| Academic Lesson Plan for ENGINEERING MATERIAL(Winter-2023) | | |
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| **Discipline: Mechanical Engineering** | **Semester: 3rd** | **Name of Faculty: Abhoy Mohanta** |
| **Subject: ENGINEERING MATERIAL** | **No. of days/per week Class Allotted: 4** | **Semester from: 01/08/2023 - 30/11/2023** |
| | | **No. of weeks:15** |
| **Week** | **Class Day** | **Theory Topics** |
| 1st | 1st | 1.1 Material classification into ferrous and non ferrous category and alloys |
| | 2nd | 1.1 Material classification into ferrous and non ferrous category and alloys |
| | 3rd | 1.2 Properties of Materials: Physical , Chemical and Mechanical |
| | 4th | 1.3 Performance requirements |
| 2nd | 1st | 1.4 Material reliability and safety |
| | 2nd | 2.1 Characteristics and application of ferrous materials |
| | 3rd | 2.2 Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel |
| | 4th | 2.3 Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel |
| 3rd | 1st | 2.4 Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo, |
| | 2nd | 2.4 Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo, |
| | 3rd | 3.1 Concept of phase diagram and cooling curves |
| | 4th | 3.1 Concept of phase diagram and cooling curves |
| 4th | 1st | 3.1 Concept of phase diagram and cooling curves |
| | 2nd | 3.1 Concept of phase diagram and cooling curves |

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| 4th | 3rd | 3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel |
| | 4th | 3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel |
| 5th | 1st | 3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel |
| | 2nd | 3.2 Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel |
| | 3rd | 4.1 Crystal defines, classification of crystals, ideal crystal and crystal imperfections |
| | 4th | 4.1 Crystal defines, classification of crystals, ideal crystal and crystal imperfections |
| 6th | 1st | 4.2 Classification of imperfection: Point defects, line defects, surface defects and volume defects |
| | 2nd | 4.2 Classification of imperfection: Point defects, line defects, surface defects and volume defects |
| | 3rd | 4.3 Types and causes of point defects: Vacancies, Interstitials and impurities |
| | 4th | 4.4 Types and causes of line defects: Edge dislocation and screw dislocation |
| 7th | 1st | 4.5 Effect of imperfection on material properties |
| | 2nd | 4.6 Deformation by slip and twinning |
| | 3rd | 4.7 Effect of deformation on material properties |
| | 4th | 4.7 Effect of deformation on material properties |
| 8th | 1st | 5.1 Purpose of Heat treatment |
| | 2nd | 5.1 Purpose of Heat treatment |
| | 3rd | 5.2 Process of heat treatment: Annealing, normalizing, hardening, tampering, stress relieving measures |
| | 4th | 5.2 Process of heat treatment: Annealing, normalizing, hardening, tampering, stress relieving measures |

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| 9th | 1st | 5.3 Surface hardening: Carburizing and Nitriding |
| | 2nd | 5.3 Surface hardening: Carburizing and Nitriding |
| | 3rd | 5.4 Effect of heat treatment on properties of steel |
| | 4th | 5.4 Effect of heat treatment on properties of steel |
| 10th | 1st | 5.5 Hardenability of steel |
| | 2nd | 5.5 Hardenability of steel |
| | 3rd | 6.1 Aluminum alloys: Composition, property and usage of Duralmin, y- alloy. |
| | 4th | 6.1 Aluminum alloys: Composition, property and usage of Duralmin, y- alloy. |
| 11th | 1st | 6.2 Copper alloys: Composition, property and usage of Copper Aluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel |
| | 2nd | 6.2 Copper alloys: Composition, property and usage of Copper Aluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel |
| | 3rd | 6.2 Copper alloys: Composition, property and usage of Copper Aluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel |
| | 4th | 6.2 Copper alloys: Composition, property and usage of Copper Aluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel |
| 12th | 1st | 6.3 Predominating elements of lead alloys, Zinc alloys and Nickel alloys |
| | 2nd | 6.3 Predominating elements of lead alloys, Zinc alloys and Nickel alloys |
| | 3rd | 6.4 Low alloy materials like P-91, P-22 for power plants and other |
| | 4th | high temperature services. High alloy materials like stainless<br>steel grades of duplex, super duplex materials etc. |

