

POWER ELECTRONICS – CHALLENGES AND TRENDS

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Abstract:

Since the invention of the world's first electronics patent by Edison in 1884, power electronics have been evolved as a distinctive subject area in electrical engineering and making significant contributions towards the modern technological growth. Power electronics has developed continuously over the years and are finding increasing applications.

Power Electronics is an interdisciplinary field that combines power, electronics, control theory and digital circuitry for the control and conversion of electric power. It can be viewed as a branch of system engineering. Power Electronics have already found an important place in the modern technology and is now used in great variety of applications. It is difficult to draw the boundaries for the applications of power electronics; and the upper limit is undefined.

The new engineering standard under the Washington Accord Graduate Attributes requires an outcome-based education to empower graduates with technical and professional knowledge, skills and abilities for practicing engineering in the continuously changing global market place. This presentation summarizes the chronological development, and its challenges ahead for maintaining its identity; and how it can continue educating engineering in the new era of engineering educational standard; and also what one would expect the future of power electronics and its trends

About the Speaker:



Prof. Dr. Muhammad H. Rashid is employed by the Florida Polytechnic University as a Professor and Chair of Electrical and Computer Engineering. Previously he was employed by the University of West Florida, Pensacola, Florida as a professor of electrical and computer engineering. He was also employed by the University of Florida as *Professor and Director* of UF/UWF Joint Program. Rashid received B.Sc. degree in Electrical Engineering from the Bangladesh University of Engineering and Technology, and M.Sc. and Ph.D. degrees from the University of Birmingham in UK. Previously, he worked as Professor of Electrical Engineering and the Chair of the Engineering Department at Indiana University- Purdue University at Fort Wayne. Also, he worked as Visiting Assistant Professor of Electrical Engineering at the University of Connecticut, Associate Professor of Electrical Engineering at Concordia University (Montreal, Canada), Professor of Electrical Engineering at Purdue University Calumet, and Visiting Professor of Electrical Engineering at King Fahd university of Petroleum and Minerals (Saudi Arabia), as a design and development engineer with Brush Electrical Machines Ltd. (England, UK), a Research Engineer with Lucas Group Research Centre (England, UK), a Lecturer and Head of Control Engineering Department at the Higher Institute of Electronics (in Libya & Malta).

Dr. Rashid is actively involved in teaching, researching, and lecturing in electronics, power electronics, and professional ethics. He has published 22 books listed in the US Library of Congress and more than 160 technical papers. His books are adopted as textbooks all over the world. His book, *Power electronics* has translations in Spanish, Portuguese, Indonesian, Korean, Italian, Chinese, Persian, and Indian edition. His book, *Microelectronics* has translations in Spanish in Mexico and in Spain, Italian, and Chinese.

He has received many invitations from foreign governments and agencies to give keynote lectures and consult, by foreign universities to serve as an external examiner for undergraduate, master's and Ph.D. examinations, by funding agencies to review research proposals, and by U.S. and foreign universities to evaluate promotion cases for professorship. Dr. Rashid has worked as a regular employee or consultant in Canada, Korea, United Kingdom, Singapore, Malta, Libya, Malaysia, Saudi Arabia, Pakistan, and Bangladesh. Dr. Rashid has traveled to almost all States in USA and many countries to lecture and present papers (Japan, China, Hong Kong, Indonesia, Taiwan, Malaysia, Thailand, Singapore, India, Pakistan, Turkey, Saudi Arabia, United Arab Emirates, Qatar, Libya, Jordan, Egypt, Morocco, Malta, Italy, Greece, United Kingdom, Brazil, and Mexico).

He is a *Fellow* of the Institution of Engineering & Technology (IET, UK) and a *Life Fellow* of the Institute of Electrical and Electronics Engineers (IEEE, USA). He was elected as an IEEE Fellow with the citation "*Leadership in power electronics education and contributions to the analysis and design methodologies of solid-state power converters.*" Dr. Rashid is the recipient of the *1991 Outstanding Engineer Award* from The Institute of Electrical and Electronics Engineers (IEEE). He received the *2002 IEEE Educational Activity Award (EAB) Meritorious Achievement Award in Continuing Education* with the following citation "*for contributions to the design and delivery of continuing education in power electronics*

and computer-aided-simulation". He is the recipient of the 2008 IEEE Undergraduate Teaching Award with citation: *For his distinguished leadership and dedication to quality undergraduate electrical engineering education, motivating students and publication of outstanding textbooks*. He is also the recipient of the IEEE 2013 Industry Applications Society *Outstanding Achievement Award*.

Dr. Rashid is an ABET program evaluator for electrical and computer engineering (and also from 1995-2000) and was an engineering evaluator for the Southern Association of Colleges and Schools (SACS, USA). He is also an ABET program evaluator for (general) engineering program. He is the Series Editors of *Power Electronics and Applications*, and *Nanotechnology and Applications* with the CRC Press. He serves as the Editorial Advisor of *Electric Power and Energy* with Elsevier Publishing. He lectures and conducts workshops on Outcome-Based Education (OBE) and its implementations including assessments.

Dr. Rashid is a Distinguished Lecturer for the IEEE Education Society and a Regional Speaker (previously Distinguished Lecture) for the IEEE Industrial Applications Society. He also authored a book on "The Process of Outcome-Based Education - Implementation, Assessment and Evaluations". 2012 UiTM Press, Malaysia