

# Electric Vehicles and System Design

## Overview

The transportation sector represents a significant fraction of total greenhouse gas emissions in many developed and developing countries. With continued use of internal combustion engine vehicles, there will be continuing increase in CO<sub>2</sub> emissions from the transportation sector. The increasing use of electronic features to improve vehicle performance, fuel economy, emissions, passenger comfort, safety, and convenience has resulted in the growth of electrical loads in the vehicle. Hence there is an increasing interest in the electrification of transportation to reduce emissions, improve fuel economy, and to enable more electrification of all the accessory loads. Electrifying the transportation enables significant economic and environmental benefits, and new opportunities for consumer engagement.

In the last 10 years, a significant number of electric vehicles have been deployed. The electric vehicles such as Tesla model S have significantly increased the perception about the viability and usefulness of electric vehicles. In addition, more than 400,000 plug-in electric vehicles are on the road today. Trends clearly suggest that we must educate the engineers of today and tomorrow in the technical details of electric vehicles. There is a strong need for engineers who can do research, design, develop, and commercialize the zero or low emission vehicles to advance the deployment of electrified transportation system.

This course provides a comprehensive discussion on the need for electric vehicles, architectures, vehicle mechanics, drive cycles, power converters, machines & control, energy efficiency, and related topics.

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| <b>Dates</b>                   | <b>3<sup>rd</sup> July 2017 to 13<sup>th</sup> July 2017</b>   |  |
| <b>Location</b>                | <b>B.M.S College of Engineering, Bull Temple Road, Bangalore-560019</b>  |  |
| <b>Course Schedule</b>         | 3 <sup>rd</sup> July 2017  | : Introduction to Electric and Hybrid vehicles   |
|                                | 4 <sup>th</sup> July 2017 & 5 <sup>th</sup> July 2017  | : Electric vehicle architecture                  |
|                                | 6 <sup>th</sup> July 2017  | : Propulsion system analysis                     |
|                                | 7 <sup>th</sup> July 2017 & 10 <sup>th</sup> July 2017   | : Power Electronics for Electric vehicles        |
|                                | 11 <sup>th</sup> July 2017   | : Electric machines and control for EVs and HEVs |
|                                | 12 <sup>th</sup> July 2017   | : Energy storage and battery charging            |
|                                | 13 <sup>th</sup> July 2017   | : Miscellaneous topics                           |
|                                | <b>Number of participants for the course is limited to sixty.</b>  |  |
| <b>You Should Attend If...</b> | <ul style="list-style-type: none"> <li>▪ You are a practicing engineer in electrical engineering field</li> <li>▪ You are a post graduate student/research scholar interested in the area of electric vehicles</li> <li>▪ You are involved in design of transportation systems that utilize electric motors, power converters.</li> <li>▪ You are interested in teaching a course on Electric Vehicles.</li> </ul> |  |
| <b>Fees</b>                    | <b>The participation fees for taking the course is as follows:</b>   |  |
|                                | Participants from abroad   | : US \$500                                       |
|                                | Industry/ Research Organizations   | : Rs.10,000                                      |
|                                | Faculty from other Institutions  | : Rs. 5,000                                      |
|                                | Students from other Institutions   | : Rs. 2,000                                      |
|                                | The above fee includes all instructional materials, computer use for tutorials and assignments. The participants will be provided with accommodation based on availability on payment basis.   |  |
| <b>Pre requisites:</b>         | An undergraduate degree in engineering or a strong technical background is highly recommended. Attendees should have taken an undergraduate or graduate course in basic electric circuits, electric machines and power electronics.  |  |

## Foreign Faculty



Dr. Kaushik Rajashekara, FIEEE  
Distinguished Professor and Endowed Chair  
Department of Electrical Engineering,  
The University of Texas at Dallas

Prof. Kaushik Rajashekara received his B.Eng., M.Eng, and Ph.D (1984) degrees in Electrical Engineering from the Indian Institute of Science, Bangalore; and MBA (1992) from Indiana Wesleyan University, USA. From 1977 to 1985, he worked as Senior Scientific Officer/Asst. Professor in Indian Institute of Science, Bangalore. In 1978 and 1984-85, he worked at ABB, Switzerland in the area of power electronics and traction systems. In 1982, he was a visiting scientist at the Technical University of Dresden, Germany. In July 1989, he joined Delphi Corporation, which was a division of General Motors. In Delphi and GM, he held various technical positions, and was the Chief Scientist for Advanced Power Conversion & Propulsion for electric, hybrid, and fuel cell vehicles. In May 2006, he joined Rolls-Royce Corporation, USA as the Chief Technologist for electric power and control systems working on More Electric Aircraft architectures and power conversion/control technologies for gas turbines in Aero, Marine, Defense, and Energy applications.

**Local Institutional Coordinator:** Dr.Ravishankar Deekshit,  
Dean, Student Affairs, BMS College of Engineering.

## Host Faculty



Dr.P.Meena, Ph. D  
B.M.S.College of Engineering.

Prof.Meena holds a Ph.D in the area of Power Quality Improvement from Visvesvaraya Technological University, Karnataka, India and has been with the department of Electrical and Electronics Engineering at BMS College of Engineering, Bengaluru since 1988. Has authored 35 research papers including the ones on innovations in engineering education. Her research interests include power quality issues and investigations into power control strategies for effective operation of an integrated grid, and technologies for smart metering.



Smt. Nethravathi.S  
B.M.S.College of Engineering.

Ms. Nethravathi has been with department of Electrical and Electronics since 2010. She has a Master's Degree in Power Systems and has authored five research papers. Her areas of interest include condition monitoring and automation systems.

Course Registration:  
<http://www.gian.iitkgp.ac.in>

## Contacts

Dr.P.Meena:  
Email: PMeena.eee@bmsce.ac.in  
Mobile: 09008658263

Ms. Nethravathi. S  
Email: nethravathis.eee@bmsce.ac.in  
Mobile: 09632149366

More details at [www.bmsce.in](http://www.bmsce.in)