

Lecture 1 - The Seven Concerns

Lecture 2 - Design Thinking and Collaboration

Lecture 3 - Challenges to Innovation

Lecture 4 - Understanding Users

Lecture 5 - Arriving at Design Insights

Lecture 6 - Prototyping for User Feedback

Lecture 7 - 1st C The Cause

Lecture 8 - Crossing the First Pitfall

Lecture 9 - Trial and Error

Lecture 10 - User Feedback for Development

Lecture 11 - New users, new needs to meet

Lecture 12 - Knowing the Context

Lecture 13 - 2nd C The Context

Lecture 14 - The Basic Need

Lecture 15 - Ingenious Attempts

Lecture 16 - Further Insights

Lecture 17 - The Working Rig

Lecture 18 - Concepts generation

Lecture 19 - Experiencing the Product

Lecture 20 - Refinements

Lecture 21 - 3rd C - The Comprehension

Lecture 22 - Understanding Constraints

Lecture 23 - Positioning the Product

Lecture 24 - Exploring Possibilities

Lecture 25 - More Experiments

Lecture 26 - Understanding the Technology

Lecture 27 - At the 2nd Valley of Death

Lecture 28 - Finishing Touches

Lecture 29 - The Check

Lecture 30 - The Cause

Lecture 31 - The Product, the Users and the Context

[Lecture 32 - The Prototyping](#)

[Lecture 33 - User needs](#)

[Lecture 34 - The Crucial Step Missed](#)

[Lecture 35 - 5th C The Conception](#)

[Lecture 36 - Synchronic Studies](#)

[Lecture 37 - One product, many problems](#)

[Lecture 38 - Concept Clusters](#)

[Lecture 39 - From idea to product](#)

[Lecture 40 - Prototyping](#)

[Lecture 41 - Materials and Technologies](#)

[Lecture 42 - Collaborative Efforts](#)

[Lecture 43 - 6th C - The Crafting](#)

[Lecture 44 - Recap](#)

[Lecture 45 - The Manufacturing Challenge](#)

[Lecture 46 - The User Feedback](#)

[Lecture 47 - The Iterative Process](#)

[Lecture 48 - 7th C - The Connection](#)

[Lecture 49 - The Seed for Innovation](#)

[Lecture 50 - Pinnacle for Innovation](#)

[Lecture 51 - The Innovation Timeline](#)

[Lecture 52 - The Innovation Champions](#)

[Lecture 53 - The Innovation Domains](#)

[Lecture 54 - The Innovation Templates](#)

[Lecture 55 - The Serial Innovation](#)

Lecture 1 - An Introduction to Design

Lecture 2 - The many notions of design

Lecture 3 - Design as a process and a product

Lecture 4 - The evolution of design

Lecture 5 - Design engages with many disciplines

Lecture 6 - Design is concerned with the user

Lecture 7 - Good design, bad design

Lecture 8 - Users and Contexts

Lecture 9 - Multiple users, differing contexts

Lecture 10 - Understanding user experience

Lecture 11 - Design for a meaningful impact

Lecture 12 - Design and Society

Lecture 13 - Community and Collaboration

Lecture 14 - Understanding Contexts

Lecture 15 - Knowledge and Access

Lecture 16 - Meeting Needs: Necessity or Luxury?

Lecture 17 - Function, Context and Consequences

Lecture 18 - Design and Sustainability

Lecture 19 - The cost of looking the other way

Lecture 20 - Sustainability practices in daily life

Lecture 21 - The perspective of engineering

Lecture 22 - Understanding embodied energy

Lecture 23 - The user's role in sustainability

Lecture 24 - Framing the world's future

Lecture 25 - Design and industry

Lecture 26 - Understanding varied user needs

Lecture 27 - Success through new materials and manufacturing

Lecture 28 - Pushing the boundaries of mass production

Lecture 29 - A Classic chair for all times

Lecture 30 - Breaking familiar assumptions

Lecture 31 - Design and Collaboration

[Lecture 32 - Team work](#)

[Lecture 33 - Collaborating with unlikely partners](#)

[Lecture 34 - Principles of collaboration](#)

[Lecture 35 - Design thinking](#)

[Lecture 36 - Feedback and assessment](#)

[Lecture 37 - Innovation by Design](#)

[Lecture 38 - Facilitating the reach of a traditional craft](#)

[Lecture 39 - Pitfalls of innovation](#)

[Lecture 40 - The seven concerns of innovation](#)

[Lecture 41 - From a concern to a palki](#)

[Lecture 42 - A little design goes a long way](#)

