. Parama Banerjee**

- Lecture 1 - Neonatal screening in India - Clinical Aspect
- Lecture 2 - Neonatal Screening - Biochemical Aspect - Part I
- Lecture 3 - Neonatal Screening - Biochemical Aspect - Part II
- Lecture 4 - Neonatal Screening - Biochemical Aspect - Part III
- Lecture 5 - India Newborn Action Plan (INAP)
- Lecture 6 - Congenital Adrenal Hyperplasia - Biochemical Aspect
- Lecture 7 - Congenital Adrenal Hyperplasia
- Lecture 8 - Congenital and Acquired hypothyroidism
- Lecture 9 - National Program for Hemoglobinopathies
- Lecture 10 - Common Genetic Disorders in children
- Lecture 11 - Congenital Hearing Disorders
- Lecture 12 - Congenital Ophthalmological Disorders
- Lecture 13 - Congenital Orthopedic Disorders
- Lecture 14 - Congenital Structural Disorders
- Lecture 15 - Malnutrition in Indian Children
- Lecture 16 - Clinical features and management of Protein Energy Malnutrition
- Lecture 17 - Medico-Social aspects and Prevention of Malnutrition in India
- Lecture 18 - Integrated Child Developmental Services (ICDS)
- Lecture 19 - Community Nutrition Programs
- Lecture 20 - Vitamin A
- Lecture 21 - Vitamin A disorders in Children
- Lecture 22 - Vitamin B 1, 2, 3
- Lecture 23 - Vitamin B 6, 9
- Lecture 24 - Vitamin B 9, 12
- Lecture 25 - Vitamin C
- Lecture 26 - Vitamin B and C disorders in Children
- Lecture 27 - Vitamin D
- Lecture 28 - Vitamin D disorders in Children
- Lecture 29 - Iodine
- Lecture 30 - National program for Vitamin A and Iodine deficiency disorders

Lecture 31 - Iron

Lecture 32 - Iron (Anaemia)

Lecture 33 - Anemia in Children - Part I

Lecture 34 - Anemia in Children - Part II

Lecture 35 - Anemia Mukht Bharat

Lecture 36 - Universal Immunization Program and Mission Indradhanush

Lecture 37 - Vaccine preventable disease - Part I

Lecture 38 - Vaccine preventable disease - Part II

Lecture 39 - Vaccine preventable disease - Part III

Lecture 40 - IAP immunization schedule and VPD surveillance

Lecture 41 - NVBDCP - Part I

Lecture 42 - NVBDCP - Part II

Lecture 43 - NVBDCP - Part III (Program aspect)

Lecture 44 - National program for TB and Leprosy

Lecture 45 - National program for AIDS and Hepatitis

Lecture 46 - Pneumonia

Lecture 47 - Diarrhea

Lecture 48 - IMNCI - Part I

Lecture 49 - IMNCI - Part II

Lecture 50 - RMNCH+A

Lecture 51 - Common Congenital Heart Diseases

Lecture 52 - Rheumatic Heart Disease

Lecture 53 - Childhood Asthma

Lecture 54 - Seizures in Childhood

Lecture 55 - Nephrotic syndrome

Lecture 56 - Developmental Delay and Cerebral Palsy

Lecture 57 - Common behavioral and psychiatric Disorders in Childhood - Part I

Lecture 58 - Common behavioral and psychiatric Disorders in Childhood - Part II

Lecture 59 - Learning and Developmental Disorders in Children

Lecture 60 - School Health Programme and Rashtriya Bal Swasthya Karyakram (RBSK)

Lecture 1 - Fundamental of geoinformation

Lecture 2 - Optical remote sensing

Lecture 3 - LiDAR Remote Sensing

Lecture 4 - Microwave remote sensing

Lecture 5 - Thermal/Column Concentration

Lecture 6 - Geographic Information System (GIS)

Lecture 7 - Global Navigation Satellite System (GNSS)

Lecture 8 - 3-Dimensional Terrain Modeling

Lecture 9 - Cloud Computing

Lecture 10 - Internet of Things (IoT)

