

[Lecture 1 - RBE: Background and Overview](#)

[Lecture 2 - RBE Framework](#)

[Lecture 3 - RBE-Framework continuation and Major Procedural Elements](#)

[Lecture 4 - RBE-Major Procedural Elements \(Continued...\)](#)

[Lecture 5 - Risk Characterization](#)

[Lecture 6 - Reliability Characterization and Probability Distributions-Discrete Distribution](#)

[Lecture 7 - Probability Distributions - Continuous Distribution](#)

[Lecture 8 - Statistical Estimation in Probability Theory](#)

[Lecture 9 - Probability and Confidence Interval](#)

[Lecture 10 - Regression Analysis](#)

[Lecture 11 - Life Prediction : Introduction](#)

[Lecture 12 - Life Prediction : Related Aspects](#)

[Lecture 13 - Life Prediction and Assessment Approaches](#)

[Lecture 14 - Life Prediction : Accelerated Screening and Life Testing](#)

[Lecture 15 - Probabilistic Fracture Mechanic Approach](#)

[Lecture 16 - Introduction and Reliability Block Diagram \(RBD\)](#)

[Lecture 17 - RBD - System Redundancies](#)

[Lecture 18 - Fault Tree Analysis](#)

[Lecture 19 - Fault Tree Analysis Continuation and Event Tree Analysis](#)

[Lecture 20 - Markov Model](#)

[Lecture 21 - Dynamic Fault Tree](#)

[Lecture 22 - Dynamic Event Tree and Binary Decision Diagram](#)

[Lecture 23 - Common Cause Failure](#)

[Lecture 24 - Importance and Sensitivity Analysis](#)

[Lecture 25 - Maintainability](#)

[Lecture 26 - PRA-Introduction](#)

[Lecture 27 - PRA-Organizational and Quality Aspects](#)

[Lecture 28 - PRA-Qualitative Modeling and Analysis](#)

[Lecture 29 - PRA-Quantification of the PRA model](#)

[Lecture 30 - Monte Carlo Simulation, Root Cause Analysis](#)

[Lecture 31 - Low Power and Shutdown PRA](#)

[Lecture 32 - Internal Flood PRA](#)

[Lecture 33 - Level 1 Fire PRA](#)

[Lecture 34 - Seismic PRA](#)

[Lecture 35 - Level 2 and Level 3 PRA](#)

[Lecture 36 - Human Reliability- Introduction](#)

[Lecture 37 - State of the Art in Human-Reliability](#)

[Lecture 38 - Technique for Human Error Rate Prediction \(THERP\)](#)

[Lecture 39 - Human Cognitive Reliability \(HCR\) Method](#)

[Lecture 40 - CQB - Method Consciousness, Cognition, Conscience and Brain](#)

[Lecture 41 - Uncertainty - Introduction](#)

[Lecture 42 - Uncertainty: Overview, preliminary discussions considering selected approaches](#)

[Lecture 43 - Parametric Approach to Uncertainty](#)

[Lecture 44 - Uncertainty Modelling using Fuzzy Approach in RBE](#)

[Lecture 45 - Uncertainty – Bayesian, and Monte-Carlo technique](#)

[Lecture 46 - Scope of Course and Introduction](#)

[Lecture 47 - PoF and FMMECA](#)

[Lecture 48 - Failure Mechanism and Models](#)

[Lecture 49 - Virtual Qualification](#)

[Lecture 50 - Physical qualification and Prognostics](#)

[Lecture 51 - PHM Introduction](#)

[Lecture 52 - Prognostics and Health Management in RBE](#)

[Lecture 53 - Major AI and ML Techniques and Algorithms in PHM](#)

[Lecture 54 - Role of ANN technique in RUL Estimation](#)

[Lecture 55 - Uncertainty Management in PHM](#)

[Lecture 56 - RBE-Introduction](#)

[Lecture 57 - RBE for Life Extension in support of regulatory relicensing](#)

[Lecture 58 - RBE-Risk Monitor](#)

[Lecture 59 - RBE-Inservice-Inspection](#)

[Lecture 60 - RB Operator Support System](#)

NPTEL : Introduction to Japanese Language and Culture (General)

Co-ordinators : Mrs. Vatsala Misra

Lecture 1 - Introduction to Japanese scripts

Lecture 2 - Jiko shoukai (Self introduction)

Lecture 3 - Dochira kara desu ka (Where are you from?)

Lecture 4 - Senmon wa nan desu ka (What is your specialization?)

