

High Value Manufacturing (HVM) of advanced multi-functional composite materials through robotics: Aerospace, automotive and energy applications

Overview

India is at the beginning of manufacturing revolution as the IT revolution has reached its maturity in the last couple of years. Over the last four decades, Indian Engineering Institutes have focused mainly on supplying the workforce to the IT industry at the expense of traditional manufacturing. As a result, engineering syllabus and the delivery methodology have not been updated in the context of current industrial needs. Next wave of employment and wealth creation in India is likely to happen in the High Value Manufacturing (HVM) Sector as the government's '*Make in India*' campaign as well as FDI in the Indian manufacturing sector in order to support the projected growth in domestic requirements in energy, defence, aviation, surface transportation, healthcare and hygiene sectors to name a few. These High Value Sectors require engineering graduates equipped with '*inter-disciplinary*' skills as well as good understanding of the global manufacturing supply chain. This short course aims to bridge the skills gaps that exist between what is currently taught in individual disciplines, through rigid syllabi, and what is required by the manufacturing sector.

The proposed two-week program will deliver insights into the global manufacturing sector, advanced materials, embedding robotics and data-driven automation, embedding multi-functionality into structures and materials thus making them smart. Advanced composite materials have made significant progress in the last two decades with the development of Boeing 787, Airbus A350 in the aviation sector; BMW I series in the automotive sector and very large wind turbines (up to 180 m diameter rotor), to name a few. While these are examples of primarily structural application of advanced materials, next wave of innovations is likely to come from embedded smart multi-functional composite materials. Through this short course, we will provide syllabus and lectures on interdisciplinary approach to high value manufacturing of advanced multi-functional composite structures.

Objectives of the Course

- Global manufacturing supply chain at the interface of advanced materials, embedded systems and robotics
- Emerging High Value Manufacturing Sector and its relevance to advanced materials.
- Advanced composites, materials and manufacturing methods
- Concepts of 3D weaving, braiding and Robotic fibre placement

- Autoclave and out-of-autoclave manufacturing techniques
- Embedded sensors and active elements in composites.
- Fundamentals of Robotics and advanced manufacturing techniques
- Application of advanced composites in electrical and electronics engineering

Modules	<p>Module A: Module A: High Value</p> <p>Manufacturing in the context of</p> <p>Advanced Materials</p> <p>Module B: Smart, multi-functional</p> <p>composite materials</p> <p>Dates: 20/12/2018 to 31/12/2018</p> <p>Number of participants for the course will be limited to Sixty.</p> <p>Selection will be based on first come first serve</p>	<p>Course Co-ordinator</p> <p>Dr. Siddaramaiah</p> <p>Professor & Head</p> <p>Department of Polymer</p> <p>Science & Technology,</p> <p>Sri Jayachamarajendra</p> <p>College of Engineering,</p> <p>JSS S&TU, Mysuru 570</p> <p>006, Karnataka, India</p> <p>Tel: +91 821 2548285 (O)</p> <p>Cell No.: 9972095262</p>
You Should Attend If...	<p><input type="checkbox"/> Students at all levels- (B.Tech/M.Sc./M.Tech./ Ph.D.) or Faculty from reputed academic institutions and technical institutions</p> <p><input type="checkbox"/> Executives, engineers and researchers, serving in academic and government organizations including R&D laboratories</p>	
Fees	<p>The participation fees for taking the course is as follows:</p> <p><input type="checkbox"/> Participants from Host Institute: Rs. 1000/</p> <p><input type="checkbox"/> Indian Participants (from Academic Institutes) Rs. 2000/-</p> <p><input type="checkbox"/> Industry/ Research Organizations (Indian): Rs. 4000/-</p> <p><input type="checkbox"/> Participants from abroad: US \$200</p> <p>The above fee includes all instructional materials computer use for tutorials and assignments, laboratory equipment usage charges and working lunch</p>	

International Teaching Faculty



Prof. Prasad Potluri, Professor & Research Director, Northwest Composites Centre, University of Manchester, UK:

Prof. Prasad Potluri is a Professor of Robotics and Textile Composites in the School of Materials and the Director of Research at the Northwest Composites Centre/National Composites Certification and Evaluation Facility. He is currently an EPSRC High Value Manufacturing Catapult Fellow at the National Composites Centre in Bristol. He worked as a Design Engineer in the automotive industry (Suzuki) before joining academics. Following a Ph.D., in applied robotics, he started his academic career at UMIST in 1994 and worked at the interface of textiles, composites and robotics. Prof. Potluri has extensive industrial collaborations and a significant proportion of his funding is for collaborative R&D. He received funding of over £9 million from a variety of sources including the EPSRC, TSB, EU, BIS, DSTL and the US Air Force. He developed a number of novel machines for 3D weaving, braiding, robotic fibre placement and complex winding. He is a Principal Investigator for the EPSRC Centre for Innovative Manufacturing in Composites and manages the research on 3D fibre preforming on behalf of the centre.

