

SEKOLAH KEJURUTERAAN ELEKTRIK	
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UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SKEE 3742

SEKOLAH KEJURUTERAAN ELEKTRIK
FAKULTI KEJURUTERAAN

UNIVERSITI TEKNOLOGI MALAYSIA

POWER ELECTRONICS LABORATORY
PROBLEM PACK

Thyristor Control DC Drive

<p>Disediakan oleh:</p> <p>PM. Dr. Nik Rumzi Nik Idris PM. Dr. Naziha Ahmad Azli PM. Dr. Awang Jusoh PM. Dr. Junaidi Abdul Aziz PM. Dr. Shahrin Md. Ayob PM. Ir. Dr. Tan Chee Wei Dr. Mohd. Rodhi Sahid Dr. Norjulia Mohammad Nordin En. Nik Din Muhammad En. Mohd Zaki Daud</p> <p>Tarikh : 18 Julai 2019</p>	<p>Disahkan oleh:</p> <p>Pengarah Program Dr. Jasrul Jamani Jamian</p> <p>Tandatangan Cop</p> <p>DR. JASRUL JAMANI BIN JAMIAN Senior Lecturer Electrical Power Eng. Dept. (POWER) Faculty of Electrical Engineering Universiti Teknologi Malaysia 81310 UTM Johor Bahru Johor Darul Takzim</p> <p>Tarikh : 18 Julai 2019</p>
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Project Introduction:

Power electronic converters are used to convert and control electrical energy. They consist of power semiconductor devices operated as *switches* and passive elements such as inductors and/or capacitors. Ideally, there will be no losses in power electronic converters since there are no losses in ideal switches, inductors or capacitors. There are few types of power electronic converters and their applications in DC drive systems. Generally the selection of the converter depending on the type of applications, such as power rating, transient requirement, mode of operation etc.

Project tasks:

In this laboratory assignment, students are required to carry out a brief literature review, design and construct the energy conversion circuit (power modulator) so that a variable DC output voltage can be generated. The designed power modulator must be able to drive a DC motor with variable speed. To do the job, the **thyristors (SCR)** can be used to construct the power modulator. A technical report supported with the set of the data and experimental results is expected to be produced at the end of project time. The collected data, data analysis and plots of waveforms should be well presented in the report.

Few questions need to be answered to smooth the project flow:

- Why do we need to convert electrical energy?
- What are the available circuit topologies to drive DC motor?
- What is the DC drive?
- What are the methods to control the speed of a DC motor?
- What is the relationship between firing angle and generated output voltage?
- How the variable speed controls are carried out?
- What is the mode of operation of the DC motor?