Lecture 11 - Exploration Mapping

Lecture 12 - Environmental Management

Lecture 13 - Restoration Monitoring

Lecture 14 - Contamination Mapping and Geo-Assessments

Lecture 15 - Volume Measurement and Geospatial Techniques

Lecture 16 - Subsidence Detection

Lecture 17 - Topographic and Slope Analysis

Lecture 18 - Disaster Management

Lecture 19 - Heat Detection and Monitoring

Lecture 20 - Gas and Particulate Matter Monitoring

Lecture 21 - Minerals, Mining and Society - I

Lecture 22 - Minerals, Mining and Society - II

Lecture 23 - Mining and Its Environmental Impacts - I

Lecture 24 - Mining and Its Environmental Impacts - II

Lecture 25 - Environmental Impact Assessment for Mining Projects - I

Lecture 26 - Environmental Impact Assessment for Mining Projects - II

Lecture 27 - Sustainable Development for Mining Industry - I

Lecture 28 - Sustainable Development for Mining Industry - II

Lecture 29 - SDF for Mining Industry - I

Lecture 30 - SDF for Mining Industry - II

Lecture 31 - Fundamental: Geoinformation and SDGs in Mining

- Lecture 32 - SDG 1 and 2 [No Poverty and Zero Hunger]
- Lecture 33 - SDG 3, 4 and 5
- Lecture 34 - SDG 6 [Clean Water and Sanitation]
- Lecture 35 - SDG 7, 8 and 9
- Lecture 36 - SDG 11
- Lecture 37 - SDG 12, 13
- Lecture 38 - SDG 14, 15, 17
- Lecture 39 - Life Cycle and Associated Environmental Impacts
- Lecture 40 - Sustainability Performance Monitoring
- Lecture 41 - Land Acquisition and Rehabilitation and Resettlement Act - I
- Lecture 42 - Land Acquisition and Rehabilitation and Resettlement Act - II
- Lecture 43 - Land Acquisition, R and R Act - III
- Lecture 44 - Mine Closure Plan - I
- Lecture 45 - Mine Closure Plan - II
- Lecture 46 - Challenges Towards SD In Mining Industry
- Lecture 47 - Sustainable Development in Mining Legislation - NMP 2019
- Lecture 48 - Sustainable Development in Mining Legislation - II
- Lecture 49 - Life Cycle Analysis
- Lecture 50 - Life Cycle Analysis for Mining Industry
- Lecture 51 - Circular Economy for Mining Industry - I
- Lecture 52 - Circular Economy for Mining Industry - II
- Lecture 53 - Circular Economy for Mining Industry - III
- Lecture 54 - Carbon footprints of mining industry
- Lecture 55 - Net Zero and Decarbonisation of Mining Industry
- Lecture 56 - Sustainability Reporting for Mining Industry - I
- Lecture 57 - Sustainability Reporting for Mining Industry - II
- Lecture 58 - Sustainability Assessment for Indian Mines
- Lecture 59 - CSR for Sustainable Development
- Lecture 60 - Sustainable Development in Mining Industry - Case Study

