

Fakulti:	<b>FAKULTI KEJURUTERAAN ELEKTRIK</b>		
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## SKEE 3742

**SEKOLAH KEJURUTERAAN ELEKTRIK  
FAKULTI KEJURUTERAAN  
UNIVERSITI TEKNOLOGI MALAYSIA**

### POWER ELECTRONICS LABORATORY PROBLEM PACK

#### Power Quality Study of Thyristor Controlled Rectifier

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## **Project Introduction:**

In general, power electronics converter yields several advantages when applied into electrical consumer products i.e. lightweight, compact and highly efficient. This is achievable by operating the power semiconductors i.e. thyristor and transistor in either ON or OFF states. However, the switching and type of load contribute to power quality issue. Its create low order harmonics and produce low power factor at the input side of the power supply. Harmonics can be considered as disturbance for electrical power system hence undesirable. The harmonics content in the voltage and current is calculated based on total harmonics distortion (THD). Higher harmonics content will result in lower power factor, higher root mean square (rms) value and higher power losses.

The objectives of this project are to investigate:

- a) The THD of the input ac voltage and current for different rectifier parameters
- b) The power factor and efficiency of the rectifier for different rectifier parameters

## **Project tasks:**

In this project assignment, students are required to carry out a brief literature review and to perform simulation (Matlab/simulink software) in order to generate a variable DC output voltage from an AC source. The simulation results need to be verified using experimental modules. The converter should follow these specifications:

<b>No.</b>	<b>Parameter</b>	<b>Value</b>
1.	Input voltage	45 V <sub>rms</sub> , 50 Hz
2.	R – L	33 Ω, 100 mH
3.	Firing angle	$\alpha = 0^\circ, 30^\circ, \text{boundary and } 90^\circ$

To do the job, a full bridge thyristor controlled rectifier circuit will be used. An industrial report supported with the simulation and experimental results are expected to be produced at the end of project time. The collected data, analysis and plots of waveforms should be well presented in the report.