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## DEPARTMENTAL INTERNAL REVIEW REPORT

### 1. Areas of Research/Faculty details/Laboratories' details

#### Faculties with their areas of research

Faculty, contact	Area of research
Dr. M. K. Surappa Professor and Director director@iitrpr.ac.in +91-1881-24-2100	Prof. Surappa's research interests include processing, characterization and application development of micro and nano aluminium and magnesium based metal matrix composites.
Dr. Harpreet Singh Coordinator harpreetsingh@iitrpr.ac.in +91-1881-24-2226	Dr. Singh's research areas include surface engineering-degradation of materials, high temperature corrosion and its prevention, slurry erosion of hydraulic turbines and its control, bio-medical coatings for bio-implants, and coatings for several other wear and corrosion related applications. He is also working in the area of modulation-assisted machining of difficult-to-machine materials with an aim to enhance the tool-life and produce machining scrap with desirable properties. He is also working on grain-size refinement of alloys through friction-stir processing.
Dr. Anshu Dhar Jayal jayal@iitrpr.ac.in +91-1881-24-2149	Dr. Jayal's research interests are broadly related to advancement of sustainable manufacturing, with an emphasis on dry, near-dry and cryogenic machining. His specific research areas include: development, modeling and optimization of sustainable manufacturing processes and systems; metrics development for sustainability evaluation; tribological and thermo-mechanical issues in manufacturing processes; and microstructure alteration in engineering materials for improved surface integrity and life.
Dr. Anupam Agrawal anupam@iitrpr.ac.in +91-1881-24-2165	Dr. Agrawal works in the area of experimental and numerical studies of various manufacturing processes: machining, traditional and advanced material forming processes, CAD/CAM. He is involved in developing new material forming processes for creating monolithic free form objects, applicable for aerospace, automobile and other related industries.
Dr. Dhiraj K. Mahajan dhiraj.mahajan@iitrpr.ac.in +91-1881-24-2244	Dr. Mahajan's teaching interests are Mechanics of Materials, Polymers Physics, Continuum Mechanics and Atomistic Computer Modeling of Materials. His research interests are mechanics and physics of elastomers, polymers, adhesion at polymer-solid interfaces and fatigue failure of polycrystalline

	metals under aggressive environment with immediate focus on hydrogen based degradation of steels. His research emphasis is on identifying connections among microstructure, deformation mechanisms, and mechanical properties of materials using both experimental and multiscale simulation techniques such as electronic structure calculations, molecular dynamics simulations, discrete dislocation dynamics and crystal plasticity based finite element modeling.
Dr. Ekta Singla ekta@iitrpr.ac.in +91-1881-24-2165	Dr Singla's research focuses on customized design of robotic arms. Maintaining a grasp in this field, her research works diverge into the related areas of redundant manipulators, performance measures and motion planning of robotic arms. Incorporating the concepts of modular design and evolutionary robotics, she is working on the integration of design and fabrication features into the evolutionary development of robotic structures at micro level. Her teaching interests include Robotics, Design optimization, Optimization techniques, Mechatronics and CAD.
Dr. Himanshu Tyagi himanshu.tyagi@iitrpr.ac.in +91-1881-24-2119	Dr. Tyagi works in the broad area of thermo-fluids engineering and specializes in the study of heat transfer aspects of various applications such as nanofluids, solar energy, biological systems, energy storage and micro-electronic devices. He was worked extensively in these areas in industry in India and USA and has ongoing collaborations in the field of nanofluids and solar energy with academia and industry. He is interested in developing technologies to efficiently harness clean and sustainable energy resources.
Dr. Jitendra Prasad jprasad@iitrpr.ac.in +91-1881-24-2104	Dr. Prasad has been leading the Biomedical Engineering Program at IIT Ropar in collaboration with PGIMER, Chandigarh. His research and teaching interests include Biomechanics, Bone Fracture Healing, Mechano-transduction, Clinical Engineering (Medical Devices & Equipment), Structural and Multidisciplinary Design Optimization, Computational Mechanics, and Agent Based Modeling.
Dr. Navin Kumar nkumar@iitrpr.ac.in +91-1881-24-2170	Dr. Kumar's research interests are related to both theoretical and experimental aspects of mechanics and dynamics of nano and bio materials and structures, biomedical engineering, biomedical instrumentation, smart structures and materials, fault diagnosis and condition monitoring. In particular he is interested in the areas of biomaterial and biological materials characterization, experimental and computer simulation of nano materials and structures, active vibration control and fault diagnosis. He has joint research projects related to

