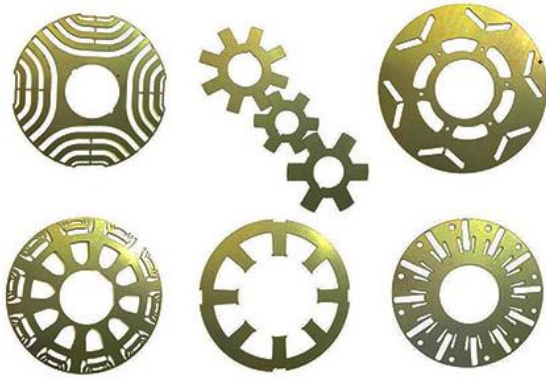
PSG COLLEGE OF TECHNOLOGY
COIMBATORE

National Level Workshop on

Rudiments of Traction Motor Design

15th June 2019



Organized by PSG College of Technology
In association with Siemens

SIEMENS
Ingenuity for life

Dept. of Electrical & Electronics Engineering
&
Dept. of Robotics & Automation Engineering

PSG College of Technology
Peelamedu, Coimbatore – 641 004
Tamilnadu.

ABOUT THE WORKSHOP

The idea of electrification is expanding in wide spectrum of application ranging from two wheelers, four wheelers, and tramway to electric aircraft for cleaner skies. Electric motor technology is the heart of all the engineering application enabling the industry to meet the market demand. Numerous motor designs including rotor topologies, cooling system, winding, mechanical and magnetic material continues to evolve in the recent decades as part of innovation.

Exclusively automotive application is gaining momentum focusing on research to reduce the cost, increase torque, power density with enhanced efficiency and reliability in electric motors. As the strategic critical rare earth permanent magnet, materials such as Neodymium Iron Boron are experiencing trade war, tariff in past few months other choices of machines using ferrites or magnet-less topologies are explored. This workshop will address the present scenario and illustrates the possible solution for the young design engineers.

OBJECTIVES

The Key objective of conducting the workshop on "**Rudiments of Traction Motor Design**" is to impart special skills to young engineers involved in electrification for wide range of applications. It emphasizes real world design problems to address the present scenario and illustrate possible solution to the fulfill gap on Industry-University collaborations. This workshop will supplement the fundamental concepts involved in traction motor for design engineers.

ELIGIBILITY

- Practicing engineers from motor industries
- Faculty working in engineering colleges
- Engineers from R&D organizations
- UG/PG engineering students

WORKSHOP CONTENTS

- Recent Advance in Traction Motors
- Traction Motor: Spec. Requirement & Goals
- Key Performance Metrics for evaluation
- Torque Speed Curves, Drive cycle & Eff. Map
- Review: Traction Motor Choices
- Topology: Radial vs. Axial
- IPM comparison to PM-SynRM
- Slot/Pole selection & Winding Configuration
- Hands On: Simulate, Analyze & Optimize Commercial EV PMSM motor using Siemens Simcenter SPEED & MotorSolve
- Supplementing concepts: Sizing, Hard & Soft Magnetic Materials Fundamentals, Winding, Field weakening operation.

REGISTRATION FEE:

Students	**Rs. 1,000/-**
Faculty	**Rs. 2,000/-**
Industries	**Rs. 5,000/-**

The registration fee inclusive of tax and cost towards course material, lunch and refreshment.

GATEWAY TO REGISTER

Registration for workshop can be made by sending the duly filled application form along with Demand Draft drawn in favour of "PSG CNCE" payable at Coimbatore. The applicants should send their applications in the specified format through their Principal or Sponsor to reach us on or before **12th June 2019**.

The duly sponsored application form is to be sent to:
Dr. M. Sundaram
Organizing Secretary
Dept. of Robotics & Automation Engineering,
PSG College of Technology
Peelamedu, Coimbatore - 641004
Contact No: 090956 07079 / 099524 74349
Email: and.eee@psgtech.ac.in

ABOUT THE COLLEGE

PSG College of Technology established in 1951, is one of the many educational institutions nurtured by PSG & Sons Charities Trust. The college is Government Aided, Autonomous, ISO 9001 2008 certified and affiliated to Anna University. Equipped with latest facilities and excellent infrastructures, the college offers a total of 48 full time and part time programs in Science, Engineering and Management at UG & PG levels. The institution has a strong alumni base, most of them occupying coveted positions in many educational, industrial and research organizations all over the world. Currently more than 520 research scholars, both full time and part time, are working for their Ph.D. degree.

The College has developed more than 45 centers of excellence in various disciplines. More research facilities have been created in tie-up with numerous leading industries in worldwide.

