

STUDY UNIT DESCRIPTION

Faculty of Electrical Engineering

CODE EPC2101

TITLE Fundamentals of electric drives

LEVEL 02 - Years 2, 3 in Modular Undergraduate Course

ECTS CREDITS 5

DEPARTMENT Electric Drives

DESCRIPTION Fundamentals of electric motors dimensioning. Speed-torque characteristics of motors and machinery. Regulation performances, dynamic characteristics and energy performances of DC motors with separate and series excitation.

Induction motor as a control plant. Speed-torque characteristic, calculation of necessary resistances and other operating parameters according to the technology demands.

Transients in electromechanical systems. Analysis of static and dynamic loads. Motors' sizing. Calculations of motor's heating and cooling. Duty cycle and typical operational modes.

Speed and torque regulation in DC and AC drive systems. Leonardo (motor-generator) set. Systems with thyristor rectifiers. Variable frequency AC drive. Voltage-to-frequency profiles for various industrial applications.

Study-unit Aims:

The unit provides students with approaches for estimation of electric drive's operational points, selection of proper electric drive system and dimensioning of its components. Basics of electric drives' regulation are also given.

Learning Outcomes:

1. Knowledge & Understanding:

By the end of the study-unit the student will be able to:

- calculate reduced values of speed and torque in electromechanical system;
- build speed-torque characteristics of machinery and electric motor and estimate the operating point of the system;
- assess starting torque and currents, estimate equivalent load of the driveline;
- select and size electric motor and proper converter for the given load profile;
- analyze transient processes in electromechanical systems.

2. Skills:

By the end of the study-unit the student will be able to:

- design electromechanical systems;
- perform primary commissioning of DC and AC electric drives;
- analyze processes in electromechanical systems, detect faults and improve converter's adjustments.

Main Text/s and any supplementary readings:

- Drives engineering handbook. Rockwell automation publishing.
- Electrical drives and controls. Published by the University of Tirunveli.

ADDITIONAL NOTES

Pre-requisite Study-units: EPC1201, EPC1202

STUDY-UNIT TYPE

Lecture and Tutorial

METHOD OF ASSESSMENT

Assessment Component/s	Resit Availability	Weighting
Practical	No	10%