SEKOLAH KEJURUTERAAN ELEKTRIK	
Nama Matapelajaran: Makmal Tahun 3 (PBL) Kod Matapelajaran : SKEE 3742	Semakan : 3 Tarikh Keluaran : 2008 Pindaan Terakhir : 2019 No. Prosedur : **PK-UTM-FKE-(0)-10**

UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SKEE 3742

SEKOLAH KEJURUTERAAN ELEKTRIK

FAKULTI KEJURUTERAAN

UNIVERSITI TEKNOLOGI MALAYSIA

POWER ELECTRONICS LABORATORY
STUDENT PACK

DC Motor Speed Control with Chopper Drive

Disediakan oleh:	Disahkan oleh:
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. Zaki Daud	Pengarah Program Dr. Jasrul Jamani Jamian Tandatangan Cop : 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
Tarikh : 18 Julai 2019	Tarikh : 18 Julai 2019

1. Project Guide:

(a) **Keywords / Questions That Can Help You Tackle The Problem**

The following topics can give you some ideas on how to start the project:

Power electronic energy conversion
DC-DC converter topology
Insulated Gate Bipolar transistor (IGBT)
Duty cycle D , control
Variable DC output
DC motor ant its equivalent circuit
Motor constant parameters
DC motor speed control
Quadrant of Operation

(b) **Problem-solving Time-line**

	Activities	Week 1	Week 2	Week 3
1.	**Understanding/Brainstorming**	√		
2.	**Design/Simulation**		√	
3.	**Experiment and measurement**			√

(c) **Report Writing**

- Follow the formal laboratory/technical report writing, as specified in the general guide of Laboratory Coordinator.

(d) **Special Write-up**

Part of the students' assessment will include reporting of your activities each week in a log book. Students are also required to submit a specific write-up on a particular topic/activities/results each week

Each group is expected to submit the following write-ups (maximum 2 pages, font 10, 1.5 spacing)to your facilitator as follows:

- Write-up on laboratory progress
- Write-up on work to done for next week lab

Each write-up is to be submitted as teamwork on the **second week** of the laboratory. Please ensure that each team member is responsible enough to contribute in completing the work.

2. Equipments list:

(a) Digital oscilloscope Tektronik / Lecroy (manual is available at the laboratory)
(b) 20 V permanent magnet DC motor
(c) Differential probe
(d) Voltage probe
(e) Current Probe
(f) Multimeters (V and I)

3. Components list:

(a) **Leybold** Experimental Kit
  i) IBGT 1000V/10A (735 346K)

	ii) PWM Control Unit (735 341) iii) Reference variable generator (73402) iv) Capacitor 2x1000μF (735 095K) v) Isolation Amplifier 4-Channel (735261) vi) DC power supply (±15V, 0 V) (725843K) or GwInstek DC Power Supply vii) RMS meter (727 10) viii) Main/Supply Unit 415 (725 60K)
4.	**Softwares:**
	(a) Matlab/Simulink Student Version Release 14 (available in all PCs at the laboratory) (b) PSpice Student Version 9.1 (available in all PCs at the laboratory)
5.	**Additional resources:**
	(a) Materials related to the problem/project. Can be technical papers, short manual on how to use Matlab/Simulink etc.
6.	**References:**
	Typically books and/or journal/conference papers (a) Introduction to Power Electronics, Daniel W. Hart, Prentice Hall International Inc., 1997 (b) Power Electronics: Converters, Application and designs, Second Edition, Mohan, Underland and Robin, John Wiley and Sons, 1995. (c) Power Electronics: Circuits, Device and Application, Muhammad H. Rashid, Prentice Hall, 2003 (d) Principles of Electric Machines and Power Electronics. P.C. Sen, John Wiley & Sons, 1989