Lecture 0 - Neuroscience of Human Movement

Lecture 1 - Membrane Physiology - Part 1

Lecture 2 - Membrane Physiology - Part 2

Lecture 3 - Nernst Equation

Lecture 4 - Goldman Equation

Lecture 5 - Action Potential - Part 1

Lecture 6 - Action Potential - Part 2

Lecture 7 - Action Potential - Part 3

Lecture 8 - Action Potential - Part 4

Lecture 9 - Action Potential - Part 5

Lecture 10 - Review of Action Potential and Neurotransmitters

Lecture 11 - Neuromuscular Junction

Lecture 12 - Disorders of Neuromuscular Junction

Lecture 13 - Skeletal Muscles - Part 1

Lecture 14 - Skeletal Muscles - Part 2

Lecture 15 - Skeletal Muscles - Part 3

Lecture 16 - Skeletal Muscles - Part 4

Lecture 17 - Muscle force production

Lecture 18 - Motor Units - Part 1

Lecture 19 - Motor Units - Part 2

Lecture 20 - Motor Units - PIC and EMG

Lecture 21 - Receptors - Part 1

Lecture 22 - Receptors - Part 2

Lecture 23 - Spine and Spinal Cord

Lecture 24 - Excitation and Inhibition within Spinal Cord - Part 1

Lecture 25 - Excitation and Inhibition within Spinal Cord - Part 2

Lecture 26 - Monosynaptic Reflexes - Part 1

Lecture 27 - Monosynaptic Reflexes - Part 2

Lecture 28 - Monosynaptic Reflexes - Part 3

Lecture 29 - Oligosynaptic and Polysynaptic Reflexes - Part 1

Lecture 30 - Oligosynaptic and Polysynaptic Reflexes - Part 2



[Lecture 31 - Pre-Programmed Reactions - Part 1](#)

[Lecture 32 - Pre-Programmed Reactions - Part 2](#)

[Lecture 33 - Spinal Cord Injuries and Central Pattern Generators](#)

[Lecture 34 - Animal Preparations for Neuroscience Experiments](#)

[Lecture 35 - Overview of motor control system](#)

[Lecture 36 - Terminology : Directional Terms and Planes \(Primary Motor Cortex - Part - 1\)](#)

[Lecture 37 - Primary Motor Cortex - Part 2](#)

[Lecture 38 - Primary Motor Cortex - Part 3](#)

[Lecture 39 - Primary Motor Cortex - Part 4](#)

[Lecture 40 - Primary Motor Cortex - Part 5](#)

[Lecture 41 - Primary Motor Cortex - Part 6](#)

[Lecture 42 - Primary Motor Cortex - Part 7](#)

[Lecture 43 - Primary Motor Cortex - Part 8](#)

[Lecture 44 - Primary Motor Cortex - Part 9](#)

[Lecture 45 - Primary Motor Cortex - Part 10](#)

[Lecture 46 - Primary Motor Cortex - Part 11](#)

[Lecture 47 - Primary Motor Cortex - Part 12](#)

[Lecture 48 - Primary Motor Cortex - Part 13](#)

[Lecture 49 - Primary Motor Cortex - Part 14](#)

[Lecture 50 - Primary Motor Cortex - Part 15](#)

[Lecture 51 - Cerebellum - Part 1](#)

[Lecture 52 - Cerebellum - Part 2](#)

[Lecture 53 - Cerebellum - Part 3](#)

[Lecture 54 - Cerebellum - Part 4](#)

[Lecture 55 - Cerebellum - Part 5](#)

[Lecture 56 - Cerebellum - Part 6](#)

[Lecture 57 - Cerebellum - Part 7](#)

[Lecture 58 - Cerebellum - Part 8](#)

[Lecture 59 - Cerebellum - Part 9](#)

[Lecture 60 - Cerebellum - Part 10](#)

[Lecture 61 - Cerebellum - Part 11](#)

[Lecture 62 - Cerebellum - Part 12](#)

[Lecture 63 - Basal Ganglia - Part 1](#)

[Lecture 64 - Basal Ganglia - Pathways](#)

[Lecture 65 - Basal Ganglia - Inputs](#)

[Lecture 66 - Basal Ganglia - Outputs](#)

[Lecture 67 - Basal Ganglia - Various Functions](#)

[Lecture 68 - Basal Ganglia - Motor Functions](#)

[Lecture 69 - Basal Ganglia - Motor Functions.](#)

[Lecture 70 - Basal Ganglia - Dopamine and Acetylcholine](#)

[Lecture 71 - Basal Ganglia - Disorders](#)

[Lecture 72 - Parkinson's Disease - Intro](#)

[Lecture 73 - Parkinson's Disease - Rate Model, Pathophysiology](#)

[Lecture 74 - Parkinson's Disease - Current therapeutic approaches and the future](#)

[Lecture 75 - Basal Ganglia - Various Disorders](#)

[Lecture 76 - Neuropsychiatric disorders due to BG dysfunction](#)

[Lecture 77 - Parietal and Premotor Cortex - Part 1](#)

