| 2019/2020 | Electrical Engineering, Mathematics and Computer Science | Master Electrical Engineering |
|---|---|---|
| ET4145 | Power Electronic Components | ECTS: 4 |

**Responsible Instructor**

| Name | E-mail |
|---|---|
| Dr. T. Batista Soeiro | T.BatistaSoeiro@tudelft.nl |

**Instructor**

| Name | E-mail |
|---|---|
| Dr.ing. B. Roodenburg | B.Roodenburg@tudelft.nl |

**Contact Hours / Week x/x/x/x**
0/0/2/0 + 0/0/0/4 lab

**Education Period**
3
4

**Start Education**
3

**Exam Period**
3

**Course Language**
English

**Expected prior knowledge**
Following this course is only possible with course ET4119 in advance

**Course Contents**
Understanding of Power electronic components: diodes, BJT's, MOSFET's, thyristors, IGBT's. Base and gate drive circuits. High frequency inductors and transformers. Thermal analysis and heatsinks. Conducted electromagnetic interference.

**Study Goals**
THEORY: Understanding the theoretical and practical operation of components based on the physical structure, the V-I characteristics, time and thermal behavior.
PRACTICAL: Design and construction of your own inductor, which will be used in a 50-150-300VDC Boost Converter. The ability to perform (differential) voltage-, current and temperature measurements on these components and explain these measurements at the hand of theory.

**Education Method**
Lectures Q3 (all students) : 14 hours (7x 2 hours)
Practical Q3 (max. 24 students, groups A & B): 12 hours (3x 4 hours) + 4 hours catch-up
Duo presentations (Q3, groups A & B) : 4 hours
Practical Q4 (max. 24 students, groups C & D): 12 hours (3x 4 hours) + 4 hours catch-up
Duo presentations (Q4, groups C & D) : 4 hours

**Literature and Study Materials**
TEXT BOOK: Mohan, Undeland and Robbins, Power Electronics, Converters, Applications and Design, ISBN:978-0-471-22693-2, 824 pages, 3rd edition, John Wiley & Sons, 2003.
ADDITIONAL READING: Provided via Brightspace
DATA SHEETS: Provided via Brightspace and hard-copy in the lab.
HARDWARE: Provided in the lab sessions.

**Assessment**
EXAM true-or-false questionnaire and an oral is optional to students (40%)
DESIGN REPORT of your inductors
DUO PRESENTATION on design- and practical results (20%)
FINAL REPORT on practical (40%)

**Tags**
Challenging
Circuits
Design
Elektricity & Magnetism
Energy
Group work
Lab Research
Practicals
Semiconductors
Small groups
Specific

**maximum aantal deelnemers**
Theory Q3: 48 students
Practical Q3: 24 students, 2 groups of 12, A & B consisting of 6 sub-groups of 2
Practical Q4: 24 students, 2 groups of 12, C & D consisting of 6 sub-groups of 2