Lecture 1 - Jaipur Foot - A classic innovation - Part 1

Lecture 2 - Jaipur Foot - A classic innovation - Part 2

Lecture 3 - User Centred Helmet Design - Part 1

Lecture 4 - User Centred Helmet Design - Part 2

Lecture 5 - Challenges of Reaching a Million Users - Part 1

Lecture 6 - Challenges of Reaching a Million Users - Part 2

Lecture 7 - Challenges of Reaching a Million Users - Part 3

Lecture 8 - Technology to Solution - Part 1

Lecture 9 - Technology to Solution - Part 2

Lecture 10 - A Collaborative Excellence - Part 1

Lecture 11 - A Collaborative Excellence - Part 2

Lecture 12 - Collaborative Innovation Methods - Part 1

Lecture 13 - Collaborative Innovation Methods - Part 2

Lecture 14 - Collaborative Innovation Methods - Part 3

Lecture 15 - Learnings from Grassroot Innovation - Part 1

Lecture 16 - Learnings from Grassroot Innovation - Part 2

Lecture 17 - Systemic Approach to Biomed Innovations - Part 1

Lecture 18 - Systemic Approach to Biomed Innovations - Part 2

Lecture 19 - Systemic Approach to Biomed Innovations - Part 3

Lecture 20 - Research to Innovation - Part 1

Lecture 21 - Research to Innovation - Part 2

Lecture 22 - Smartcane for the Blind - A Success Story - Part 1

Lecture 23 - Smartcane for the Blind - A Success Story - Part 2

Lecture 1 - Introduction

Lecture 2 - Situating Ethnography

Lecture 3 - Engaging with the Other

Lecture 4 - Equality and Empathy

Lecture 5 - Notions of Reality

Lecture 6 - Objectivity and Subjectivity

Lecture 7 - Conclusion

Lecture 8 - Introduction

Lecture 9 - The Ethnographic Process

Lecture 10 - Ethnography: Process or Product

Lecture 11 - Fundamental Concepts

Lecture 12 - Fundamental Concepts (Continued...)

Lecture 13 - Conclusion

Lecture 14 - Introduction

Lecture 15 - The Research Question

Lecture 16 - Is Ethnography the Method?

Lecture 17 - Accessing Existing Knowledge

Lecture 18 - Designing Fieldwork

Lecture 19 - Case Studies: Research Question and Applying Ethnography

Lecture 20 - Case Studies: The Value of Existing Knowledge

Lecture 21 - Case Studies: Identifying Participants, Places, Activities

Lecture 22 - Case Studies: Access and Impact

Lecture 23 - Conclusion

Lecture 24 - Access: Not Just Consent

Lecture 25 - Challenges of Access

Lecture 26 - Building Rapport

Lecture 27 - Gaining Trust

Lecture 28 - Limits to Access

Lecture 29 - Immersion

Lecture 30 - The Ethics of Engaging

Lecture 31 - Conclusion: Covert and Overt Research

[Lecture 32 - Introduction](#)

[Lecture 33 - Types of Observation](#)

[Lecture 34 - \(ALM\) LxT 1: Observing Imponderabilia](#)

[Lecture 35 - What to Observe](#)

[Lecture 36 - Participant Observation](#)

[Lecture 37 - Degrees of Participation](#)

[Lecture 38 - Ethnographic Records](#)

[Lecture 39 - Conclusion: Types of Ethnographic Records](#)

[Lecture 40 - Introduction](#)

[Lecture 41 - Forms of Interviews](#)

[Lecture 42 - \(ALM\) LxT 1: Oral History and Ethnography](#)

[Lecture 43 - Characteristics of Interviews](#)

[Lecture 44 - Listening and Speaking](#)

[Lecture 45 - Reflexivity in Interviewing](#)

[Lecture 46 - Designing the Interview](#)

[Lecture 47 - Designing the Core Discussion - I](#)

[Lecture 48 - Designing the Core Discussion - II](#)

[Lecture 49 - Doing the Interview - I](#)

[Lecture 50 - Doing the Interview - II](#)

[Lecture 51 - Conclusion](#)

[Lecture 52 - Introduction](#)

[Lecture 53 - Researching THE Visual - I](#)

[Lecture 54 - Researching THE Visual - II](#)

[Lecture 55 - Researching WITH the Visual](#)

[Lecture 56 - Choosing the Visual Medium](#)

[Lecture 57 - Representation through Visuals](#)

[Lecture 58 - \(ALM\) LxT 1: Part I: Presentation by Anjali Monteiro and KP Jayasankar](#)

[Lecture 59 - Reflexivity in Visual Ethnography - I](#)

[Lecture 60 - Reflexivity in Visual Ethnography - II](#)

[Lecture 61 - Conclusion](#)

[Lecture 62 - Introduction](#)

[Lecture 63 - Designing Information for HIV-AIDS Affected Persons - Prof. Anirudha Joshi](#)

[Lecture 64 - A New Approach to Urban Housing - Prof. Uday Athavankar](#)

[Lecture 65 - Cognitive Ethnography - Prof. Sahana Murthy](#)

[Lecture 66 - Participative Design for Language Learning - Prof. Alka Hingorani](#)

[Lecture 67 - Conclusion](#)