[Lecture 78 - Parietal and Premotor Cortex - Part 2](#)

[Lecture 79 - Parietal and Premotor Cortex - Part 3](#)

[Lecture 80 - Parietal and Premotor Cortex - Part 4](#)

[Lecture 81 - Parietal and Premotor Cortex - Part 5](#)

[Lecture 82 - Parietal and Premotor Cortex - Part 6](#)

Lecture 1 - How is TB affecting public health Globally and Nationally

Lecture 2 - Epidemiology of TB-Session - 1

Lecture 3 - Epidemiology of TB-Session - 2

Lecture 4 - Pathogenesis of TB-Session - 1

Lecture 5 - Pathogenesis of TB-Session - 2

Lecture 6 - Clinical manifestations of TB-Session - 1

Lecture 7 - Clinical manifestations of TB-Session - 2

Lecture 8 - Clinical manifestations of TB-Session - 3

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

Lecture 17 - Molecular Diagnosis of Tuberculosis-Session - 2

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

Lecture 21 - Radiology in diagnosis of Tuberculosis-Session - 2

Lecture 22 - Radiology in diagnosis of Tuberculosis-Session - 3

Lecture 23 - Radiology in diagnosis of Tuberculosis-Session - 4

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

Lecture 29 - Case Discussion-Approach to diagnosis of TB spine

Lecture 30 - Diagnosis of Childhood Tuberculosis-Session - 1

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Lecture 31 - Diagnosis of Childhood Tuberculosis-Session - 2

Lecture 32 - Video demonstration of gastric fluid aspiration technique in a child

Lecture 33 - Case Discussion-Approach to diagnosis of TB in a child with presumptive pulmonary TB

Lecture 34 - Case Discussion-Approach to diagnosis of TB meningitis in a child

Lecture 35 - Drugs for treating Tuberculosis and Principles of Chemotherapy-Session - 1

Lecture 36 - Drugs for treating Tuberculosis and Principles of Chemotherapy-Session - 2

Lecture 37 - Treatment of Drug Sensitive Pulmonary Tuberculosis

Lecture 38 - Case discussion-Approach to treatment of drug sensitive TB

Lecture 39 - Management of drug resistant Tuberculosis-Session - 1

Lecture 40 - Management of drug resistant Tuberculosis-Session - 2

Lecture 41 - Case discussion-Approach to treatment of Multi-drug resistant TB (MDR-TB)/ Extensively drug resistant TB (XDR-TB)

Lecture 42 - Management of Extra-pulmonary Tuberculosis-Session - 1

Lecture 43 - Management of Extra-pulmonary Tuberculosis-Session - 2

Lecture 44 - Panel discussion-Practical difficulties in the management of Extra-pulmonary TB

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

Lecture 46 - Management of patients with HIV-TB coinfection-Session - 2

Lecture 47 - Case discussion-Approach to management of HIV-TB

Lecture 48 - Management of TB in special situations

Lecture 49 - Case discussion-Approach to management of TB in pregnancy

Lecture 50 - Treatment of Pediatric Tuberculosis-Session - 1

Lecture 51 - Treatment of Pediatric Tuberculosis-Session - 2

Lecture 52 - Management of Adverse effects to anti-TB drugs-Session - 1

Lecture 53 - Management of Adverse effects to anti-TB drugs-Session - 2

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

Lecture 55 - Case discussion-Approach to management of skin rashes during anti-TB treatment

Lecture 56 - Non-tuberculous Mycobacteria- Diagnosis and Clinical management-Session - 1

Lecture 57 - Non-tuberculous Mycobacteria - Diagnosis and Clinical Management Session - 2

Lecture 58 - Newer Anti-TB drugs and regimens-Session - 1

Lecture 59 - Newer Anti-TB drugs and regimens-Session - 2

Lecture 60 - Management of Latent TB Infection-Session - 1

Lecture 61 - Management of Latent TB Infection-Session - 2

Lecture 62 - Airborne infection control in tuberculosis-Session - 1

Lecture 63 - Airborne infection control in tuberculosis-Session - 2

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[Lecture 64 - Vaccine for Tuberculosis-Session - 1](#)