Lecture 5 - Kore wa hon desu (This is a book)

Lecture 6 - Ikura desu ka (How much is it?)

Lecture 7 - Ima nan-ji desu ka (What is the time now?)

Lecture 8 - Kaigi wa roku-ji-han kara desu (The meeting is from 6:30)

Lecture 9 - Ashita Tokyo e ikimasu. (I will go to Tokyo tomorrow)

Lecture 10 - Watashi wa mainichi roku-ji ni okimasu (I wake up at 6â€™oclock everyday)

Lecture 11 - Itsu Kanpur e kimashita ka (When did you come to Kanpur?)

Lecture 12 - Y?binkyoku wa asoko ni arimasu (The post office is over there)

Lecture 13 - Rao san wa doko ni imasu ka (Where is Mr. Rao?)

Lecture 14 - Pikuniku e ikimash? (Letâ€™s go for a picnic)

Lecture 15 - Kesa pan to tamago o tabemashita (I ate eggs and bread for breakfast)

Lecture 16 - Depa-to no tonari no biru wa gink? desu (The building next to the department store is the bank)

Lecture 17 - Taj hoteru wa ookii hoteru desu(Hotel Taj is a big hotel)

Lecture 18 - Hoteru de nani o tabemashita ka (What did you eat at the hotel?)

Lecture 19 - Tokyo wa ?kikute kirei desu (Tokyo is big and beautiful)

Lecture 20 - Ko-hi- wa oishiku arimasen(Coffee is not tasty)

Lecture 21 - Hantai kotoba (Opposites)

Lecture 22 - Watashi wa mainichi miruku o nomimasu (I drink milk everyday)

Lecture 23 - Watashi wa oniisan ni kamera o moratta(I received a camera from my brother)

Lecture 24 - Nani o tabetai desu ka(What do you want to eat?)

Lecture 25 - Nani o sashiagemasu ka (Giving and Receiving)

Lecture 26 - Sensei wa watashi ni hon o kuremashita (My teacher gave me a book)

Lecture 27 - Chotto matte kudasai (Just a minute please)

Lecture 28 - Ke-ki o tabete mite kudasai (Eat and see how is the cake)

Lecture 29 - Nani o shite imasu ka(What are you doing?)

Lecture 30 - Tokyo ni sunde imasu (I live in Tokyo)

Lecture 31 - Kanji ga kakemasu (I can write Kanji)

[Lecture 32 - Im?to wa niny? o hoshigatte imasu \(My sister wants a doll\)](#)

[Lecture 33 - Aisukuri-mu ga ke-ki yori suki desu \(I like ice-cream more than cakes\)](#)

[Lecture 34 - Kutsu o kai ni ikimasu \(I am going to buy shoes\)](#)

[Lecture 35 - Ashita motto atsuku narimasu \(It is going to become very hot tomorrow\)](#)

[Lecture 36 - Rainen Tokyo e iku to omoimasu \(I think I will go to Tokyo next year\)](#)

[Lecture 37 - Pen de kaite mo ii desu ka\(Is it alright to write in pen?\)](#)

[Lecture 38 - Comprehensions and Expressions](#)

[Lecture 39 - Basic Kanji](#)

[Lecture 40 - Basic Kanji](#)

[Lecture 1 - Introduction](#)

[Lecture 2 - Pre Siddhantic Astronomy](#)

[Lecture 3 - Siddhantic Astronomy](#)

[Lecture 4 - Astronomy in Medieval India](#)

[Lecture 5 - Introduction to Telescopic Astronomy and Concluding remarks](#)

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

NPTEL : NOC:Carbon Accounting and Sustainable Designs in Product Lifecycle Management (General)

Co-ordinators : Prof. Amandeep Singh Oberoi, Prof. Deepu Philip, Prof. Prabal Pratap Singh

Lecture 1 - Productivity and Sustainability - Part 1

Lecture 2 - Measuring Productivity

Lecture 3 - Measures Affecting Productivity

Lecture 4 - Productivity and Sustainability - Part 2

Lecture 5 - Environmental Management system

Lecture 6 - Green System

Lecture 7 - Carbon Footprint

Lecture 8 - Carbon Credit Trading

Lecture 9 - Industrial Ecology and Carbon Footprint

Lecture 10 - Examples of Carbon Footprint Calculations

Lecture 11 - Examples of Carbon Footprint Calculations

Lecture 12 - Some More Green Thoughts and Footprints

Lecture 13 - Green Manufacturing

Lecture 14 - Partnership for a New Generation of Vehicles (PNGV)