CHAIRMAN

Dr. R. Rudramoorthy
Principal, PSG College of Technology

CONVENORS

Dr. J. Kanakaraj
Head, Dept. of Electrical and Electronics Engineering
Dr. B. Vinod
Head, Dept. of Robotics and Automation Engineering

ORGANISING SECRETARY

Dr. M. Sundaram, Dept. of EEE

CO-ORDINATORS

Dr. J. Chelladurai, Dept. of EEE
Mr. M. Anand, Dept. of EEE
Ms. J. Joe Brislin, Dept. of RAE
Ms. B. Bindu, Dept. of RAE

Important Date to Remember:
Last date for receipt of application : 12.06.2019

The details of this workshop is available in the website: www.psgtech.edu

ABOUT THE EEE DEPARTMENT

The Department of Electrical and Electronics Engineering (EEE) has been playing a vital role in producing scientists and technologists of highest caliber ever since it was established in the year 1951. The department offers UG (Regular and Sandwich) programmes, PG programmes (Applied Electronics, Power Electronics & Drives, and Embedded & Real-Time Systems), and PhD programmes. The department along with its highly qualified faculty members started functioning right from inception and engages actively in teaching and research in all current areas of Electrical and Electronics Engineering.

ABOUT THE RAE DEPARTMENT

The Department of Robotics and Automation Engineering has been established in order to meet the growing demand for trained manpower in the field of Industrial automation. This programme is a very unique one that is tailored to mould quality automation engineers for manufacturing, defense, food, aerospace, medical and service sectors. The department has competent and committed faculty drawn from industry and practicing professional, apart from academicians to enhance the quality of the programme.

ABOUT THE CEMPE

Centre for Electrical Machines and Power Electronics (CEMPE) specializes in electric motor design and its control with supporting engineering simulation solutions. Our research themes include electric machines used in wide spectrum of applications ranging from High-Efficiency Motors, Electric Vehicles, Robots and Extreme High Temperature Motors. Our group had active grants from Dept. of Heavy Industries (DHI), Dept. of Science and Technology (DST) and other governmental organizations. We invite you to take advantage of this opportunity to learn more about our research group.

PROJECTS ON TRACK AT CEMPE

- Energy Efficient Motor as per IEC Standards
- Electric Motor for High-Temperature Environments
- EV/HEV's Motor Design
- Switched/Synchronous Reluctance
- Digital Welding Power Source

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APPLICATION FORM

Name (in Block Letters):.....
Date of birth & Age :.....
Qualification :.....
Experience (if any) :.....
Designation & Dept. :.....
Organization :.....
Address for :.....
Communication : .....
.....
Office No. :..... Mob No. :.....
Email Id:.....
Demand Draft No. & Bank: .....
.....
Amount in Rs.:.....

DECLARATION BY THE CANDIDATE

The given information is true to the best of my knowledge. I agree to abide by the rules and regulations governing the programme. If selected, I shall attend the course for the entire duration.

Place:
Date: Signature of the candidate

SPONSORSHIP

Mr./Ms./Dr._____

is an employee of our Institution / Industry and is hereby sponsored. He/she will be permitted to attend the workshop, if selected.

Office Seal

Place Signature of the
Date Sponsoring Authority

SESSION DETAILS

	Rudiments of Traction Motor Design
9.00 am to 10.30 am	Tesla Model 3 2019 – Why Brushless PM motor rather than IM! Significance of Rotor Design Extreme Torque Linear Labs Motor – Strategies involved, Principle of Operation Chevy Bolt, Toyota Evolution of Electric Drive System C-Motive Motor technologies, Magnax Axial Motor, Advanced Electric Machines Ltd. Topologies and Strategies UQM electric drive system for transit Buses, Bombardier high power locomotives for Indian Railways
	Coffee Break
11.00 am to 12.30 am	Radial vs. Axial Motor topologies, Torque Speed curves, Drive cycle, Efficiency Map, Key Performance Metrics Base Speed, Corner Speed, Constant Power Speed Ratio, Continuous Torque and Peak Torque - Concepts Torque Characteristics of IPM motor, Comparison of Interior Permanent Magnet motor to Permanent magnet Assisted Synchronous reluctance machines, Trade-off and evaluations involved in design.
	Lunch
1.30 pm to 3.00 pm	Hands On session: Simulating and Analyzing the Toyota Prius 2010 version using Siemens Simcenter Speed and MotorSolve. SPEED software will be used in supplementing some of analytical computation involved. E.g., Air gap flux, Magnet angle, etc. Supplementing concepts of electric loading, magnetic loading and tip speed ratio fundamentals, Soft and Hard Permanent magnet materials fundamentals
	Coffee Break
3.30 pm to 5.00 pm	Performance evaluation of Toyota Prius 2010 and recent evolution of electric drive system Load line plot and advancement in Hard Permanent Magnet material Other lumped parameter for analysis, significance of reluctance torque, Field weakening etc.
	End