[Lecture 65 - Vaccine for Tuberculosis-Session - 2](#)

[Lecture 66 - Services offered by Revised National TB Control Programme \(RNTCP\)-Session - 1](#)

[Lecture 67 - Services offered by Revised National TB Control Programme \(RNTCP\)-Session - 2](#)

[Lecture 68 - Services offered by Revised National TB Control Programme \(RNTCP\)-Session - 3](#)

[Lecture 69 - Services offered by Revised National TB Control Programme \(RNTCP\)-Session - 4](#)

[Lecture 70 - Tuberculosis notification-Session - 1](#)

[Lecture 71 - Tuberculosis notification-Session - 2](#)

[Lecture 72 - Addressing Social Barriers in Tuberculosis Control-Session - 1](#)

[Lecture 73 - Addressing Social Barriers in Tuberculosis Control-Session - 2](#)

[Lecture 74 - Standards for TB Care in India-Session - 1](#)

[Lecture 75 - Standards for TB Care in India-Session - 2](#)

[Lecture 76 - Global Tuberculosis Control Strategies](#)

Lecture 1 - Sustainability

Lecture 2 - Dams

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

Lecture 9 - Definition of Health Risk

Lecture 10 - Transport Of Pollutants in the Environment

Lecture 11 - Assesment of Risk

Lecture 12 - Remediation and Liability

Lecture 13 - Remendiation and Liability

Lecture 14 - Life Cycle Analysis

Lecture 15 - Energy and Environment module - 1

Lecture 16 - Energy and Environment module - 2

Lecture 17 - Energy and Environment module - 3

Lecture 18 - Energy and Environment module - 4

Lecture 19 - Energy and Environment module - 5

Lecture 20 - Energy and Environment module - 6

Lecture 21 - Energy and Environment module - 7

Lecture 22 - Drinking Water Supply: Need and Challenges

Lecture 23 - Drinking Water Supply: Need and Challenges

Lecture 24 - Water Quality Standards And Philosophy of Water Treatment

Lecture 25 - Water Treatment: Point Of Use Filters

Lecture 26 - Wastewater Management in Developing Urban Environments: Indian Scenario

Lecture 27 - Wastewater Recycling: A Sustainable Option For Water Management

Lecture 28 - Sustainable Water Management In Urban Areas - Part 1

Lecture 29 - Sustainable Water Management In Urban Areas - Part 2

Lecture 30 - Ground Water Contamination

Lecture 31 - Groundwater - Sanitation Nexus

[Lecture 32 - Chasing Sustainability - The Challenge - Part 1](#)

[Lecture 33 - Chasing Sustainability - The Challenge - Part 2](#)

[Lecture 34 - Developing Frame Works Of Action: Ethics - Part 1](#)

[Lecture 35 - Developing Frame Works Of Action: Ethics - Part 2](#)

[Lecture 36 - Social And sanitation](#)

[Lecture 37 - Promoting Policies For Eco-Productive Cities in the global House - Part 1](#)

[Lecture 38 - Promoting Policies For Eco-Productive Cities in the global House - Part 2](#)

[Lecture 39 - The need to study ecology](#)

[Lecture 40 - Ecosystem functions and services](#)

[Lecture 41 - What is studied in ecology?](#)

[Lecture 42 - Ecological footprint](#)

[Lecture 43 - Energy and Material flow in ecosystems and ecological efficiency](#)

[Lecture 44 - Energy flow, productivity and Biodiversity](#)

[Lecture 45 - Biodiversity, population and ecological principles](#)

[Lecture 1 - C1 - L00](#)

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

[Lecture 3 - C1 - L01](#)

[Lecture 4 - C1 - L02](#)

[Lecture 5 - C1 - L03](#)

[Lecture 6 - C1 - L04](#)

[Lecture 7 - C1 - L05](#)

[Lecture 8 - C1 - L06](#)

[Lecture 9 - C1 - L07](#)

[Lecture 10 - C1 - L08](#)