Lecture 15 - Smart Design and Engineering

Lecture 16 - Road to Product Lifecycle Management - Part 1

Lecture 17 - Road to Product Lifecycle Management - Part 2

Lecture 18 - Road to Product Lifecycle Management - Part 3

Lecture 19 - Sustainability and Green Supply Chain - Part 1

Lecture 20 - Sustainability and Green Supply Chain - Part 2

Lecture 21 - Energy Transformations

Lecture 22 - PLM Components and levels - Part 1

Lecture 23 - PLM Components and levels - Part 2

Lecture 24 - PLM integration - Part 1

Lecture 25 - PLM integration - Part 2

Lecture 26 - Facility carbon accounting

Lecture 27 - Activities of emission - Part 1

Lecture 28 - Activities of emission - Part 2

Lecture 29 - Carbon and business data - Part 1

Lecture 30 - Carbon and business data - Part 2

Lecture 31 - Carbon and business data - Part 3

[Lecture 32 - Carbon accounting software - Part 1](#)

[Lecture 33 - Carbon accounting software - Part 2](#)

[Lecture 34 - Carbon Accounting Model - Part 1](#)

[Lecture 35 - Carbon Accounting Model - Part 2](#)

[Lecture 36 - Carbon Accounting Model - Part 3](#)

[Lecture 37 - Carbon Accounting Model - Part 4](#)

[Lecture 38 - Carbon Accounting Model - Part 5](#)

[Lecture 39 - Integrated PL,SLM and ALM](#)

[Lecture 40 - Environmental, Social and Governace \(ESG\) Systems](#)

[Lecture 41 - Carbon Accounting Databases - Part 1](#)

[Lecture 42 - Carbon Accounting Databases - Part 2](#)

[Lecture 43 - Carbon Accounting Databases - Part 3](#)

[Lecture 44 - Database Management Systems](#)

[Lecture 45 - Database Design](#)

[Lecture 46 - Terminologies in Database Design - I](#)

[Lecture 47 - Terminologies in Database Design - II](#)

[Lecture 48 - Database Schema - Part 1](#)

[Lecture 49 - Database Schema - Part 2](#)

[Lecture 50 - Database Normalization - Part 1](#)

[Lecture 51 - Database Normalization - Part 2](#)

[Lecture 52 - Carbon Accounting User Interface - Part 1](#)

[Lecture 53 - Carbon Accounting User Interface - Part 2](#)

[Lecture 54 - Carbon Accounting User Interface - Part 3](#)

NPTEL : NOC:Stress Management (General)

Co-ordinators : Prof. Rajlakshmi Guha

Lecture 1 - What is Stress

Lecture 2 - Sources of stress

Lecture 3 - Types of Stress

Lecture 4 - Personality Factors and Stress

Lecture 5 - Stress and the College Student

Lecture 6 - Stress and Nervous System

Lecture 7 - Hypothalamic-Pituitary-Adrenal (HPA) Axis

Lecture 8 - Effect of Stress on Immune System

Lecture 9 - Health Risk Associated with Chronic Stress

Lecture 10 - Stress and Major Psychiatric Disorders

Lecture 11 - Understanding your stress level

Lecture 12 - Role of Personality Pattern, Self Esteem, Locus of Control

Lecture 13 - Role of Thoughts Beliefs and Emotions - I

Lecture 14 - Role of Thoughts Beliefs and Emotions - II

Lecture 15 - Life Situation Intrapersonal : (Assertiveness, Time Management)

Lecture 16 - Developing Cognitive Coping Skills

Lecture 17 - Autogenic Training, Imagery and Progressive Relaxation

Lecture 18 - Other Relaxation Techniques

Lecture 19 - Exercise and Health

Lecture 20 - DIY Strategies Stress Management

[Lecture 1 - Introduction to Need of 21st Century Education](#)

[Lecture 2 - Accreditation](#)

[Lecture 3 - Outcome based Learning](#)

[Lecture 4 - Approach to Design Outcome based Learning](#)

[Lecture 5 - Approach to Design Outcome based Learning \(Continued...\)](#)

[Lecture 6 - Instructional Design for Active Learning](#)

[Lecture 7](#)

[Lecture 8](#)

[Lecture 9](#)

[Lecture 10](#)

[Lecture 11](#)

[Lecture 12](#)

[Lecture 13](#)

[Lecture 14](#)

[Lecture 15](#)

[Lecture 16](#)

[Lecture 17](#)

