EI0610 Electrical Actuators — Bachelor

Electromagnetism | Dynamic systems | Control theory | Signal processing | Numeric simulation
Transportation | Industrial electronics | Power systems | Robotics
Motor drives | Power conversion | Wind generation | Motion control

Focus: General introduction to electric machines, components and control of DC drives, and use of gearboxes in electric drives

EI0628 Power Electronics - Basics and Applications — Bachelor

Electric circuits | Electromagnetism | Semiconductors | Heat transfer | Numeric simulation
Consumer electronics | Industrial electronics | Transportation | Power systems
Power supplies | Electrolysis (H_2) | Motor drives | HVDC systems

Focus: General introduction to power semiconductors, power converters, modulation and applications

EI7324 Control of Electrical Drives Part I — Master

Electromagnetism | Dynamic systems | Control theory | Signal processing | Numeric simulation
Transportation | Industrial electronics | Power systems | Robotics
Motor drives | Power conversion | Wind generation | Motion control

Focus: Modeling of induction machines for controlled drives, control methods for rotary field drives, sensor technology, and applications of controlled drives.

EI7390 Electronic Power Conversion — Master

Electric circuits | Electromagnetism | Semiconductors | Control theory | Numeric simulation
Consumer electronics | Industrial electronics | Transportation | Power systems
Power supplies | Motor drives | Battery chargers | Renewables | Energy storage

Focus: Power semiconductors, control oriented modeling, three-phase power converters, power factor correction, and soft-switched DC-DC converters.

EI8031 Power Electronics for Distributed Energy Systems — Master

Electric circuits | Dynamic systems | Power theories | Control theory | Numeric simulation
Integration of renewables | Transportation | Power systems
Wind power | Energy storage | Photovoltaics | EV chargers | HVDC systems

Focus: Grid-connected power converters, instantaneous power theories, synchronization, dynamic modeling, stability criteria, and control of inverters.

ED180031 Control of Electrical Drives Part II — Master

Electromagnetism | Dynamic systems | Control theory | Signal processing | Numeric simulation
Transportation | Industrial electronics | Power systems | Robotics
Motor drives | Power conversion | Wind generation | Motion control

Focus: Continuous and discrete models of electric machines, advanced control strategies and controller design for FOC, MTPA, DTC and MPC, sensorless control.

ED180028 Design of Power Converters for Photovoltaic and ESSs — Master

Electric circuits | Electromagnetism | Semiconductors | Heat transfer | Numeric simulation
Integration of renewables | Residential applications | Power systems
Photovoltaics | DC-DC converters | Battery interfaces | Renewables | Energy storage

Focus: PV generation, and storage, PV inverters, bidirectional DC-DC converters (DAB), design of magnetic components, EMC filter design, and capacitors.

ED180018 High-Power Converters — Master

Electric circuits | Electromagnetism | Semiconductors | Modulation theory | Numeric simulation
Renewable energy | Industrial electronics | Transportation | Power systems
Wind power | Energy storage | Medium voltage | EV fast chargers | HVDC systems

Focus: High-power semiconductors, multilevel converters (NPC, FC, CHB, MMC), space vector and carrier-based modulations, internal voltage controls.

EI7495 Power Electronics and Drives for Electric Vehicles — Master

Electromagnetism | Control theory | Electric circuits | Power conversion | Numeric simulation
Transportation | Vehicles | Power systems | EV energy storage
EV motor drives | Power conversion | EV chargers | DC-DC converters

Focus: Power converters in electric vehicles, electric powertrains, motor drives, battery cells balancing, EV chargers (PFC + DC-DC), low-voltage battery interfaces.

Project: Advanced Pow. Electron. Systems - Design of a DC-DC — Master

Electric circuits | Electromagnetism | Semiconductors | Heat transfer | Numeric simulation
Power supplies | Chargers | Consumer electronics
Photovoltaics | DC-DC converters | Battery interfaces | Renewables | Energy storage

Focus: Development of DC-DC converters including EMC filter, semiconductors, gate drivers, transformer, inductor, auxiliary circuits, PCB, construction and testing.

Practical courses:

EI80006	Practical Course Power Electronics DC/DC Converter	Master
EI7368	Laboratory on Simulation of Controlled Electrical Drives	Master
EI7406	Laboratory on Electrical Drive Control	Master
EI78019	Motor Control with Real-Time Microcontrollers	Master
EI0658	Practical Course on Power Engineering	Bachelor
EI80003	Lab. on Simulation of Controlled Electrical Drives	Master