Lecture 1 - Introduction

Lecture 2 - Design today - human aid to lifestyle

Lecture 3 - Journey, fitting task to man

Lecture 4 - Domain, philosophy and objective

Lecture 5 - Mutual task comfort: two way dialogue, communication model

Lecture 6 - Ergonomics/ human factors fundamentals

Lecture 7 - Physiology, (work physiology) and stress

Lecture 8 - Human body - structure and function, anthropometrics

Lecture 9 - Anthropometry: body growth and somatotypes

Lecture 10 - Static and dynamic anthropometry: standing

Lecture 11 - Anthropometry landmark: sitting postures

Lecture 12 - Anthropometry : squatting and cross-legged postures

Lecture 13 - Measuring techniques

Lecture 14 - Statistical treatment of data and

Lecture 15 - Human body-structure and function

Lecture 16 - Posture and job relation

Lecture 17 - Posture and body supportive devices

Lecture 18 - Chair characteristics

Lecture 19 - Vertical work surface

Lecture 20 - Horizontal work surface

Lecture 21 - Movement

Lecture 22 - Work Counter

Lecture 23 - Communication and cognitive issues

Lecture 24 - Psycho-social behaviour aspects,

Lecture 25 - Information processing and perception

Lecture 26 - Cognitive aspects and mental workload

Lecture 27 - Human error and risk perception

Lecture 28 - Visual performance

Lecture 29 - Visual displays

Lecture 30 - Environmental factors influencing

Lecture 31 - Ergonomics design methodology

[Lecture 32 - Ergonomics criteria/check](#)

[Lecture 33 - Design process involving](#)

[Lecture 34 - Some checklist for task easiness](#)

[Lecture 35 - Occupational safety and stress at workplace](#)

[Lecture 36 - Workstation design](#)

[Lecture 37 - Furniture support](#)

[Lecture 38 - Vertical arm reach and relevant](#)

[Lecture 39 - Humanising design :Design and human compatibility, comfort and adaptability aspects](#)

[Lecture 40 - Scope for exploration](#)

Lecture 1 - Sustainability and Sustainable Development - Understanding Un-sustainability and need for Sustainability

Lecture 2 - Sustainability and Sustainable Development - Definitions

Lecture 3 - Sustainability and Sustainable Development - Pathway

Lecture 4 - Systems Approach to Design

Lecture 5 - Evolution of sustainability within Design

Lecture 6 - Diverse Approaches to Design for Sustainability - Part A

Lecture 7 - Diverse Approaches to Design for Sustainability - Part B

Lecture 8 - Relationship between approaches to Design for Sustainability and the application context

Lecture 9 - Product Life Cycle Design - Methods and Strategies

Lecture 10 - Product Life Cycle Assessment - Part A

Lecture 11 - Product Life Cycle Assessment - Part B

Lecture 12 - Life Cycle Assessment using Software

Lecture 13 - Design for Product Life Cycle

Lecture 14 - Product-Service System Design - Definition and Types

Lecture 15 - Sustainable Product-Service System Design - Definition and Examples

Lecture 16 - Sustainable Product-Service System Design - Examples

Lecture 17 - Khadi Movement as a precursor to PSS thinking

Lecture 18 - Sustainable Product-Service System Design - Transition Paths, Strategy and Challenges

Lecture 19 - Sustainable Product-Service System Design - Methods and Tools - Part A

Lecture 20 - Sustainable Product-Service System Design - Methods and Tools - Part B

Lecture 21 - Sustainable Product-Service System Design - Methods and Tools - Part C

Lecture 22 - Sustainable Product-Service System Design - Methods and Tools - Part D

Lecture 23 - Sustainable Product-Service System Design - Methods and Tools - Part E

Lecture 24 - Sustainable Product-Service System Design - Methods and Tools - Part F

Lecture 25 - Sustainable Product-Service System Design - Methods and Tools - Part G

Lecture 26 - Sustainable Product-Service System Design - Methods and Tools (Summary)

Lecture 27 - Sufficiency Economy Philosophy applied to Sustainable PSS Thinking

Lecture 28 - LCA of PSS

Lecture 29 - Sustainable Product-Service System Design Applied to Distributed Economy

Lecture 30 - Other Design for Sustainability Tools and approaches - Architecture

Lecture 31 - Other Design for Sustainability Tools and approaches - Agriculture

[Lecture 32 - Other Design for Sustainability Tools and approaches - Cities and communities](#)

[Lecture 33 - Other Design for Sustainability Tools and approaches - Carbon Footprint](#)

[Lecture 34 - Co-design Session](#)

[Lecture 35 - Design for Sustainability - Engineering Design Criteria and Guidelines](#)

[Lecture 36 - Design for Sustainability - Engineering Design Criteria and Guidelines \(ICS Toolkit\)](#)

[Lecture 37 - Design for Sustainability - Concluding Lecture - Part A](#)

[Lecture 38 - Design for Sustainability - Concluding Lecture - Part B](#)

Lecture 1 - Introduction to Innovation

Lecture 2 - Design Inspired Innovation and User Innovation

Lecture 3 - Product Design - Part I

Lecture 4 - Product Design - Part II

Lecture 5 - Product Design - Part III

Lecture 6 - Introduction to User study and Problem and need Identification

Lecture 7 - Contextual Enquiry

Lecture 8 - Physical model

Lecture 9 - Importance and Overview of Human Factors/Ergonomics in Product Design