[Lecture 11 - C1 - L09](#)

[Lecture 12 - C1 - L10A](#)

[Lecture 13 - C1 - L10B](#)



[Lecture 1 - C2 - Introduction Assorted Interviews](#)

[Lecture 2 - C2 - L00](#)

[Lecture 3 - C2 - L01](#)

[Lecture 4 - C2 - L02](#)

[Lecture 5 - C2 - L03](#)

[Lecture 6 - C2 - L04](#)

[Lecture 7 - C2 - L05](#)

[Lecture 8 - C2 - L06](#)

[Lecture 9 - C2 - L07](#)

[Lecture 10 - C2 - L08](#)

[Lecture 11 - C2 - L09](#)

Lecture 1 - Introduction

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 $\tilde{}$ ve Extension
- Lecture 59 - Bonus: MS-Excel for Na $\tilde{}$ 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](#)

[Lecture 98 - Local vs. Global Truncation Errors](#)

[Lecture 99 - Richardson's Extrapolation](#)

[Lecture 100 - Stiff System of ODEs: Introduction](#)

[Lecture 101 - Adaptive Step-sizing](#)

[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](#)

[Lecture 110 - Problems with Shooting Method](#)

[Lecture 111 - Solving ODE-BVP using Finite Difference Method](#)

[Lecture 112 - Microsoft Excel based Solution](#)

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

Lecture 1 - Introduction to health research

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)

# DIGIMAT - The No.1 Learning Management Platform for Creative Learning

**NPTEL : NOC:Regulatory Requirements for Medical Devices including in Vitro Diagnostics in India (Version 2.0) (Multi-Disciplinary)**

**Co-ordinators : Prof. Malay Mitra, Prof. Aseem Sahu, Prof. Arun B.Ramteke**

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**

Lecture 1 - Courses Overview

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](#)

[Lecture 76 - Practical Issues: Measurement Delay](#)

[Lecture 77 - Other Practical Issues](#)

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

Lecture 1 - What is Science? - Part 1

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

**Co-ordinators : Prof. Mousumi Ghosh, Prof. Manjari Jain, Prof. R Jayapal, Prof. Anand Krishnan, Prof. Suhel Quader, Prof. V.V. Robin, Prof. Umesh Srinivasan**

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

Lecture 30 - Introduction to Data Visualisation Analysis - Part 2

## DIGIMAT - The No.1 Learning Management 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](#)

[Lecture 39 - Avian Conservation: Case study 3](#)

[Lecture 40 - Avian Conservation: Case study 4](#)

[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](#)

**NPTEL : NOC:Oral Biology (Multi-Disciplinary)**

**Co-ordinators : Multifaculty**

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

**NPTEL : NOC:One Health (Multi-Disciplinary)**

**Co-ordinators : Multi Faculty**

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 Learning Management 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

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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 Learning Management Platform for Creative Learning

**NPTEL : NOC:Making Learning Engaging Through Interactive Games (Multi-Disciplinary)**

**Co-ordinators : Prof. Kartic Vaidyanathan**

Lecture 1 - Need for interactive gamified learning

Lecture 2 - Learnings from the Master Class titled Confessions of a Converted Lectuer by Prof Eric Mazur

Lecture 3 - Understanding Play and its context in learning in 21st century

Lecture 4 - Benefits of Game Based Learning Scientific Evidences

Lecture 5 - Learning Stoichiometry calculations using board game Case Study

Lecture 6 - Benefits of Game Based Learning across age groups and subjects

Lecture 7 - Benefits of Puzzle Games

Lecture 8 - Game Based Learning Adoption by Countries Overview

Lecture 9 - Yu Kai Chow Psychology of gamification

Lecture 10 - Board Card Game Activity Game Sources

Lecture 11 - Board Card Game Mechanics Across Subjects - Part 1

Lecture 12 - Board Card Game Mechanics Across Subjects - Part 2

Lecture 13 - Growth Mindset Card Game Game Play of UNO adaptation

Lecture 14 - How Play Game Mechanics Enhance Learning in the UNO Game

Lecture 15 - Tools for bulding Board Card Games Snake and Ladder

Lecture 16 - Sample Games Created Inspired by Snake and Ladder Mechanics

Lecture 17 - Sample Card Games Created Across Subjects and Different Mechanics by Students

