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NPTEL : Fuels Refractory and Furnaces (Metallurgy and Material Science)

Co-ordinators : Prof. Satish Ch. Koria

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Lecture 3 - Characterization of Fuels: Concepts

Lecture 4 - Production of Secondary Fuels : Carbonization

Lecture 5 - Materials Balance in Coke-making

Lecture 6 - Heat Balance and Clean Development Mechanism

Lecture 7 - Production of Secondary Fuels: Gasification

Lecture 8 - Materials and Heat Balance in Gasification

Lecture 9 - Principles of combustion: Concepts and illustrations

Lecture 10 - Principles of combustion: Concepts and illustrations

Lecture 11 - Materials balance in combustion

Lecture 12 - Principles of Combustion: Flame Temperature

Lecture 13 - Flame Temperature Calculations

Lecture 14 - Refractory in Furnaces

Lecture 15 - Refractory in Furnaces

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NPTEL : Introduction to Biomaterials (Metallurgy and Material Science)

Co-ordinators : Dr. Kantesh Balani, Dr. Birkamjit Basu

Lecture 1 - Introduction to basic concepts of Biomaterials Science; Salient properties of important material classes; overview of body environment,

Lecture 2 - Manufacturing and properties of metals, ceramics, polymers and composites

Lecture 3 - Concept of biocompatibility, host response, structure-property of biological cell

Lecture 4 - Structure and properties of cells, protein and cellular adaptation process

Lecture 5 - Cell-I

Lecture 6 - Cell-II

Lecture 7 - Cell Migration and Cell Division and cell death

Lecture 8 - Cell Differentiation and Cell Death

Lecture 9 - Cell Apoptosis-I

Lecture 10 - Cell Apoptosis-II

Lecture 11 - Structure and properties of Protein; cell - material interaction

Lecture 12 - Assessment of biocompatibility of biomaterials

Lecture 13 - Biological testing (hemocompatibility, tribological testing)

Lecture 14 - Structure and properties of bone as well as in vivo testing and histocompatibility assessment

Lecture 15 - Important biometallic alloys

Lecture 16 - Ti Alloy

Lecture 17 - Co-Cr-Mo alloys

Lecture 18 - Bioceramics

Lecture 19 - Processing of Bioceramics

Lecture 20 - Ceramics, Bioceramics and Glasses

Lecture 21 - Sintering and mechanical properties of ceramics

Lecture 22 - Fracture and toughening of ceramic composites

Lecture 23 - Development of based bioceramic composites for hard tissue replacement

Lecture 24 - Alternative phosphate materials, based composites with bactericidal property and glass ceramics for dental restoration

Lecture 25 - Electrostatic Spraying of UHMWPE-HA-CNT composites

Lecture 26 - Thin Films and Coatings

Lecture 27 - Thermal Spray Coatings

Lecture 28 - Biocompatibility of plasma sprayed CNT reinforced Hydroxyapatite biocomposite coatings

Lecture 29 - Biocompatibility of Alumina and CNT reinforced Hydroxyapatite

Lecture 30 - Glass-ceramics for dental restoration applications

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[Lecture 36 - Tissue Engineering and wound healing](#)

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Lecture 3 - Exercises on Measurement of Quantities, Introduction to Stoichiometry

Lecture 4 - Stoichiometry Concept and Exercise

Lecture 5 - Exercise on Stoichiometry and Introduction to Thermochemistry

Lecture 6 - Thermochemistry

Lecture 7 - Exercise on Thermochemistry & Frequently Asked Questions

Lecture 8 - Errors in Measurements

Lecture 9 - Basics of Materials & Energy Balance

Lecture 10 - Introduction to Mineral Beneficiation

Lecture 11 - Materials Balance in Mineral Processing and Faq

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Lecture 13 - Calcination Concepts & Exercises

Lecture 14 - Pyromet ExtractionUnit Processes

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Lecture 16 - Material Balance in Roasting;illustration

Lecture 17 - Heat Balance in Roasting illustration

Lecture 18 - Exersises on Roasting

Lecture 19 - Exercises on Roasting

Lecture 20 - Smelting Matte Smelting

Lecture 21 - Exercise-I Matte Smelting

Lecture 22 - Exercise-II Matte Smelting

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Lecture 24 - Lead Smelting Material Balance

Lecture 25 - Imperial Smelting Process

Lecture 26 - Introduction to Ironmaking

Lecture 27 - Coke Making

Lecture 28 - Ironmaking Fundamentals

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Lecture 30 - Material & Heat Balance in Ironmaking - II

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Lecture 7 - Free electron band diagrams in an empty lattice

Lecture 8 - Effect of periodic potential, Origin of band-gap through Kronig-Penny model

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NPTEL : Steel Making (Metallurgy and Material Science)

Co-ordinators : Prof. Satish Ch. Koria, Prof. Dipak Mazumdar

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NPTEL : Structure of Materials (Metallurgy and Material Science)

Co-ordinators : Dr. Anandh Subramaniam

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Co-ordinators : Prof. Bikramjit Basu

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