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| 13th | 1st | 7.1 Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials |
| | 2nd | 7.1 Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials |
| | 3rd | 7.1 Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials |
| | 4th | 8.1 Classification, composition, properties and uses of Iron base and Copper base spring material |
| 14th | 1st | 8.1 Classification, composition, properties and uses of Iron base and Copper base spring material |
| | 2nd | 8.1 Classification, composition, properties and uses of Iron base and Copper base spring material |
| | 3rd | 9.1 Properties and application of thermosetting and thermoplastic polymers |
| | 4th | 9.1 Properties and application of thermosetting and thermoplastic polymers |
| 15th | 1st | 9.2 Properties of elastomers |
| | 2nd | 10.1 Classification, composition, properties and uses of particulate |
| | 3rd | fiber reinforced composites |
| | 4th | 10.2 Classification and uses of ceramics |

| Academic Lesson Plan for Environmental Science (Winter-2023) | | |
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| **Discipline: Mechanical Engineering** | **Semester: 3rd** | **Name of Faculty: Abhoy Mohanta** |
| **Subject: Environmental Science** | **No. of days/per week Class Allotted: 4** | **Semester from: 01/08/2023 - 30/11/2023** |
| | | **No. of weeks:15** |
| **Week** | **Class Day** | **Theory Topics** |
| 1st | 1st | Unit 1: The Multidisciplinary nature of environmental studies |
| | 2nd | Definition, scope and importance, Need for public awareness |
| | 3rd | Definition, scope and importance, Need for public awareness |
| | 4th | Definition, scope and importance, Need for public awareness |
| 2nd | 1st | Unit 2: Natural Resources Renewable and non renewable resources: a) Natural resources and associated problems. |
| | 2nd | □ Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction mining, dams and their effects on forests and tribal people. |
| | 3rd | Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dam's benefits and problems |
| | 4th | Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources |
| 3rd | 1st | Food Resources: World food problems ,changes caused by agriculture and overgrazing,effectsofmodernagriculture,fertilizersp esticidesproblems, water logging, salinity,. |
| | 2nd | Energy Resources: Growing energy need, renewable and nonrenewable energy sources, use |
| | 3rd | Land Resources: Land as a resource ,land degradation ,man induces landslides, soil erosion, |

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| | 4th | Role of individual in conservation of natural resources. |
| 4th | 1st | Role of individual in conservation of natural resources. |
| | 2nd | Equitable use of resources for sustainable lifestyles. |
| | 3rd | Unit 3: Systems Concept of an ecosystem. |
| | 4th | Structure and function of an ecosystem. |
| 5th | 1st | Producers, consumers, decomposers |
| | 2nd | Energy flow in the ecosystems. Ecological succession. |
| | 3rd | Food chains, food web sand ecological pyramids. |
| | 4th | Introduction, types, characteristic features, structure and function of the following ecosystem: |
| 6th | 1st | Forest ecosystem: |
| | 2nd | Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). |
| | 3rd | Unit 4: Biodiversity and it's Conservation |
| | 4th | Introduction-Definition: genetics, species and ecosystem diversity |
| 7th | 1st | Biogeographically classification of India. |
| | 2nd | Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and opt in values. |
| | 3rd | Biodiversity at global, national and local level. |
| | 4th | Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts. |

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| 8th | 1st | Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts. |
| | 2nd | Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts. |
| | 3rd | Unit 5: Environmental Pollution. Definition Causes, effects and control measures of: |
| | 4th | Air pollution. |
| 9th | 1st | Air pollution. |
| | 2nd | Water pollution. |
| | 3rd | Water pollution. |
| | 4th | Soil pollution |
| 10th | 1st | Marine pollution |
| | 2nd | Noise pollution. |
| | 3rd | Thermal pollution |
| | 4th | Nuclear hazards. |
| 11th | 1st | Solid waste Management: Causes, effects and control measures of urban and industrial wastes. |
| | 2nd | Role of an individual in prevention of pollution Disaster management: Floods, earth quake, cyclone and landslides. |
| | 3rd | Unit 6: Social issues and the Environment |

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| | 4th | From unsustainable to sustainable development. Urban problems related to energy. |
| 12th | 1st | Water conservation, rain water harvesting, water shed management. |
| | 2nd | Resettlement and rehabilitation of people; its problems and concern. |
| | 3rd | Environmental ethics: issue and possible solutions. |
| | 4th | Climate change, global warming, acid rain, ozone layer |
| 13th | 1st | depletion, nuclear accidents and holocaust, case studies Air (prevention and control of pollution) Act. |
| | 2nd | Water (prevention and control of pollution) Act. |
| | 3rd | Public awareness. |
| | 4th | Public awareness. |
| 14th | 1st | Unit 7: Human population and the environment Population growth and variation among nations. |
| | 2nd | Population explosion-family welfare program. |
| | 3rd | Population explosion-family welfare program. |
| | 4th | Environment and human health. |
| 15th | 1st | Human rights. |
| | 2nd | Value education |
| | 3rd | Role of information technology in environment and human health |
| | 4th | Role of information technology in environment and human health |


Abhay Mohanta