Lecture 10 - Physical Ergonomics Principles and Issues (Part 1) - Anthropometry

Lecture 11 - Physical Ergonomics Principles and Issues (Part 2) - Biomechanics

Lecture 12 - Cognitive and Emotional aspects of Human Factors with respect to Product Design and Innovation

Lecture 13 - Creative Techniques and tools for concept generation, concept evaluation

Lecture 14 - Tools and Techniques for Prototyping

Lecture 15 - Evaluation Tools and Techniques for User-Product Interaction

Lecture 1 - Basic Definitions and Concepts in Interaction Design

Lecture 2 - Relevance of goals in Interaction Design

Lecture 3 - System model, mental model, and representation model

Lecture 4 - Interaction Models and Interaction Paradigms

Lecture 5 - Interaction paradigm

Lecture 6 - Overview of Goal Directed Design Process

Lecture 7 - The Research phase in Goal Directed Design Process - Part 1

Lecture 8 - The Research phase in Goal Directed Design Process - Part 2

Lecture 9 - The Research phase in Goal Directed Design Process - Part 3

Lecture 10 - The Modeling phase in Goal Directed Design Process

Lecture 11 - The Requirement definition phase in Goal Directed Design Process - Part 1

Lecture 12 - The Requirement definition phase in Goal Directed Design Process - Part 2

Lecture 13 - The Framework definition and refinement phase in Goal Directed Design Process - Interaction framework

Lecture 14 - The Framework definition and refinement phase in Goal Directed Design Process - Visual design and industrial design framework

Lecture 15 - Design evaluation and testing

[Lecture 1 - Introduction to Automotive Ergonomics](#)

[Lecture 2 - Driver Information Acquisition and Processing](#)

[Lecture 3 - Anthropometric and Biomechanical Data in Automotive Design](#)

[Lecture 4 - Occupant Packaging : Basics and Details](#)

[Lecture 5 - Principles of Control and Display Design](#)

[Lecture 6 - Usability evaluation of In-vehicle control and displays](#)

[Lecture 7 - Human Fields of View and Driver's Fields of View](#)

[Lecture 8 - Vehicle Entry and Exit : Basics and Details](#)

[Lecture 9 - Driver Distraction and Driving Performance Measurement](#)

[Lecture 10 - Driver Workload Measurement](#)

[Lecture 11 - Virtual Ergonomics Evaluation Technique and its application in Automotive Design](#)

[Lecture 12 - Automotive Craftsmanship](#)

Lecture 1 - Introduction to Ergonomics Workplace Assessment - I

Lecture 2 - Introduction to Ergonomics Workplace Assessment - II

Lecture 3 - Task Analysis

Lecture 4 - Physiological Fundamentals of Workplace Evaluation

Lecture 5 - Biomechanics in Workplace Evaluation

Lecture 6 - Assessment of Physical Job Demand

Lecture 7 - Assessment of Physical and Cognitive Work with Psychophysiological Methods

Lecture 8 - Assessment of Physical and Cognitive Work with Psychophysiological Methods

Lecture 9 - Assessment of Mental Workload

Lecture 10 - Neuroergonomics in Work Evaluation

Lecture 11 - Psychosocial Aspect of Workplace Analysis

Lecture 12 - Assessment of Thermal Environment

Lecture 13 - Assessment of Visual Environment

Lecture 14 - Analysis of Auditory Environment and Noise Pollution

[Lecture 1 - Introduction to GIS](#)

[Lecture 2 - Introduction \(Continued...\)](#)

[Lecture 3 - Introduction \(Continued...\)](#)

[Lecture 4 - Introduction \(Continued...\)](#)

[Lecture 5 - Introduction \(Continued...\)](#)

[Lecture 6 - Real World to Digital World Through GIS](#)

[Lecture 7 - Real World to Digital World Through GIS \(Continued...\)](#)

[Lecture 8 - Real World to Digital World Through GIS \(Continued...\)](#)

[Lecture 9 - GIS Data \(Continued...\)](#)

[Lecture 10 - Real World to Digital World Through GIS \(Continued...\)](#)

[Lecture 11 - Representing the Real World](#)

[Lecture 12 - Representing the Real World \(Continued...\)](#)

[Lecture 13 - Representing the Real World \(Continued...\)](#)

[Lecture 14 - Representing the Real World in Surface Models \(Continued...\)](#)

[Lecture 15 - Representing the Real World \(Continued...\)](#)

[Lecture 16 - Quering and Georeferencing](#)

[Lecture 17 - Elevation, Relative and Discrete Referencing](#)

[Lecture 18 - Coordinate Systems](#)

[Lecture 19 - Maps and Numbering](#)

[Lecture 20 - Map Projections](#)

[Lecture 21 - Data Quality and Measures](#)

[Lecture 22 - Positional Accuracy and Source of Errors](#)

[Lecture 23 - Classification Accuracy and Pixel Errors](#)

