**19EE31E4-UTILIZATION OF ELECTRIC POWER**

**(EEE)**

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| **Course Category:** | Professional core | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture-Tutorial-Practical:** | 3-0-0 |
| **Pre-requisite:** | Electrical engineering, Kinematics | **Sessional Evaluation:**  **Univ.Exam Evaluation:**  **Total Marks:** | 40  60  100 |

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| **Course Objectives:** | Students undergoing this course are expected to learn : | |
| 1.The basic concepts of illumination and design of different lighting schemes.  2.The concepts of different electric heating techniques.  3.The concepts of different electric welding techniques.  4.About the electrical drives, different motor characteristics and load classification.  5.About different traction systems and electrical breaking concepts.  6.The speed-time curves of different train services and calculation of tractive effort. | |
| **Course Outcomes:** | After completing the course the student will be able to | |
| **CO1** | Understand the basic concepts of illumination and design of different lighting schemes. |
| **CO2** | Distinguish the concepts of different electric heating techniques. |
| **CO3** | Explain the concepts of different electric welding techniques. |
| **CO4** | Enumerate the concepts of electrical drives, different motor characteristics and load classification. |
| **CO5** | Demonstrate different traction systems and electrical braking concepts. |
| **CO6** | Analyse speed-time curves of different train services and calculation of tractive effort. |
| **Course Content:** | **UNIT – I**  **Illumination:**Introduction, terms used in Illumination-laws of Illumination- discharge lamps-MV and SV lamps- relative comparison between above methods- basic principles of light control- types and design of lighting schemes- flood lighting-efficient lighting systems- aviation and transport lighting-lighting for displays and signaling-neon signs- LED-LCD displays beacons and lighting for surveillance.  **UNIT-II**  **Electric heating:** Advantages and methods of electric heating- types and applications of electric heating equipment- resistance ovens-induction heating-dielectric heating-arc furnace  **UNIT –III**  **Electric welding:** Advantages of electric welding- choice of welding time- electric welding equipment- resistance welding and arc welding techniques-comparison of A.C and D.C welding.  **UNIT –IV**  **Electric drives:** Types of Electric drives, choice of motor- starting and running characteristics - speed control- particular applications of electric drives- types of industrial loads-continuous-intermittent and variable loads- load equalization.  **UNIT –V**  **Electric traction:** Systems of electric traction and track electrification. review of existing electric traction systems in India-special features of traction motors- methods of electric braking- plugging- Rheostatic braking and regenerative braking.  **UNIT –VI**  **Mechanism of train movement**: Speed-time curves for different services- trapezoidal and quadrilateral speed time curves- calculations of tractive effort- power- specific energy consumption for a given run- effect of varying acceleration and braking retardation- adhesive weight and coefficient of adhesion. | |
| **Text books**  **&**  **Reference books:** | **Text books:**  1. “Utilization of electric energy”, by E.Openshaw Taylor, Orient  Longman.  2. “Utilization of electrical power including Electric drives and Electric  traction”, by N.V.Suryanarayana, New Age International (P) Limited,  Publishers, 1996.  **Reference books:**   1. “Art & science of utilization of electrical energy”, by H.Partab, DhanpatRai&Sons.   2. “Generation distribution and utilization of Electrical energy”, by  C.L.Wadhwa, New Age International (P) Limited, Publishers, 1997.  3. “A course in power systems”, by J.B.Gupta, Kataria& sons, 11th  Edition. | |
| **e-Resources:** | <http://nptel.ac.in/courses>  <http://iete-elan.ac.in>  http://freevideolectures.com/university/iitm | |