[Lecture 18](#)

[Lecture 19](#)

[Lecture 20](#)

NPTEL : Ayurvedic Inheritance of India (General)

Co-ordinators : Dr. M.S. Valiathan

[Lecture 1 - Roots of Ayurveda](#)

[Lecture 2 - Traditional Medicine in Buddhist India](#)

[Lecture 3 - Period of Systematization](#)

[Lecture 4 - Philosophical ideas in Ayurveda](#)

[Lecture 5 - Human Body in Health](#)

[Lecture 6 - Human Body in Disease](#)

[Lecture 7 - Food and Drinks](#)

[Lecture 8 - Code for Healthy Living](#)

[Lecture 9 - Diseases](#)

[Lecture 10 - Diagnosis and Prognosis](#)

[Lecture 11 - Medical Treatment of Diseases](#)

[Lecture 12 - Materia Medica](#)

[Lecture 13 - Surgical Treatment of Diseases](#)

[Lecture 14 - Surgical Instruments](#)

[Lecture 15 - Treatment of fractures; some surgical procedures](#)

[Lecture 16 - Principles and methods of rejuvenation: enhancement of sexual potency and fertility](#)

[Lecture 17 - Selection of Students: Oath at initiation: Process of Training](#)

[Lecture 18 - A Science Initiative in Ayurveda \(ASIIA\)](#)

[Lecture 19 - Ayurvedic Biology: Illustrative Studies](#)

[Lecture 20 - Conclusion: An Ayurvedic View of Life](#)

Co-ordinators : Dr. G. Phanikumar, Prof. C. Balaji, Dr. Arun K.Tangirala, Dr. Abhijit P. Deshpande, Prof. M.S. Ananth, Dr. Prathap Haridoss

Lecture 1 - Insight into research

Lecture 2 - Role of Guide and Student

Lecture 3 - Art of Re-Search

Lecture 4 - Persistent small steps towards success

Lecture 5 - Overview of research

Lecture 6 - Overview of Literature Survey

Lecture 7 - Literature Survey using Web of Science

Lecture 8 - Literature Survey using Scopus

Lecture 9 - Writing Up

Lecture 10 - Tutorial on using BibTeX with LaTeX to add references to a document

Lecture 11 - Tutorial on using Microsoft Word with Bibliographic Sources

Lecture 12 - Tutorial on using Microsoft Word with endnote entries

Lecture 13 - Experimental skills

Lecture 14 - Data analysis - Part 1

Lecture 15 - Data analysis - Part 2

Lecture 16 - Modelling skills - Part 1

Lecture 17 - Modelling skills - Part 2

Lecture 18 - Safety in laboratory

Lecture 19 - How to make Technical presentation

Lecture 20 - Technical Writing

Lecture 21 - Creativity in research - Part 1

Lecture 22 - Creativity in research - Part 2

Lecture 23 - Creativity in Research - Part 3

Lecture 24 - Group discussion on Ethics in Research

Lecture 25 - Intellectual property - Part 1

Lecture 26 - Intellectual property - Part 2

Lecture 27 - DOE Part 1

Lecture 28 - DOE part 2

Lecture 29 - DOE part 3

Lecture 30 - DOE part 4

[Lecture 31 - DOE part 5](#)

[Lecture 32 - Research in Applied Mechanics](#)

[Lecture 33 - Research in Chemical Engineering](#)

[Lecture 34 - Research in Civil Engineering](#)

[Lecture 35 - Research in Computer Science and Engineering](#)

[Lecture 36 - Research in Engineering Design](#)

[Lecture 37 - Research in Humanities and Social Sciences](#)

[Lecture 38 - Research in Mechanical Engineering](#)

[Lecture 39 - Research in Metallurgical and Materials Engineering](#)

[Lecture 40 - Research in Ocean Engineering](#)

[Lecture 41 - Research in Management Studies](#)

[Lecture 42 - Research in Aerospace Engineering](#)

[Lecture 43 - Research in Biotechnology](#)

[Lecture 44 - Research in Chemistry](#)

[Lecture 45 - Research in Electrical Engineering](#)

[Lecture 46 - Research in Mathematics](#)

[Lecture 47 - Research in Physics](#)

[Lecture 48 - Discussion with Research Scholars](#)

[Lecture 1 - Introduction](#)

[Lecture 2 - Origin of Life](#)

[Lecture 3 - Evolution](#)

[Lecture 4 - Cells](#)

[Lecture 5 - Biomolecules: Lipids](#)