[Lecture 24 - Spatial Data Editing and Transformations](#)

[Lecture 25 - Map Display and Visualization in GIS](#)

[Lecture 26 - Introduction to GPS](#)

[Lecture 27 - GPS: Working and Signals](#)

[Lecture 28 - GPS errors and DGPS](#)

[Lecture 29 - GNSS and Applications](#)

[Lecture 30 - Introduction to QGIS](#)

[Lecture 31 - Introduction to database](#)

[Lecture 32 - DataBase Management System - Introduction](#)

[Lecture 33 - DataBase Management System - \(Continued...\)](#)

[Lecture 34 - DBMS models](#)

[Lecture 35 - Normalization forms](#)

[Lecture 36 - Creating and Maintaining a database](#)

[Lecture 37 - Spatial Query using SQL - Introduction](#)

[Lecture 38 - Spatial analysis](#)

[Lecture 39 - Spatial analysis \(Continued...\)](#)

[Lecture 40 - Basic Editing](#)

[Lecture 41 - Introduction to Remote Sensing](#)

[Lecture 42 - Basic spatial analysis](#)

[Lecture 43 - Basic spatial analysis](#)

[Lecture 44 - Advanced spatial analysis](#)

[Lecture 45 - Advanced spatial analysis](#)

[Lecture 46 - Introduction to QGIS and Data Import](#)

[Lecture 47 - QGIS Plugins](#)

[Lecture 48 - Georeferencing an Image](#)

[Lecture 49 - Creating Vector Features](#)

[Lecture 50 - Vector Functions and Querying](#)

[Lecture 51 - Data Acquisition and Raster Functions - I](#)

[Lecture 52 - Data Acquisition and Raster Functions - II](#)

[Lecture 53 - Map composition](#)

[Lecture 54 - Bhuvan geoportal and Google earth](#)

[Lecture 55 - Introduction to R - Part I](#)

[Lecture 56 - Introduction to R - Part II](#)

[Lecture 57 - Open Source GIS Softwares](#)

[Lecture 58 - Open Source GIS softwares: Introduction](#)

[Lecture 59 - PROS and CONS of open source](#)

[Lecture 60 - GIS Data Standards](#)

[Lecture 61 - Open Geospatial Consortium \(OGC\)](#)

[Lecture 62 - National Spatial Data Infrastructure \(NSDI\)](#)

[Lecture 63 - Introduction to Web GIS and Geoserver](#)

[Lecture 64 - Geoserver - Raster and SLD Integration](#)

- Lecture 1 - Introduction to system Design
- Lecture 2 - Engineering systems Classification & examples
- Lecture 3 - Modern System design processes
- Lecture 4 - Six functions of design process
- Lecture 5 - Tools for enabling creative development
- Lecture 6 - Team Development : Group Exercises
- Lecture 7 - System Requirement Analysis
- Lecture 8 - Originating Requirements: Example System Engineering software -CORE
- Lecture 9 - Functional Architecture Development
- Lecture 10 - Functional Decomposition
- Lecture 11 - Functional Decomposition : Examples
- Lecture 12 - Physical Architecture Development
- Lecture 13 - Implementing Fault Tolerance in Physical Architecture
- Lecture 14 - Operational Architecture Development - Part I
- Lecture 15 - Operational Architecture Development - Part II
- Lecture 16 - Interface architecture Development
- Lecture 17 - Interface standards and Design process
- Lecture 18 - Integration and qualification
- Lecture 19 - Qualification planning and methods
- Lecture 20 - System Design Example: Autolink system
- Lecture 21 - System Design Examples
- Lecture 22 - System Design Examples (Continued...)
- Lecture 23 - Graphical Modelling Techniques
- Lecture 24 - Process modeling
- Lecture 25 - Behavior modeling
- Lecture 26 - Graphical Modelling Techniques (Continued...)
- Lecture 27 - System modeling and simulation
- Lecture 28 - Bondgraph modeling of Dyanamic systems
- Lecture 29 - Decision making in System Design
- Lecture 30 - Decision making in System Design (Continued...)

NPTEL : Vehicle Dynamics (Engineering Design)