Lecture 18 - Tools for building Bingo Games

Lecture 19 - Puzzle Game Design Tools

Lecture 20 - Mentimeter

Lecture 21 - Quizizz

Lecture 22 - Wordwall

Lecture 23 - GIMKIT - Part 1

Lecture 24 - GIMKIT - Part 2

Lecture 25 - Raptivity Digital Tool Demo

Lecture 26 - Example scenarios of student and faculty created digital games across topic

Lecture 27 - Dr. Preeti Aghalayam's - Experience narration with interactive games

Lecture 28 - Interview with Dr. Anuradha Prashant

Lecture 29 - Interview with Dr. Ankur Gera and her faculty team

Lecture 30 - Interview with Dr. GK SuraishKumar

Lecture 31 - Interview with Dr. Jacey Lynn Minoi

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[Lecture 32 - Interview with Dr. Kirupa Priyadarshini](#)

[Lecture 33 - Dave Eng Interviews Prof. Silvana Falcon Who has Written Lectuers and Play](#)

**NPTEL : NOC:Local Anaesthesia in Dentistry (Multi-Disciplinary)**

**Co-ordinators : Prof. Ramakrishna Sheno, Prof. Sobhan Mishra, Prof. Kannan Balaraman, Prof. S. Jimson, Prof. Madan Mishra, Prof. Ashi Chug, Prof. Bhagawan Das Rai**

Lecture 1 - The Drug; Pharmacology; Neurophysiology; Action of Vasoconstrictors - Part 1

Lecture 2 - The Drug; Pharmacology; Neurophysiology; Action of Vasoconstrictors - Part 2

Lecture 3 - Anatomic Considerations - Panel Discussion

Lecture 4 - Dosage and Clinical Actions of Specific Agents - Part 1

Lecture 5 - Dosage and Clinical Actions of Specific Agents - Part 2

Lecture 6 - Dosage and Clinical Actions of Specific Agents - Panel Discussion

Lecture 7 - Armamentarium - Part 1

Lecture 8 - Armamentarium - Part 2

Lecture 9 - Armamentarium - Part 3

Lecture 10 - Armamentarium - Part 4

Lecture 11 - Anatomic Considerations - Part 1

Lecture 12 - Anatomic Considerations - Part 2

Lecture 13 - Anatomic Considerations - Part 3

Lecture 14 - Anatomy of Trigeminal Nerve - Video Demonstration

Lecture 15 - Maxillary Injection Techniques - Part 1

Lecture 16 - Maxillary Injection Techniques - Part 2

Lecture 17 - Demonstration of Maxillary Injection Techniques

Lecture 18 - Maxillary Injection Techniques - Panel Discussion

Lecture 19 - Mandibular Injection Techniques - Part 1

Lecture 20 - Mandibular Injection Techniques - Part 2

Lecture 21 - Demonstration of Mandibular Injection Techniques

Lecture 22 - Mandibular Injection Techniques - Panel Discussion

Lecture 23 - Local Complications

Lecture 24 - Local Complications - Panel Discussion

Lecture 25 - Systemic Complications - Part 1

Lecture 26 - Systemic Complications - Part 2

Lecture 27 - Systemic Complications - Part 3

Lecture 28 - Demonstration of Systemic Complications

Lecture 1 - Understanding Basics

Lecture 2 - Types of IPR and Their Applications

Lecture 3 - Innovation and Intellectual Property

Lecture 4 - Understanding Various Portfolios

Lecture 5 - International and National Scenario of IP

Lecture 6 - Patent Filing Strategies

Lecture 7 - Patent Filing

Lecture 8 - Country Selection for Patent Filing in Foreign Countries

Lecture 9 - International Filing - 1

Lecture 10 - International Filing - 2

Lecture 11 - Ranking Based Tier Strategies

Lecture 12 - Centralization of Patent Renewals and Translations

Lecture 13 - Budgeting for Patent Portfolio

Lecture 14 - Monitoring Based Countermeasures

Lecture 15 - General Cost Saving Measures

Lecture 16 - Various IP Strategies (Patent)