	mechanical characteristics of biological materials with PGIMER, Chandigarh and NIPER, Mohali.
Dr. Prabhat K. Agnihotri prabhat@iitrpr.ac.in +91-1881-24-2257	Dr. Agnihotri's research interests include the modelling, processing and characterization of multiscale hybrid (nano-) composites. He is also interested in exploring the deformation and failure mechanisms in nanomaterials by performing well designed experimental and numerical calculations.
Dr. Prabir Sarkar prabir@iitrpr.ac.in +91-1881-24-2151	Dr. Sarkar mainly works in product design. His specific research areas include design creativity, bio-mimicry, sustainable design and manufacturing, design methods, and design research. He is interested in supporting companies by helping them design new products, assess sustainability of products, make products compliant with international standards, create suitable tools and design methods, improve product aesthetic and ergonomic aspects, and conduct research on design process.
Dr. Rakesh K. Maurya rakesh.maurya@iitrpr.ac.in +91-1881-24-2275	Dr. Maurya works in the areas of internal combustion engines, alternative fuels and sustainable energy utilization. His specific research areas include biofuels, HCCI and low temperature combustion for IC engines, engine emission control, engine management systems, engine instrumentation and combustion diagnostics, particulate characterization and control, engine endurance and long term durability studies, new engine designs. He is interested in development of advanced high efficiency and ultra-low emission engines.
Dr. Ramjee Repaka ramjee.repaka@iitrpr.ac.in +91-1881-24-2159	Dr. Repaka works in the areas of heat transfer, bioheat transfer and energy. His recent research activities mainly focus on early detection of cancer using different modalities. This includes numerical and experimental investigations to detect the early traces of cancer in the skin and in the breast. His main interest is to introduce a novel methodology to medical industries and practitioners for (a) early detection, (b) staging and (c) subsequent treatment/irradiation of underlying skin cancer with minimal thermal damage.
Dr. Ranjan Das ranjandas@iitrpr.ac.in +91-1881-24-2245	Dr. Das works mainly in the area of heat transfer and inverse optimization related to thermal and fluid flow problems. His current research is aimed at predicting performance parameters of various practical equipments such as fins, solar collectors, wind turbines, fuel cells and cooling towers.
Dr. Ravi Mohan Prasad ravimohan.prasad@iitrpr.ac.in +91-1881-24-2272	Dr. Prasad works in the field of "Materials for Energy and Environmental Applications." His current research areas include Polymer-derived porous ceramics and nano composites, Ceramic membranes for hydrogen purification,

	Chemiresistor gas sensors, Photocatalysts for wastewater decontamination, and Hydrogen storage materials.
Dr. Satwinder Jit Singh sjsingh@iitrpr.ac.in +91-1881-24-2109	Dr. Singh works on Applied Mechanics and Numerical Methods.
Dr. Srikant Sekhar Padhee sspadhee@iitrpr.ac.in +91-1881-24-2270	Dr. Padhee works in the field of multifunctional, functionally graded and smart composite structures involving multi-physics and multi-scale analysis. His work explores the interaction of non-linear and non-classical phenomena in these composites using advanced analytic tools like Variational Asymptotic Method.
Dr. Vishwajeet Mehandia vishwajeet@iitrpr.ac.in +91-1881-24-2233	Dr. Mehandia works on Complex fluids (Active suspensions), Dynamics of granular materials, and Biophysics (Active cellular processes, Physics of tissue morphology).

## Areas of expertise and faculties involved

<b>Design and analysis</b>	
Noise and Vibration	Dr. Navin Kumar, Dr. Srikant Sekhar Padhee
Robotics	Dr. Ekta Singla
Optimization	Dr. Jitendra Prasad, Dr. Ekta Singla, Dr. Satwinder Jit Singh
CAD/CAM	Dr. Anupam Agrawal, Dr. Prabir Sarkar, Dr. Ekta Singla, Dr. Jitendra Prasad
FEM	Dr. Jitendra Prasad, Dr. Satwinder Jit Singh, Dr. Navin Kumar, Dr. Dhiraj K. Mahajan, Dr. Prabhat K. Agnihotri
Applied Mechanics	Dr. Satwinder Jit Singh, Dr. Dhiraj K. Mahajan, Dr. Prabhat K. Agnihotri, Dr. Srikant Sekhar Padhee.
<b>Manufacturing and materials</b>	
Machining	Dr. Anshu Dhar Jayal, Dr. Anupam Agrawal, Dr. Harpreet Singh, Dr. Prabir Sarkar
Tribology	Prof. M. K. Surappa, Dr. Harpreet Singh, Dr. Anshu Dhar Jayal, Dr. Navin Kumar
Metal Forming	Dr. Anupam Agrawal, Dr. Dhiraj K. Mahajan
Corrosion	Dr. Harpreet Singh, Dr. Dhiraj K. Mahajan
Welding	Dr. Harpreet Singh
Materials Science	Prof. M. K. Surappa, Dr. Harpreet Singh, Dr. Ravi Mohan Prasad, Dr. Dhiraj K. Mahajan, Dr. Prabhat K. Agnihotri, Dr. Srikant Sekhar Padhee
<b>Thermal and fluids</b>	
Thermal Sciences	Dr. Himanshu Tyagi, Dr. Ramjee Repaka, Dr. Ranjan Das, Dr. Rakesh Kumar Maurya
Optimization	Dr. Ranjan Das
Energy Storage	Dr. Ravi Mohan Prasad
Bio-mass Gasification	Dr. Himanshu Tyagi, Dr. Rakesh Kumar Maurya
Fluid Dynamics	Dr. Vishwajeet Mehandia
<b>Bio-engineering</b>	