[Lecture 6 - Biomolecules: Carbohydrates, Water](#)

[Lecture 7 - Biomolecules: Amino acids, Proteins](#)

[Lecture 8 - Biomolecules: Enzymes](#)

[Lecture 9 - Biomolecules: Nucleotides](#)

[Lecture 10 - Cell structure and function – Prokaryotes](#)

[Lecture 11 - Cell structure and function – Eukaryotes](#)

[Lecture 12 - Cell cycle](#)

[Lecture 13 - Cell division – mitosis](#)

[Lecture 14 - Cell division – meiosis](#)

[Lecture 15 - Culture growth](#)

[Lecture 16 - Mendelian genetics: Genetic disorders](#)

[Lecture 17 - Mendelian genetics: Mendelian inheritance principles](#)

[Lecture 18 - Mendelian genetics: Pedigree analysis](#)

[Lecture 19 - Mendelian genetics: Non-Mendelian inheritance](#)

[Lecture 20 - DNA replication](#)

[Lecture 21 - Transcription](#)

[Lecture 22 - Translation](#)

[Lecture 1 - Introduction to the Course](#)

[Lecture 2 - Introduction to the Winter School](#)

[Lecture 3 - Socio-algorithmic processes and the Everyday - Part 1](#)

[Lecture 4 - Socio-algorithmic processes and the Everyday - Part 2](#)

[Lecture 5 - Socio-algorithmic processes and the Everyday - Part 3](#)

[Lecture 6 - Data Protection and Privacy Regulation in the Digital Era - Part 1](#)

[Lecture 7 - Data Protection and Privacy Regulation in the Digital Era - Part 2](#)

[Lecture 8 - Data Protection and Privacy Regulation in the Digital Era - Part 3](#)

[Lecture 9 - Data-driven Identities - Part 1](#)

[Lecture 10 - Data-driven Identities - Part 2](#)

[Lecture 11 - Data-driven Identities - Part 3](#)

[Lecture 12 - Promises and Challenges of e-Health - Part 1](#)

[Lecture 13 - Promises and Challenges of e-Health - Part 2](#)

[Lecture 14 - Promises and Challenges of e-Health - Part 3](#)

[Lecture 15 - Digital Finance - Part 1](#)

[Lecture 16 - Digital Finance - Part 2](#)

[Lecture 17 - Digital and our everyday interactions with the state - Part 1](#)

[Lecture 18 - Digital and our everyday interactions with the state - Part 2](#)

[Lecture 19 - Digital and our everyday interactions with the state - Part 3](#)

[Lecture 20 - Creating a Machine Zone through Affected Feedback: Leisure and Entertainment on Social Media - Part 1](#)

[Lecture 21 - Creating a Machine Zone through Affected Feedback: Leisure and Entertainment on Social Media - Part 2](#)

[Lecture 22 - Creating a Machine Zone through Affected Feedback: Leisure and Entertainment on Social Media - Part 3](#)

- Lecture 1 - Introduction to the course
- Lecture 2 - An Inexperienced Engineering Teacher's View
- Lecture 3 - From traditional lecturing to helping students learn - 1
- Lecture 4 - From traditional lecturing to helping students learn - 2
- Lecture 5 - Better learning (Bloom's Taxonomy)
- Lecture 6 - Problem based learning (PBL) and Problem Solving - Part 1
- Lecture 7 - Problem based learning (PBL) and Problem Solving - Part 2
- Lecture 8 - Writing Learning Outcomes for a Course
- Lecture 9 - Active Learning
- Lecture 10 - Cooperative Group Learning
- Lecture 11 - Flipped Classroom
- Lecture 12 - Effective Laboratory Courses
- Lecture 13 - Assessment - Part 1
- Lecture 14 - Assessment - Part 2
- Lecture 15 - How can we use research in education? - Part A1
- Lecture 16 - How can we use research in education? - Part A2
- Lecture 17 - The Class, as a Whole - Part A3
- Lecture 18 - Psychological Type (Orientation) and Learning - Part B
- Lecture 19 - Cognitive Development Theories – Two Main Examples - Part C
- Lecture 20 - Learning Theories - Part D
- Lecture 21 - Feedback and Reflection - Part 1
- Lecture 22 - Feedback and Reflection - Part 2
- Lecture 23 - Feedback and Reflection - Part 3
- Lecture 24 - Live Session 1
- Lecture 25 - Live Session 2

[Lecture 1 - Course mechanics](#)

[Lecture 2 - Goals and VR definitions](#)