Lecture 17 - Various IP Strategies (Trademark, Copyright, Trade secret)

Lecture 18 - Understanding Elements of IP Strategies

Lecture 19 - IP Valuation Strategy

Lecture 20 - IP SWOT (Strength, Weaknesses, Opportunities, Threats) Analysis

Lecture 21 - Generations of Innovation

Lecture 22 - Idea Generation

Lecture 23 - Innovation Management

Lecture 24 - Innovation Management System ISO 56000

Lecture 25 - Strategies to Protect Innovation

Lecture 26 - Ensuring Quality and Extracting Values from the Patent Portfolio

Lecture 27 - International Patent Classification (IPC) System

Lecture 28 - Patent Landscape

Lecture 29 - Patent Infringement

Lecture 30 - PATENTSCOPE Search System

Lecture 31 - IP Incubating

[Lecture 32 - IP Accounting](#)

[Lecture 33 - IP Commercialization](#)

[Lecture 34 - IP and Taxation](#)

[Lecture 35 - Lean IP Management](#)

[Lecture 36 - National IP Strategies](#)

[Lecture 37 - Significance of IP Audit](#)

[Lecture 38 - IP and SDGs](#)

[Lecture 39 - IP Enforcement](#)

[Lecture 40 - Case Studies](#)

- 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

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 Learning Management 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

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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

- Lecture 1 - Fundamentals in Ecology
- Lecture 2 - Evolutionary Ecology
- Lecture 3 - How animals and plants sense and navigate the world
- Lecture 4 - Accessing resources
- Lecture 5 - Competing for resources
- Lecture 6 - Movement ecology
- Lecture 7 - Adaptations in predator-prey interactions
- Lecture 8 - Social behaviour
- Lecture 9 - Mating systems
- Lecture 10 - Life history theory
- Lecture 11 - General intro to population dynamics
- Lecture 12 - Math Refresher
- Lecture 13 - Density independent growth
- Lecture 14 - Tutorial/Numerical Examples
- Lecture 15 - Density dependent growth (Continuous time; logistic model)
- Lecture 16 - Lotka-Volterra competition models
- Lecture 17 - Competitive Exclusion and Coexistence
- Lecture 18 - Summary and recap
- Lecture 19 - Spatial population structure and dynamics
- Lecture 20 - Metapopulation case study: butterflies
- Lecture 21 - Study design - Part 1
- Lecture 22 - Study design - Part 2
- Lecture 23 - Study design - Part 3
- Lecture 24 - Quantitative thinking - Part 1
- Lecture 25 - Quantitative thinking - Part 2
- Lecture 26 - Introduction
- Lecture 27 - Conditions and resources
- Lecture 28 - Fundamental and realised niches
- Lecture 29 - Distribution of communities
- Lecture 30 - Community assembly

Lecture 31 - Introduction to species interactions

Lecture 32 - Competition

Lecture 33 - Predation

Lecture 34 - Parasitism and Infectious disease

Lecture 35 - Positive interspecies interactions

Lecture 36 - Food webs

Lecture 37 - Food web case study

Lecture 38 - Plant-animal interactions

Lecture 39 - Species invasion as an ecological process - I

Lecture 40 - Species invasion as an ecological process - II

Lecture 41 - Species concepts

Lecture 42 - Species diversity - 1

Lecture 43 - Species diversity - 2

Lecture 44 - Diversity and distribution

Lecture 45 - Relative abundance

Lecture 46 - Macroecology - 1

Lecture 47 - Macroecology - 2

Lecture 48 - Biogeography

Lecture 49 - The Changing Earth

Lecture 50 - Ecosystems and Biogeochemistry - 1

Lecture 51 - Ecosystems and Biogeochemistry - 2

Lecture 52 - Introduction to the Anthropocene

Lecture 53 - Climate change