Bio-medical	Dr. Jitendra Prasad, Dr. Navin Kumar, Dr. Himanshu Tyagi, Dr. Harpreet Singh, Dr. Ramjee Repaka, Dr. Prabir Sarkar
Bio-materials	Dr. Jitendra Prasad, Dr. Navin Kumar
Bio-mechanics	Dr. Jitendra Prasad, Dr. Vishwajeet Mehandia, Dr. Navin Kumar
Bio-mechanical Devices	Dr. Jitendra Prasad, Dr. Navin Kumar, Dr. Prabir Sarkar
Bio-mimicry	Dr. Prabir Sarkar
<b>Special areas</b>	
Sustainable Manufacturing	Dr. Anshu Dhar Jayal, Dr. Prabir Sarkar, Dr. Harpreet Singh
Eco-design	Dr. Prabir Sarkar, Dr. Anshu Dhar Jayal
Energy	Dr. Himanshu Tyagi, Dr. Navin Kumar, Dr. Ravi Mohan Prasad, Dr. Ramjee Repaka, Dr. Rakesh Kumar Maurya
MEMS and Nano-Technology	Dr. Navin Kumar, Dr. Himanshu Tyagi, Dr. Jitendra Prasad, Dr. Anupam Agrawal, Dr. Prabhat K. Agnihotri, Dr. Dhiraj K. Mahajan, Dr. Ravi Mohan Prasad
Product Design	Dr. Prabir Sarkar, Dr. Harpreet Singh, Dr. Ekta Singla, Dr. Navin Kumar, Dr. Jitendra Prasad, Dr. Anupam Agrawal, Dr. Dhiraj K. Mahajan
IC Engines and Alternative Fuels	Dr. Rakesh Kumar Maurya
Mechanism Design	Dr. Jitendra Prasad, Dr. Navin Kumar, Dr. Prabir Sarkar, Dr. Harpreet Singh, Dr. Ekta Singla
Aesthetics, Ergonomics, Design Research, Design Creativity	Dr. Prabir Sarkar
Materials Degradation and Control	Dr. Harpreet Singh, Dr. Dhiraj K. Mahajan
Composite Materials and Tribology	Prof. M.K. Surappa, Dr. Harpreet Singh, Dr. Ravi Mohan Prasad, Dr. Navin Kumar, Dr. Prabhat K. Agnihotri, Dr. Srikant Sekhar Padhee

Mechatronics	Dr. Ekta Singla
Gas Purification and Sensors	Dr. Ravi Mohan Prasad
Bioheat Transfer	Dr. Ramjee Repaka, Dr. Himanshu Tyagi

### **Laboratories at SMMEE**

- **Bio and Nano Mechanical Characterization Laboratory**

*Faculty coordinator: Dr. Navin Kumar*

Bio-Nano-Mechanical Characterization (BNMC) Laboratory is dedicated to the area of Bio and Nano materials engineering with a focus on the combined experimental characterization, as well as computational analysis of mechanical properties, stress/strain, and microstructure of engineering and biological materials and their applications in advancing manufacturing and materials processing technologies, engineering design analyses, and biomedical sciences and engineering.

- **Cell Culture & Tissue Engineering Laboratory (Up coming)**

*Faculty coordinator: Dr. Jitendra Prasad*

Cell Culture & Tissue Engineering Laboratory will cater to the needs of researchers working in biomechanical engineering. The lab is planned to have CO<sub>2</sub> Incubator, Biosafety Cabinet, Fluorescent Microscope, etc. The current needs are fulfilled by IIT Ropar's collaboration with various institutes around Chandigarh.

