**COURSE SYLLABUS**

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| **Subject: Power electronics** | **Academic field: Renewable energy** |
| **Lecturer: TungLam Nguyen** |  |
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| **Academicyear:** |  |

**COURSE DESCRIPTION**

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| **Credit points** |  | |
| **Level** | Undergraduate | |
| **Teaching time**  **Location** | University of Science and Technology of Hanoi | |
| **Time Commitment** | Lecture | 30hrs |
| Exercises | 0hrs |
| Practicals | 10hrs |
| Total | 40hrs |
| **Prerequisites** |  | |
| **Recommended background knowledge** | Electrical engineering | |
| **Subject description:** | The course places the foundation of power electronics and switched mode power converters. V-A characteristics of common power electronic devices are explored in depth. Various AC-DC and DC-DC converter topologies and their control circuitries are provided. In addition, the course also introduces about designing and selecting key components in specific power electronic applications. | |
| **Objectives & Out-come** | *Students who successfully complete this course will have a basic knowledge about power electronic systems. The students will be able to perform designing-analysing tasks on power electronics related problem at a certain degree of complexity.* | |
| **Assessment/ Evaluation** | Attendance/Attitude | 5% |
| Exercise(s) | 10% |
| Practical | 0% |
| Mid-term test | 25% |
| Final exam | 60% |
| **Prescribed Textbook(s)** | Timothy L. Skvarenina, *The power electronics handbook.* CRC Press, 2002. | |

**COURSE CONTENTS & SCHEDULE**

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| **Class** | **Contents** | **Hours** | | | **Ref./Resources** | **Assignment(s)** |
| **Lect.** | **Exr.** | **Prc.** |
| 1 | General introduction about power electronics and applications.  V-A characteristics and general requirements of power semiconductor switches | 3 |  |  |  |  |
| 2 | Drive and protection circuit design | 3 |  |  |  |  |
| 3 | Uncontrolled rectifiers | 4 |  |  |  |  |
| 4 | Controlled rectifiers | 4 |  |  |  |  |
| 5 | Operating principles of buck, boost converters. | 3 |  |  |  |  |
| 6 | Operating principles of buck-boost converters | 2 |  |  |  |  |
| 7 | Operating principles of Cúk converters. | 3 |  |  |  |  |
| 8 | Modelling and controlling DC-DC converters | 4 |  |  |  |  |
| 9 | Selecting power electronic components | 4 |  |  |  |  |

*Notes:*

* *Abbreviation: Lect. (lecture), Exr. (Exercise), Prc. (Practise).*
* *Exercises may include assignment, reports, student’s presentation, homework, class exercises ...for each class sessions*
* *Practicals mostly refer to Lab- work or outside practice such as field trip.*

**Reference Literature:**

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| [1].Bimal K. Bose, *Power Electronics and Variable Frequency Drives*. IEEE Press, 1997. |
| [2].Muhammad H. Rashid, *Power Electronics Handbook.* Elsevier, 2007 |
| [3]. |
| [4]. |