[Lecture 3 - Historical perspective](#)

[Lecture 4 - Birds-eye view \(general\)](#)

[Lecture 5 - Birds-eye view \(general\) \(Continued...\)](#)

[Lecture 6 - Birds-eye view \(hardware\)](#)

[Lecture 7 - Birds-eye view \(software\)](#)

[Lecture 8 - Birds-eye view \(sensation and perception\)](#)

[Lecture 9 - Geometric modeling](#)

[Lecture 10 - Transforming models](#)

[Lecture 11 - Matrix algebra and 2D rotations](#)

[Lecture 12 - 3D rotations and yaw, pitch, and roll](#)

[Lecture 13 - 3D rotations and yaw, pitch, and roll \(Continued...\)](#)

[Lecture 14 - Axis-angle representations](#)

[Lecture 15 - Quaternions](#)

[Lecture 16 - Converting and multiplying rotations](#)

[Lecture 17 - Converting and multiplying rotations \(Continued...\)](#)

[Lecture 18 - Homogeneous transforms](#)

[Lecture 19 - The chain of viewing transforms](#)

[Lecture 20 - Eye transforms](#)

[Lecture 21 - Eye transforms \(Continued...\)](#)

[Lecture 22 - Canonical view transform](#)

[Lecture 23 - Viewport transform](#)

[Lecture 24 - Viewport transform \(Continued...\)](#)

[Lecture 25 - Three interpretations of light](#)

[Lecture 26 - Refraction](#)

[Lecture 27 - Simple lenses](#)

[Lecture 28 - Diopters](#)

[Lecture 29 - Imaging properties of lenses](#)

[Lecture 30 - Lens aberrations](#)

[Lecture 31 - Optical system of eyes](#)

[Lecture 32 - Photoreceptors](#)

[Lecture 33 - Sufficient resolution for VR](#)

[Lecture 34 - Light intensity](#)

[Lecture 35 - Eye movements](#)

[Lecture 36 - Eye movements \(Continued...\)](#)

[Lecture 37 - Eye movement issues for VR](#)

[Lecture 38 - Neuroscience of vision](#)

[Lecture 39 - Three Psychophysical Laws](#)

[Lecture 40 - Sensation and Perception](#)

[Lecture 41 - Psychophysics of Visual Perception](#)

[Lecture 42 - Gamma Encoding](#)

[Lecture 43 - Limiting Resolution](#)

[Lecture 44 - Depth perception](#)

[Lecture 45 - Depth perception \(Continued...\)](#)

[Lecture 46 - Motion perception from Visual System](#)

[Lecture 47 - Frame rates and displays](#)

[Lecture 48 - Frame rates and displays \(Continued...\)](#)

[Lecture 49 - Psychophysics of Depth Perception](#)

[Lecture 50 - Overview](#)

[Lecture 51 - Orientation tracking](#)

[Lecture 52 - Tilt drift correction](#)

[Lecture 53 - Yaw drift correction](#)

[Lecture 54 - Tracking with a camera](#)

[Lecture 55 - Perspective n-point problem](#)

[Lecture 56 - Filtering](#)

[Lecture 57 - Lighthouse approach](#)

[Lecture 58 - Visual Rendering-Overview](#)

[Lecture 59 - Visual Rendering-overview \(Continued...\)](#)

[Lecture 60 - Shading models](#)

[Lecture 61 - Rasterization](#)

[Lecture 62 - Pixel shading](#)

[Lecture 63 - VR-specific problems](#)

[Lecture 64 - Distortion shading](#)

[Lecture 65 - Post-rendering image warp](#)

[Lecture 66 - Why Haptics?](#)

[Lecture 67 - What is Haptics?](#)

[Lecture 68 - Branches of Haptics](#)

[Lecture 69 - Human Haptics - Tactile System](#)

[Lecture 70 - Kinesthetic System](#)

[Lecture 71 - Motor System](#)

[Lecture 72 - Haptic Devices and Interfaces - Kinesthetic Devices](#)

[Lecture 73 - Haptic Devices and Interfaces - Tactile Devices](#)

[Lecture 74 - Physics and Physiology](#)

[Lecture 75 - Auditory perception](#)

[Lecture 76 - Auditory localization](#)

[Lecture 77 - Rendering](#)

[Lecture 78 - Spatialization and display](#)

[Lecture 79 - Combining other senses](#)

[Lecture 80 - Interfaces -overview](#)

[Lecture 81 - Evaluation of VR Systems](#)