Co-ordinators : Dr. R. Krishnakumar

Lecture 1 - Introduction to Vehicle Dynamics

Lecture 2 - Longitudinal Dynamics

Lecture 3 - Vehicle Load Distribution - Acceleration and Braking

Lecture 4 - Brake Force Distribution, Braking Efficiency and Braking Distance

Lecture 5 - Tractor - Semi Trailer

Lecture 6 - Tire Mechanics - An Introduction

Lecture 7 - Mechanical Properties of Rubber

Lecture 8 - Slip, Grip and Rolling Resistance

Lecture 9 - Tire Construction and Force Development

Lecture 10 - Contact Patch and Contact Pressure Distribution

Lecture 11 - Tire Brush Model

Lecture 12 - Lateral Force Generation

Lecture 13 - Ply Steer and Conicity - Part 1

Lecture 14 - Ply Steer and Conicity - Part 2

Lecture 15 - Tire Models - Magic Formula

Lecture 16 - Classification of Tyre Models and Combined Slip

Lecture 17 - Lateral Dynamics - An Introduction

Lecture 18 - Lateral Dynamics - Bicycle Model

Lecture 19 - Lateral Dynamics - Stability and Steering Conditions

Lecture 20 - Understeer Gradient and State Space Approach

Lecture 21 - Handling Response of a Vehicle

Lecture 22 - Mimuro Plot for Lateral Transient Response - Part 1

Lecture 23 - Mimuro Plot for Lateral Transient Response - Part 2

Lecture 24 - Parameters affecting vehicle handling characteristics

Lecture 25 - Subjective and Objective Evaluation of Vehicle Handling - Part 1

Lecture 26 - Subjective and Objective Evaluation of Vehicle Handling - Part 2

Lecture 27 - Subjective and Objective Evaluation of Vehicle Handling and Rollover P

Lecture 28 - Rollover Prevention (Continued...) and Vertical Dynamics

Lecture 29 - Vertical Dynamics - An Introduction

Lecture 30 - Vertical Dynamics - Quarter Car Model

Lecture 31 - Noise, Vibration and Harshness - Random Processes

- Lecture 1 - Introduction to Control Systems - Part 1
- Lecture 2 - Introduction to Control Systems - Part 2
- Lecture 3 - Overview of Feedback Control Systems - Part 1
- Lecture 4 - Overview of Feedback Control Systems - Part 2
- Lecture 5 - Mathematical Preliminaries - Part 1
- Lecture 6 - Mathematical Preliminaries - Part 2
- Lecture 7 - Transfer Function - Part 1
- Lecture 8 - Transfer Function - Part 2
- Lecture 9 - System Response - Part 1
- Lecture 10 - System Response - Part 2
- Lecture 11 - BIBO Stability - Part 1
- Lecture 12 - BIBO Stability - Part 2
- Lecture 13 - Effect of Zeros - Part 1
- Lecture 14 - Effect of Zeros - Part 2
- Lecture 15 - Closed Loop System - Part 1
- Lecture 16 - Closed Loop System - Part 2
- Lecture 17 - First Order Systems - Part 1
- Lecture 18 - First Order Systems - Part 2
- Lecture 19 - Second Order Systems - Part 1
- Lecture 20 - Second Order Systems - Part 2
- Lecture 21 - Controllers - Part 1
- Lecture 22 - Controllers - Part 2
- Lecture 23 - Closed Loop Control - Part 1
- Lecture 24 - Closed Loop Control - Part 2
- Lecture 25 - Routh's Stability Criterion - Part 1
- Lecture 26 - Routh's Stability Criterion - Part 2
- Lecture 27 - Special Cases of Routh's Stability Criterion - Part 1
- Lecture 28 - Special Cases of Routh's Stability Criterion - Part 2
- Lecture 29 - Performance Specifications - Part 1
- Lecture 30 - Performance Specifications - Part 2
- Lecture 31 - Steady State Error Analysis - Part 1

[Lecture 32 - Steady State Error Analysis - Part 2](#)

[Lecture 33 - Root Locus 1 - Part 1](#)

[Lecture 34 - Root Locus 1 - Part 2](#)

[Lecture 35 - Root Locus 2 - Part 1](#)

[Lecture 36 - Root Locus 2 - Part 2](#)

[Lecture 37 - Root Locus 3 - Part 1](#)

[Lecture 38 - Root Locus 3 - Part 2](#)

[Lecture 39 - Root Locus 4 - Part 1](#)

[Lecture 40 - Root Locus 4 - Part 2](#)

[Lecture 41 - Case Study - Modelling - Part 1](#)

[Lecture 42 - Case Study - Modelling - Part 2](#)

[Lecture 43 - Case Study - Control Design - Part 1](#)

[Lecture 44 - Case Study - Control Design - Part 2](#)

[Lecture 45 - State Space Representation - Part 1](#)

[Lecture 46 - State Space Representation - Part 2](#)

[Lecture 47 - Frequency Response - Part 1](#)

[Lecture 48 - Frequency Response - Part 2](#)

[Lecture 49 - Bode Plot 1 - Part 1](#)

[Lecture 50 - Bode Plot 1 - Part 2](#)

[Lecture 51 - Bode Plot 2 - Part 1](#)

[Lecture 52 - Bode Plot 2 - Part 2](#)

[Lecture 53 - Bode Plot 3 - Part 1](#)

[Lecture 54 - Bode Plot 3 - Part 2](#)

[Lecture 55 - Bode Plot 4 - Part 1](#)

[Lecture 56 - Bode Plot 4 - Part 2](#)

[Lecture 57 - Nyquist Plot 1 - Part 1](#)

[Lecture 58 - Nyquist Plot 1 - Part 2](#)

[Lecture 59 - Nyquist Plot 2 - Part 1](#)

[Lecture 60 - Nyquist Plot 2 - Part 2](#)

[Lecture 61 - Nyquist Stability Criterion - Part 1](#)