- **Control Engineering Laboratory**

*Faculty coordinator: Dr. Navin Kumar*

The control engineering lab is an interdisciplinary laboratory. Main area of work is feed back control systems design and analysis, control systems for biomedical application, sensors, actuators, signal processing, various types of transducers.

- **Design Research Laboratory**

*Faculty coordinator: Dr. Prabir Sarkar*

Design Research Laboratory aims at the development of methodologies, tools, and techniques for better, robust, and inclusive product design to achieve success in New Product Development (NPD). Design research investigates the process of designing products, processes, and services. It aims to help designers design better products and processes. The lab is planned to be equipped with sketching tools, collaborative design tools and design research tools.

- **Design Studio Laboratory**

*Faculty coordinators: Dr. Prabir Sarkar and Dr. Harpreet Singh*



Design Studio Laboratory is essentially a lab for exploring products, creating new products and displaying them to the public. It houses drafting facility, product realization facility and has a set of computers for research and design products. The lab is a focal point for academic and industry collaboration in product development.

- **Indoor Environment Control Laboratory**

*Faculty coordinator: Dr. Ramjee Repaka*

The main aim of the Indoor Environment Control Laboratory is to give practical insights and hands-on experience to the undergraduate students of mechanical engineering in developing their understanding in various air-conditioning and refrigeration processes encountered in real life situations. Facilities available in the lab include refrigeration test rig, air-conditioner test rig, heat pump test rig, vapor absorption refrigeration setup and ice plant test rig.

- **Machine Design Research Laboratory**

*Faculty coordinator: Dr. Navin Kumar*

The Machine Design Research Laboratory (MDRL) contributes to educate the undergraduate students, as well as to support research related to Mechanical Design. The mission of MDRL is innovative mechanical component design, improved design quality, shortened design time, and enhanced design education. Machine components design, static and dynamic analyses of machine components, stress and strain analysis, computer assisted modeling and design, component design using FEM approach.

- **Materials Science & Engineering Laboratory**

*Faculty coordinator: Dr. Harpreet Singh*

This laboratory is equipped with several basic material engineering equipments and instruments, along with some highly sophisticated equipments such as CETR Tribometer and Planetary Ball Mill. Materials testing equipments are also available, which include UTM, Micro- and Macro-hardness testers. Some Tribological Test Rigs are also developed in-house by the students. The laboratory is also capable of catering to the material testing needs of industry.

- **Mechatronics with Robotic Applications Laboratory**

*Faculty coordinator: Dr. Ekta Singla*

Mechatronics with Robotic Applications Laboratory endeavors to be a platform for the students interested in developing their skills in electro-mechanical aspects. The basic aim of the laboratory is to render both the thinking and the creative capabilities of the students. Facilities available in the lab include robotic arm and related tools from KUKA and SIMPRO. Building systems from LEGO and TETRIX are available to build robotic mechanisms and prototypes. Basic electronics components and practice kits are also made available for practice.

- **Product Design & Realization Computer Laboratory**

*Faculty coordinator: Dr. Anupam Agrawal*

The Product Design and Realization Computer Laboratory is equipped with 16 high end and 17 medium end workstations with the latest CAD modeling / analysis software, viz. Catia V6 and Solid Works 2013, Abaqus/ CAE 6.11-1, AutoCAD 2013, installed in them. This lab caters to the needs of UG and PG students for regular coursework, final year B. Tech. projects and research work.

- **Product Design & Realization Manufacturing Laboratory**

*Faculty coordinator: Dr. Harpreet Singh*

The Product Design and Realization Manufacturing Lab is equipped with both manual, as well as CNC machines, along with a non-conventional (EDM-Wire Cut) machine and a 3-D printer. A high-end Coordinate Measuring Machine (CMM) is also available, which is open for services to industry and other institutions. State-of-the-art tool dynamometers and modulation-assisted machining set-ups are also used for conducting R&D in the machining area. The students are encouraged in this laboratory to manufacture their designed products, which they showcase during “Design Fair” at the end of each semester.

- **Sustainable Product Design & Manufacturing Laboratory**

*Faculty coordinators: Dr. Anshu Dhar Jayal and Dr. Prabir Sarkar*

The Sustainable Product Design and Manufacturing (SPDM) Laboratory started with the intention of conducting research, teaching and consultancy in the area of sustainable design and sustainable manufacturing. The lab is equipped with expertise, tools, and systems for sustainability assessment of products, standard analysis, and sustainable manufacturing.

- **Thermo-fluids Laboratory**

*Faculty coordinators: Dr. Himanshu Tyagi and Dr. Ramjee Repaka*

The laboratory is equipped with several heat transfer and fluid mechanics experimental setups (such as centrifugal pump, gas turbine, convective heat transfer apparatus, boiling apparatus).