[Lecture 82 - Social interaction](#)

[Lecture 83 - System control](#)

[Lecture 84 - Manipulation](#)

[Lecture 85 - Locomotion](#)

[Lecture 86 - Principles of Perception](#)

[Lecture 87 - Introduction to Kalman Filter](#)

[Lecture 88 - Introduction to Extended Kalman Filter](#)

[Lecture 89 - Grand Challenges in VR/AR](#)

[Lecture 90 - Ultimate VR/AR System](#)

[Lecture 1 - Renewable Energy Technologies](#)

[Lecture 2 - Energy Usage by Humans - Estimate of Impact on Atmosphere](#)

[Lecture 3 - Conventional Sources of Energy](#)

[Lecture 4 - Non-Conventional Sources of Energy - An Overview](#)

[Lecture 5 - Energy consumption](#)

[Lecture 6 - Details of Energy usage in each sector](#)

[Lecture 7 - Consequences of Energy consumption](#)

[Lecture 8 - Solar Energy incident on Earth, Solar Spectrum](#)

[Lecture 9 - The Solar Energy Budget](#)

[Lecture 10 - Electromagnetic Radiation - The Solar Spectrum](#)

[Lecture 11 - Solar flat plate collector](#)

[Lecture 12 - Solar Radiator](#)

[Lecture 13 - Solar Energy - The Semiconductor](#)

[Lecture 14 - Solar energy - The p-n junction](#)

[Lecture 15 - Solar Cell - Growing the single crystal and making the p-n junction](#)

[Lecture 16 - Solar Energy - Interaction of p-n junction with radiation](#)

[Lecture 17 - Solar Energy - Solar cell characteristics and usage](#)

[Lecture 18 - Solar Energy - Solar cell construction](#)

[Lecture 19 - Solar Energy - Solar Photocatalysis](#)

[Lecture 20 - Wind Energy - Overview](#)

[Lecture 21 - Wind Energy - Energy Considerations](#)

[Lecture 22 - Wind Energy - Efficiency](#)

[Lecture 23 - Wind Energy - Parts and Materials](#)

[Lecture 24 - Wind Energy - Design Considerations](#)

[Lecture 25 - Ocean Thermal Energy - Conversion \(OTEC\)](#)

[Lecture 26 - Geothermal Energy](#)

[Lecture 27 - Geothermal Energy Technological aspects](#)

[Lecture 28 - Biomass Usage and Issues](#)

[Lecture 29 - Battery Basics](#)

[Lecture 30 - Battery Testing and Performance](#)

[Lecture 31 - Lithium ion Batteries](#)

[Lecture 32 - Common Battery Structures and Types](#)

[Lecture 33 - Types of Fuel Cells](#)

[Lecture 34 - Fuel Processing for PEM Fuel Cells](#)

[Lecture 35 - Fuel Cells : Concept to Product](#)

[Lecture 36 - Characterization of Electrochemical Devices](#)

[Lecture 37 - Fuel Cells : Parts and Assembly](#)

[Lecture 38 - Supercapacitors](#)

[Lecture 39 - Flywheels](#)

[Lecture 40 - Magnetohydrodynamic Power Generation](#)

NPTEL : NOC:Introduction to Remote Sensing (General)

Co-ordinators : Dr.Arun K.Saraf

Lecture 1 - What is satellite based remote sensing?

Lecture 2 - Development of remote sensing technology and advantages

Lecture 3 - Different platforms of remote sensing.

Lecture 4 - Electromagnetic Spectrum, solar reflection and thermal emission

Lecture 5 - Interaction of EM radiation with atmosphere including atmospheric scattering, absorption and emission

Lecture 6 - Interaction mechanism of EM radiation with ground and spectral response curve

Lecture 7 - Principles of image interpretation

Lecture 8 - Multi-spectral scanners and imaging devices

Lecture 9 - Salient characteristics of Landsat, IRS, Cartosat, Resourcesat sensors

Lecture 10 - Image characteristics and different resolutions in Remote Sensing

Lecture 11 - Image interpretation of different geological landforms, rock types and structures

Lecture 12 - Remote Sensing Integration with GIS and GPS

Lecture 13 - Geo-referencing Technique

Lecture 14 - Basic Image Enhancement Techniques

Lecture 15 - Spatial Filtering, Band ratio and Principal Component Analysis techniques