Prof. Potluri published over 150 papers in peer-reviewed journals and conference proceedings in the area of textile composites and mechanics of fibre assemblies. He is a member of the prestigious Materials Technical Committee and a Senior Member of the American Institute of Aeronautics and Astronautics, EPSRC Peer Review College and the Editorial Boards of Textile Research Journal, Journal of Industrial Textiles and Advanced Manufacturing: Polymer and Composites Science.

<https://scholar.google.co.uk/citations?user=hscDGFUAAAJ&hl=en>

Host Faculty # 1



Prof. Siddaramaiah obtained Ph.D., (1993) degree from University of Mysore, Mysore, India. He worked as a Post Doctoral Research Fellow under Brain Korea (BK-21) Fellowship for a period of one year (2007-08), Chonbuk National University, South Korea.

He visited University of Federal, Rio de Janeiro, Brasil, two times (2005 and 2009 for a period of 3 months each under UNESCO-TWAS visiting Fellowship. He had undergone training on Haake rheocord at M/s. Thermo Fisher Scientific, Karlruhe, Germany and at M/s. Bosch-Rexroth new Drive & Control Academy, Würzburg, Germany, during 16 - 26 March 2009. He is working as Professor & Head, Department of Polymer Science &

Technology, Sri Jayachamarajendra College of Engineering, Mysore, which is affiliated to Visveswaraya Technological University, Belgaum. He is the recipient of SERC Visiting Fellowship from DST, New Delhi (2000) and Visiting Scientist fellowship from IIT, Kharagpur (2000).

He has authored more than 300 research articles in reputed referred journals, more than 270 conference papers, 12 book chapters, 4 review articles, one book, three monographs and is a co-inventor of 3 Indian patents. 25 students have successfully completed their Ph.D., degree under his supervision and he has supervised 6 M.Sc., (Engg) by research, and one M.Phil. He is a recipient of “Young Scientist Award-1997”, in ‘Chemical Science’ awarded by KAAS, Bangalore, India and “Sir C.V. Raman Young Scientist Award – 1999” in ‘Chemical Technology’ by KSCST, Government of Karnataka, Bangalore (2002). He and his research team received “Best Paper Award” more than nine times. Recently he received, “Silver Trophy Plasticon Award-2012 in the category of Best Research, Plastindia Foundation, New Delhi. He is the recipient of Runner-Up of 6th National Award for Technology Innovation 2015-16 in Innovation in Polymeric Products, "Design and development of highly flexible and visibly transparent UVA radiation sensing polymer nano composite hybrids", by Ministry of Chemicals and Fertilizers, Dept. of Chemicals & Petrochemicals, Govt. of India, New Delhi, 20th Jan 2016.

Host Faculty # 2

Dr. Rudraswamy S B received B.E. degree in Electronics and Communication Engg., from Kuvempu University, Karnataka, India, in 2002, M.Tech. degree in VLSI design and embedded system from (SJCE) VTU, Karnataka, India in 2006 and the Ph.D. degree in microelectronics and nanotechnology from the **Indian Institute of Science**, Bangalore, India,



in 2015. He is currently an Associate Professor with the Department of Electronics and Communication Engineering, Sri Jayachamarajendra College of Engineering, Mysuru, India. He is the recipient of ‘**Commonwealth Fellowship award**’ from **Commonwealth Secretariat, United Kingdom** for the year 2016-17. He is a **Visiting Academic** to **University of Manchester, UK** between January 2017- April 2017 under the commonwealth fellowship. He was a **Visiting scientist/Professor** to **New Jersey’s Science and Technology University, New Jersey, United States of America** between June 2016- August 2016. **Prof Rudraswamy S B** is a recipient of the ‘**Best doctoral Thesis Award**’ from the Board for IT Education Standards, Government of Karnataka and two more

best doctoral thesis award elsewhere. He has got '**Best technical paper award**' and '**Best technical poster Award**' in an International conference and from research symposium, Indian Institute of Science, Bangalore. Published technical papers in National and International Journals and conferences. Presented technical talks in many International conferences and visited countries such as France, Germany, Switzerland, Poland and Australia to deliver technical talks. He is a member of many societies such as IEEE, ISSS, and IETE. Delivered technical talks at various Engineering and Polytechnic colleges across India. His research interest includes, Solid state oxides; MEMS; nanotechnology for sensor applications.