[Lecture 62 - Nyquist Stability Criterion - Part 2](#)

[Lecture 63 - Relative Stability 1 - Part 1](#)

[Lecture 64 - Relative Stability 1 - Part 2](#)

[Lecture 65 - Relative Stability 2 - Part 1](#)

[Lecture 66 - Relative Stability 2 - Part 2](#)

[Lecture 67 - Lead Compensation - Part 1](#)

[Lecture 68 - Lead Compensation - Part 2](#)

[Lecture 69 - Lead Compensator Design - Part 1](#)

[Lecture 70 - Lead Compensator Design - Part 2](#)

[Lecture 71 - Lag and Lag-Lead Compensation - Part 1](#)

[Lecture 72 - Lag and Lag-Lead Compensation - Part 2](#)

Lecture 1 - Course Overview and Classification of Internal Combustion Engines - Part 1

Lecture 2 - Course Overview and Classification of Internal Combustion Engines - Part 2

Lecture 3 - Engine Components - Part 1

Lecture 4 - Engine Components - Part 2

Lecture 5 - Operation of Four Stroke Engines - Part 1

Lecture 6 - Operation of Four Stroke Engines - Part 2

Lecture 7 - Two Stroke Engine and Engine Cycles - Part 1

Lecture 8 - Two Stroke Engine and Engine Cycles - Part 2

Lecture 9 - Otto Cycle and Diesel Cycle - Part 1

Lecture 10 - Otto Cycle and Diesel Cycle - Part 2

Lecture 11 - Dual Cycle and Engine Performance - Part 1

Lecture 12 - Dual Cycle and Engine Performance - Part 2

Lecture 13 - Engine Performance - Part 1

Lecture 14 - Engine Performance - Part 2

Lecture 15 - Supercharging and Combustion in SI Engines - Part 1

Lecture 16 - Supercharging and Combustion in SI Engines - Part 2

Lecture 17 - Knocking in SI Engines - Part 1

Lecture 18 - Knocking in SI Engines - Part 2

Lecture 19 - Combustion in CI Engines and Carburetion - Part 1

Lecture 20 - Combustion in CI Engines and Carburetion - Part 2

Lecture 21 - Fuel Introduction Systems - Part 1

Lecture 22 - Fuel Introduction Systems - Part 2

Lecture 23 - Analysis of Carburetor - Part 1

Lecture 24 - Analysis of Carburetor - Part 2

Lecture 25 - Engine Emissions - Part 1

Lecture 26 - Engine Emissions - Part 2

Lecture 27 - Emission Control Systems - Part 1

Lecture 28 - Emission Control Systems - Part 2

Lecture 29 - Automotive Powertrain - Part 1

Lecture 30 - Automotive Powertrain - Part 2

Lecture 31 - Automotive Clutch - Part 1

[Lecture 32 - Automotive Clutch - Part 2](#)

[Lecture 33 - Transmission - Part 1](#)

[Lecture 34 - Transmission - Part 2](#)

[Lecture 35 - Powertrain Analysis - Part 1](#)

[Lecture 36 - Powertrain Analysis - Part 2](#)

[Lecture 37 - Powertrain Analysis 2 - Part 1](#)

[Lecture 38 - Powertrain Analysis 2 - Part 2](#)

[Lecture 39 - Transmission Matching - Part 1](#)

[Lecture 40 - Transmission Matching - Part 2](#)

[Lecture 41 - Brake System - Part 1](#)

[Lecture 42 - Brake System - Part 2](#)

[Lecture 43 - Components of a Brake System and Drum Brake - Part 1](#)

[Lecture 44 - Components of a Brake System and Drum Brake - Part 2](#)

[Lecture 45 - Disc Brake and Introduction to Hydraulic Brake - Part 1](#)

[Lecture 46 - Disc Brake and Introduction to Hydraulic Brake - Part 2](#)

[Lecture 47 - Hydraulic Brake System - Part 1](#)

[Lecture 48 - Hydraulic Brake System - Part 2](#)

[Lecture 49 - Air Brake System - Part 1](#)

[Lecture 50 - Air Brake System - Part 2](#)

[Lecture 51 - Antilock Brake System 1 - Part 1](#)

[Lecture 52 - Antilock Brake System 1 - Part 2](#)

[Lecture 53 - Antilock Brake System 2 - Part 1](#)

[Lecture 54 - Antilock Brake System 2 - Part 2](#)

[Lecture 55 - Braking Analysis - Part 1](#)

[Lecture 56 - Braking Analysis - Part 2](#)

[Lecture 57 - Steering System - Part 1](#)

[Lecture 58 - Steering System - Part 2](#)

[Lecture 59 - Manual Steering Systems - Part 1](#)

[Lecture 60 - Manual Steering Systems - Part 2](#)

[Lecture 61 - Power Steering and Kinematic Steering Analysis - Part 1](#)

[Lecture 62 - Power Steering and Kinematic Steering Analysis - Part 2](#)

[Lecture 63 - Wheel Alignment - Part 1](#)