Lecture 16 - Image Classification Techniques

Lecture 17 - InSAR Techniques in its applications

Lecture 18 - Hyperspectral Remote Sensing

Lecture 19 - Integrated applications of RS and GIS in groundwater studies

Lecture 20 - Limitations of Remote Sensing Techniques

Lecture 1 - Introduction to Technical Communications and their types

Lecture 2 - Title and an abstract

Lecture 3 - An abstract vs extended abstract vs summary

Lecture 4 - Keywords and Introduction sections

Lecture 5 - Background and review work

Lecture 6 - Data inputs and analytical methods

Lecture 7 - Results and discussion

Lecture 8 - Conclusions and acknowledgement

Lecture 9 - Letters, Email, SMS and WhatsApp message

Lecture 10 - Key components of a chart and types of plots

Lecture 11 - Key components of a chart and types of plots

Lecture 12 - Tables and captions

Lecture 13 - Key elements of a map figure

Lecture 14 - Power Point Presentations - 1

Lecture 15 - Power Point Presentations - 2

Lecture 16 - Power Point Presentations - 3

Lecture 17 - Project Proposals

Lecture 18 - References and bibliography

Lecture 19 - What is Plagiarism - 1

Lecture 20 - What is Plagiarism - 2

Lecture 1 - Introduction to the course

Lecture 2 - Introduction to ultrasound imaging

Lecture 3 - Basics of wave propagation

Lecture 4 - Scattering and acoustic wave equation

Lecture 5 - Intensity, Reflection, Transmission

Lecture 6 - Recap of Week 1

Lecture 7 - Introduction to Imaging modes

Lecture 8 - Imaging artifacts

Lecture 9 - Ultrasound imaging systems

Lecture 10 - Transducers and transducer arrays

Lecture 11 - Recap of Week 2

Lecture 12 - Introduction to Microfabrication

Lecture 13 - Silicon and Silicon Dioxide

Lecture 14 - Numericals on Ultrasound

Lecture 15 - Introduction to Cleanroom

Lecture 16 - Silicon and Silicon Dioxide - II

Lecture 17 - Thermal Oxidation - I

Lecture 18 - Thermal Oxidation - II

Lecture 19 - Thermal Evaporation theory

Lecture 20 - Thermal Evaporation lab demonstration

Lecture 21 - E beam Deposition theory

Lecture 22 - E beam deposition lab demonstration

Lecture 23 - Sputtering theory

Lecture 24 - Sputtering lab demonstration

Lecture 25 - Chemical Vapor Deposition - I

Lecture 26 - Chemical Vapor Deposition - II

Lecture 27 - Lithography

Lecture 28 - Lithography lab demonstration

Lecture 29 - Lithography optics - I

Lecture 30 - Lithography optics - II

Lecture 31 - Introduction to Beamforming

[Lecture 32 - Beamforming Pt 2](#)

[Lecture 33 - Beamforming and Signal Processing](#)

[Lecture 34 - Intro to Field II simulation - impulse response, beam pattern](#)

[Lecture 35 - Recap of week 7](#)

[Lecture 36 - Ultrasound image quality metrics](#)

[Lecture 37 - Contrast agents](#)

[Lecture 38 - Contrast-enhanced imaging](#)

[Lecture 39 - Nonlinear acoustics and imaging](#)

[Lecture 40 - Recap of week 8](#)

[Lecture 41 - Field II imaging simulations](#)

[Lecture 42 - Doppler ultrasound](#)

[Lecture 43 - Color and Power Doppler ultrasound](#)

[Lecture 44 - Quantitative Ultrasound](#)

[Lecture 45 - Recap of week 9](#)

[Lecture 46 - Ultrasound bioeffects](#)

[Lecture 47 - Bioeffects and safety](#)

[Lecture 48 - Ultrasound elastography](#)

[Lecture 49 - Shear wave imaging](#)

[Lecture 50 - Recap of week 10](#)

[Lecture 51 - RIE and DRIE](#)

[Lecture 52 - Wet etching and Miller Indices - I](#)

[Lecture 53 - Wet etching and Miller Indices - II](#)

[Lecture 54 - Wet bench lab demonstration](#)

[Lecture 55 - PCB \(Printed Circuit Board\)](#)

[Lecture 56 - Ultrasonic Sensor](#)

[Lecture 57 - Material Characterisation : STM and AFM](#)

[Lecture 58 - Wire bonding lab demo](#)

[Lecture 59 - Piezoelectric polymers](#)

[Lecture 60 - Characterisation of materials - I](#)

[Lecture 61 - Characterisation of materials - II](#)

[Lecture 62 - Characterisation of materials - III](#)