

HRDF Claimable*

***Subject to HRDF Approval**

HURRY!

Limited to 15 participants only!

**Participants will be provided with a pc for the hand-on FE modeling,
Applications will be treated on "First Come, First Served" basis.**

Workshop in **DESIGN AND MODELING OF ELECTRICAL MACHINES**

23-25 November 2010

**School of Electrical and Electronic Engineering,
USM Engineering Campus, 14300 Nibong Tebal,
Pulau Pinang.**

Jointly organised by:



UNIVERSITI SAINS MALAYSIA



(Wholly-owned by USM)

WHO SHOULD ATTEND?

**R&D managers, project managers, production managers, manufacturing managers,
R&D engineers, project engineers, production engineers, manufacturing engineers,
academic lecturers, post-graduate students or anyone who is interested in motor design.**

INTRODUCTION

This workshop is the second-time organized by School of Electrical and Electronic Engineering, Universiti Sains Malaysia. Its main objective is primarily to equip participants with knowledge and skills on how to model an electrical machine using finite element software. Workshop lectures will start with the introduction and brief theoretical background of Permanent Magnet Brushless Motors, Induction Motors, Brushed DC Motors and Switched Reluctance Motors. This is followed by hand-on practice for each participant to build motor models for Permanent Magnet Brushless Motors and Induction Motors in finite element software. Further finite element analyses and predictions of motor performance will be also computed.

OBJECTIVES

To equip participants with:

- Theoretical background of electrical machines.
- Analytical calculations of electrical machines.
- Hand-on skills on how to model motor by finite element method.

COURSE CONTENTS

- Introduction – motor topology, slot number, pole number and material properties.
- Analytical predictions – airgap flux density distribution, flux linkage, phase emf, line emf, self-inductance, mutual-inductance and cogging torque.
- Winding layouts – double & single layer, overlapping and non-overlapping windings.
- Calculation of motor dimensions – tooth width, stator yoke, tooth pole, rotor yoke.
- Finite element motor modeling – motor dimensions, create regions, mesh generation, assign material properties, boundary conditions, etc.
- Post-processing in static solver – magnetic field distribution and flux density contour across motor area, airgap flux density distributions (radial and tangential components), flux linkage and inductance calculation.
- Post-processing in rotating solver – phase emf waveform, line emf waveform, cogging torque, unbalanced magnetic pulls due to rotor eccentricity, electromagnetic torque and induced eddy currents in magnets.
- Scripting – optimization, automations and animations.
- Simulink Model of PM Brushless DC motor Drives – mathematical model, simulink blocks, hysteresis current controller, PID controller, etc.
- Conclusions

METHODOLOGY

- ↪ Interactive lectures.
- ↪ Theory and analytical calculations.
- ↪ Each participant will be provided with computer for hand-on motor modeling in finite element software.
- ↪ Case studies for motor design.

Program Schedules

Tuesday, 23 Nov 2010

0830–0900 Registration

0900-1700 Lectures

Wed & Thurs, 24-25 Oct 2010

0900-1700 Lectures

(Lunch, morning & afternoon coffee breaks are provided)

REGISTRATION FEE

RM 1,300.00 per participant

50% discount for post-graduate student.

10% group discount for minimum of 3 participants from a same organisation (**not applicable to postgraduate participants**)

To register, please fill in the registration slip and fax or send to:

Khairol Anuar Hazir Mohammed

USAINS HOLDING SDN BHD

Kompleks CUREKA, Universiti Sains Malaysia

11800 USM, Penang.

Tel: 04-653 4372 / 012-286 9048 Fax: 04-6572210

E-mail: khairol@usainsgroup.com /

khairol_usains@yahoo.com

PROGRAMME LEADER

DR. DAHAMAN ISHAK

Email: dahaman@eng.usm.my

The workshop facilitator is Dr. Dahaman Ishak, a senior lecturer from the School of Electrical and Electronic Engineering, Universiti Sains Malaysia. Dr. Dahaman obtained his B. Sc. degree in Electrical Engineering from Syracuse University, New York in 1990. Many years later, he continued postgraduate studies and obtained MSc. degree and PhD degree in Electrical Engineering from University of Newcastle Upon Tyne, UK in 2001 and Sheffield University, UK in 2005, respectively. His main research interests are high performance permanent magnet brushless machines, fault diagnosis and monitoring of induction motors, electrical drives and renewable energy. He has published more than forty papers in reputable journals and international conferences. He is also a registered professional engineer with BEM and IEM.



Registration Reply Slip
Workshop in Design and Modeling of Electrical Machines
 23-25 November 2010

Fax or send registration form to : **USAINS Holding Sdn. Bhd.**, Ground Floor, Kompleks CUREKA,
 Universiti Sains Malaysia, 11800 USM PENANG. Fax : 04-657 2210

Please register the following name/names: (Please use separate sheet, if required)

Item	Participants Name <i>(Please print clearly or attach business card)</i>	Position & Email
*1.		
2.		
3.		
4.		
5.		
Industry Sector:		
Company:		
Address:		
		Postcode:
*Primary Person:		*Mobile Phone:
*Telephone No.:	*Fax No.	*E-mail:

Mode of Payment

	Number	Bank	No. of Participants:	
I enclose <input type="checkbox"/> Crossed Cheque <input type="checkbox"/> Bank Draft <input type="checkbox"/> Money Order <input type="checkbox"/> LO/PO			Early Birds:	
			Group Discount:	
			Total Sum:	RM
	Payment must be made payable to 'USAINS Holding Sdn. Bhd.'.			

- Bank Transfer** [Please fax your Bank-in Slip (Print your name & details on the slip)].

Payee Name : **USAINS Holding Sdn. Bhd.**
 Details : **WORKSHOP IN DESIGN AND MODELING OF ELECTRICAL MACHINES**
 Name of Bank : **CIMB Bank Berhad (USM Branch), Universiti Sains Malaysia, 11800 USM Penang.**
 Account Number : **0709-0006708-05-7**

- A **Local Order (LO)** or **Purchase Order (PO)** must be presented before the event.

The Organizer reserves the right to refrain a registered participant from taking part in the event if no proof of payment can be presented. This only applies to registered participants who have NOT paid the registration fee PRIOR to the event date. CONFIRMATION OF PARTICIPATION IS BY PAYMENT OR PO / LO RECEIVES BY THE ORGANISER.

- Cancellation / Substitution**

A full refund less administration fee of RM50.00 will be given for cancellation received not later than 15 days before the course. No refund will be made after this period. However, substitute participants are welcomed at no extra charge provided written notice of at **least 5 days** before the event is given to the Organizer.

Note: If you require accommodations during the workshop, you may call Parit Inn at 05-7173160 or Hotel Damai at 05-7165222. Rate starts from RM65 per night. Only 2km from USM Engineering Campus. Other hotels such as Sunway Hotel Seberang Jaya, Penang and Bukit Merah Laketown Resorts, Perak are about 25km from USM Engineering Campus.