[Lecture 64 - Wheel Alignment - Part 2](#)

[Lecture 65 - Introduction to Suspension System - Part 1](#)

[Lecture 66 - Introduction to Suspension System - Part 2](#)

[Lecture 67 - Shock Absorbers and Independent Suspension - Part 1](#)

[Lecture 68 - Shock Absorbers and Independent Suspension - Part 2](#)

[Lecture 69 - Dependent Suspension and Suspension Analysis - Part 1](#)

[Lecture 70 - Dependent Suspension and Suspension Analysis - Part 2](#)

[Lecture 71 - Introduction to Electric and Hybrid Powertrain - Part 1](#)

[Lecture 72 - Introduction to Electric and Hybrid Powertrain - Part 2](#)

[Lecture 73 - Tyres - Part 1](#)

[Lecture 74 - Tyres - Part 2](#)

Lecture 1 - Introduction

Lecture 2 - Birth and Growth of a Product

Lecture 3 - Types of Design

Lecture 4 - Stage-Gate and Spiral Design

Lecture 5 - Stages in New Product Development

Lecture 6 - Laboratory Exercise - 1

Lecture 7 - Reverse Engg. and Redesign

Lecture 8 - Technical Questioning and Mission Statement

Lecture 9 - Mission Statement- Examples

Lecture 10 - Laboratory Exercise - 2

Lecture 11 - Identifying Customer Needs

Lecture 12 - Customer Need Analysis

Lecture 13 - Product Specifications

Lecture 14 - Laboratory Exercise - 3

Lecture 15 - Need - Metric Matrix

Lecture 16 - Establishing Target Specifications

Lecture 17 - HoQ

Lecture 18 - Laboratory Exercise - 4

Lecture 19 - Functional Decomposition

Lecture 20 - FAST Method

Lecture 21 - Laboratory Exercise - 5

Lecture 22 - Function Structure (Flow Method)

Lecture 23 - Flow Method Examples

Lecture 24 - Laboratory Exercise - 6

Lecture 25 - Product and Portfolio Architecture

Lecture 26 - Portfolio Architecture Selection

Lecture 27 - Laboratory Exercise - 7

Lecture 28 - Product Architecture

Lecture 29 - Identification of Modules

Lecture 30 - Laboratory Exercise - 8

Lecture 31 - Concept Development

[Lecture 32 - Intuitive Methods](#)

[Lecture 33 - Laboratory Exercise - 9](#)

[Lecture 34 - Logical Method- TRIZ](#)

[Lecture 35 - Concept Selection](#)

[Lecture 36 - Laboratory Exercise - 10](#)

[Lecture 37 - Concept Scoring](#)

[Lecture 38 - Laboratory Exercise - 11](#)

Lecture 1 - Introduction

Lecture 2 - Evolution of Robotics

Lecture 3 - Kinematics- Coordinate transformations

Lecture 4 - Homogeneous Transformation Matrix

Lecture 5 - Industrial Robot- Kinematic Structures

Lecture 6 - Robot Architectures

Lecture 7 - Kinematic Parameters

Lecture 8 - DH Algorithm

Lecture 9 - DH Algorithm- Examples

Lecture 10 - Forward Kinematics

Lecture 11 - Forward Kinematics- Examples

Lecture 12 - Inverse Kinematics

Lecture 13 - Inverse Kinematics- Examples

Lecture 14 - Differential Relations

Lecture 15 - Manipulator Jacobian and Statics

Lecture 16 - Overview of Electric Actuators and Operational Needs

Lecture 17 - Principles of DC Motor Operation

Lecture 18 - DC Motor Equations and Principles of Control

Lecture 19 - DC Motor Control Regions and Principles of Power Electronics

Lecture 20 - Power Electronic Switching and Current Ripple

Lecture 21 - The H-Bridge and DC Motor Control Structure

Lecture 22 - The Brushless DC Machine

Lecture 23 - Control of the Brushless DC Motor

Lecture 24 - The PM Synchronous Motor (PMSM) and SPWM

Lecture 25 - Principles of PMSM Control

Lecture 26 - Encoders for Speed and Position Estimation

Lecture 27 - Stepper Motors

Lecture 28 - Introduction to Probabilistic Robotics.

Lecture 29 - Recursive State Estimation: Bayes Filter

Lecture 30 - Recursive State Estimation: Bayes Filter Illustration

Lecture 31 - Probability basics

[Lecture 32 - Probability basics](#)

[Lecture 33 - Kalman Filter](#)

[Lecture 34 - Extended Kalman Filter](#)

[Lecture 35 - Particle Filter](#)

[Lecture 36 - Binary Bayes](#)

[Lecture 37 - Velocity Motion Model](#)

[Lecture 38 - Odometry Motion Model](#)

[Lecture 39 - Occupa Grid Mapping](#)

[Lecture 40 - Range Finder Measurement Model](#)

[Lecture 41 - Localization Taxonomy](#)

[Lecture 42 - Markov Localization](#)

[Lecture 43 - Path Planning](#)