

Çankaya University
Faculty of Engineering
Department of Electrical Electronic Engineering

Code and Name of the Course: EE521 **Switching Power Supplies**
Objective: Learning SMPS structure and common topologies used in these systems. Learning the design of power stages, magnetic components and controllers of SMPS. Gaining experience in SMPS design.
Prof. Dr. İres İSKENDER e-mail: ires@cankaya.edu.tr
2023-24 Fall Semester

Contents:

- 1 Introduction: Power Semiconductor Devices**
Operation characteristics of power diodes, Thyristors, Power Transistors, Power MOSFETs, IGBTs, and SiC devices.
- 2 General Structure of SMPS**
Block diagram. Linear supplies vs SMPS. Basic definitions.
- 3 Converter Topologies**
Non-isolated and isolated DC-DC converter topologies. Operation principles and basic design equations.
- 4 Magnetic Components**
Basic design equations of inductors and transformers
- 5 Controllers**
Closed loop controller design. Voltage and current mode controllers.
- 6 Practical Aspects**
Electromagnetic Interference, Filters, Protection circuits, PFC circuits. Interleaved Boost/Buck converters
- 7 Project**
Design and Simulation of a practical SMPS circuit.

Books:

1. **Muhammad H. Rashid.:** *Power Electronics: Devices, Circuit and Applications* Pearson Education Limited, 4th Edition 2014
2. **Pressman, Abraham I.;** *Switching power supply design*, New York, McGraw-Hill, 2009.
3. **Maniktala, S.,** *Switching power supply design & optimization*, New York, McGraw-Hill, 2005.
4. **Hurley, W.G., Wölfle, W.H.,** *Transformers and Inductors for Power Electronics*, Wiley, 2013.

Grade Calculation:

M1	30%	15/11/23
M2	30%	27/12/23
Final	40%	

Grade Calculation:

Final Grade = 0.3*MT1 + 0.3*MT2 + 0.4*Final Exam