

UTILIZATION OF ELECTRICAL ENERGY

((Professional Elective-IV))

Pre Requisite: Electrical Machines

Course Objectives:

1. To understand applications of Electrical energy for Heating and Welding..
2. To study various types of Electric drives and their characteristics.
3. To understand fundamentals of Illumination.
4. To understand various Traction systems and different services.

Unit-I: (~10 Lecture Hours)

Electric Heating & Welding: Electric Heating: Advantages and methods of electric heating, resistance heating, induction heating and dielectric heating.

Electric Welding: Resistance and arc welding, electric welding equipment, comparison between A.C and D.C welding.

Unit-II: (~10 Lecture Hours)

Illumination: Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light. Discharge lamps, MV and SV lamps - comparison between tungsten filament lamps and fluorescent tubes, Basic principles of light control, Types and design of lighting and flood lighting.

Unit-III: (~10 Lecture Hours)

Electric Traction-I: System of electric traction and track electrification, Review of existing electric traction system in India. Special features of traction motor, methods of electric braking-plugging rheostatic braking and regenerative braking. Mechanics of train movement, Speed-time curves for different services- trapezoidal and quadrilateral speed time curves.

Unit -IV : (~7 Lecture Hours)

Electric Traction-II: Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and braking retardation adhesive weight and coefficient of adhesion.

Unit -V: (~8 Lecture Hours)

Train Lighting :

Systems of train lighting, Special requirements of train lighting, Single Battery system, Double Battery parallel block systems, Modified Train Lighting System, Silicon Blocker Rectifier, End on generation.

- 1) N. Mallekallu
- 2) N. Subrahmanya
- 3) G. S. S.
- 4) S. S. S.
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- 7) M. Reddy
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- 14) R. S. S.
- 15) M. S. S.
- 16) R. S. S.

Text Books :

1. H. Partab , "Art & science of Utilization of electrical energy", Dhanpat Rai & Sons - 2017
2. H. Partab, "Modern Electric Traction", Dhanpat Rai and Sons-2018
3. G. C. Garg, "Utilization of Electric power and Electric Traction", Khanna Publishers - 3rd Edition - 1990.

Reference Books:

1. R. K. Rajput, "Utilization of Electrical Power", Laxmi publications, 2nd Edition - 2014.
2. C. L. Wadhwa, "Generation, Distribution and Utilization of electrical energy", New Age International (P) Limited- 3rd Edition-2010.
3. N.V. Suryanarayana, "Utilization of electrical Power including Electric drives and Electric traction", New Age International (P) Limited- 2nd Edition- 2014.

Course Outcomes:

Subsequent to completion of the course, the student should be able to:

1. Acquire knowledge about characteristics of various Electric Drives.
2. Categorize and analyze different aspects & methods of Utilization of electrical energy from both and industrial point of view.
3. Identify the type of device/scheme Utilization of Electrical energy for any given application.
4. Design some of the electrical energy Utilization systems namely Heating equipment, Lighting schemes etc.
5. Apply the concepts of Utilization of Electrical energy to determining the ratings, specifications for different types of services namely traction, heating, illumination etc. through appropriate calculations.
6. Choose a suitable method for Heating, Welding, Traction and Illumination.

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| 1) N. Mallekallu | 7) M. Mady | 13) B. Reddy |
| 2) D. Jayabhatt | 8) K. K. S. | 14) D. M. S. |
| 3) E. M. | 9) M. M. | 15) M. B. S. |
| 4) S. S. S. | 10) G. P. S. | 16) R. B. S. |
| 5) | 11) R. S. | |
| 6) B. S. | 12) G. S. | |