- **Vibrations and Acoustics Research Laboratory**

*Faculty coordinator: Dr. Navin Kumar*

Vibration and Acoustics Laboratory (VAL) is equipped with the necessary expertise and the state-of-the-art instrumentation required for measurement, analysis, and control of undesired motion and noise in structures and machinery. In addition, short courses can be designed in the field of noise and vibration control to meet the needs of industry. Presently, VAL is focusing on investigating and developing advanced methods for active and passive noise and vibration control systems.

- **Complex Fluids Laboratory (Upcoming)**

*Faculty coordinator: Dr. Vishwajeet Mehandia*

The complex fluids laboratory will be equipped with state of the art technologies to study the rheology of particulate suspensions and granular materials. It will include 3 axial force/torque

transducer which can measure force/torque in all the 3 axes in shearing granular material. A high speed camera will also be a part of this laboratory, which will be used to image the flow dynamics of suspensions and polymeric fluids. Along with sensors and cameras, the lab will have a High Performance Computer for computational studies of complex fluids and granular materials.

- **Biomedical Engineering Laboratory (Upcoming)**

*Faculty coordinator: Dr. Navin Kumar*

Biosignals, Biomedical instrumentation, signal processing, ECG, EEG, nerve and muscle excitation, control systems, dialysis, respiratory system, digestion; Medical imaging, ultrasound, image processing.

- **Engine Research Laboratory**

*Faculty coordinator: Dr. Rakesh Kumar Maurya*

The aim of engine research laboratory is to develop state-of-art experiments related to internal combustion engines. Major thrust areas of research of engine research laboratory are as follows: HCCI and low temperature combustion for IC engines, engine emission control engine management systems, engine instrumentation and combustion diagnostics, particulate characterization and control, alternative fuels, engine endurance and long term durability studies, new engine designs.

### **Ph.D. Guidance:**

Dr. Harpreet Singh: Completed: 6, Submitted-1, Supervising 4

Dr. Anshu Dhar Jayal: 2 in progress (co-advised with Dr. Prabir Sarkar) since Jan 2012; 1 of these has just delivered his comprehensive seminar in Dec 2013 while the other student will do this in Jan 2014.

Dr. Himanshu Tyagi: Supervising 4

Dr. Ramjee Repaka: Supervising 1

Dr. Ekta Singla: Supervising 2

Dr. Anupam Agrawal: Supervising 2 (1 student with Dr. Harpreet Singh, he has delivered his pre-submission seminar in December 2013)

Dr. Prabir Sarkar: Supervising 3, 1 individual, 2 co-advised with Dr. Anshu Dhar Jayal.

Dr. Navin Kumar: Supervising 4 (1 co-adviser with Dr. Jitendra Prasad, 1 co adviser with Dr. S.J. Singh), Submitted-1

Dr. Ranjan Das: Supervising 1

Dr. Satwinder Jit Singh: Co-supervising 1 (with Dr. Navin Kumar)

### **M.S. Guidance:**

Dr. Navin Kumar: 1 (Stevens Institute of Technology, NJ)

Dr. Harpreet Singh: 8

## **2. UGs and PhDs Produced**

B.Tech degree awarded in Mechanical Engineering in 2012 : 27

B.Tech degree awarded in Mechanical Engineering in 2013 : 32

Ph.D. degree awarded in Mechanical Engineering in 2013 : 01

## **3. Publications/Patents/Books/Book Chapters/International Journals/International and National Conferences**

## Patents

1. US Patent with application No. 13/056503 on “A process for preparation of nano ceramic- metal matrix composites and apparatus thereof” has been filed. This has been published on Dec. 29, 2011 vide Pub. No. US 2011/0315920 A1. Inventors: R. Raj, M. K. Surappa and Sudarshan.
2. PCT on “A process to prepare melt-ceramic nano-composites by cross-linking organic precursor, method and apparatus thereof ” has been granted. (International Publication Number WO 2010/013080 A1). Inventors: M. K. Surappa, Sudarshan and R. Raj.
3. An Indian patent (IP05198) on “A process to prepare melt-ceramic nano-composites by cross-linking organic precursor, method and apparatus thereof” has been filed (2007). Inventors: M. K. Surappa.
4. An Indian patent on “Process for the fabrication of flyash reinforced composites” has been granted (Patent No. 198342 (259) MAS/2003). Inventors: M. K. Surappa.
5. A patent on “Process for the fabrication of Mg-30% SiC particle reinforced composites by casting route” has been granted (Patent No. 196381 (932) MAS/1999). Inventors: M. K. Surappa.

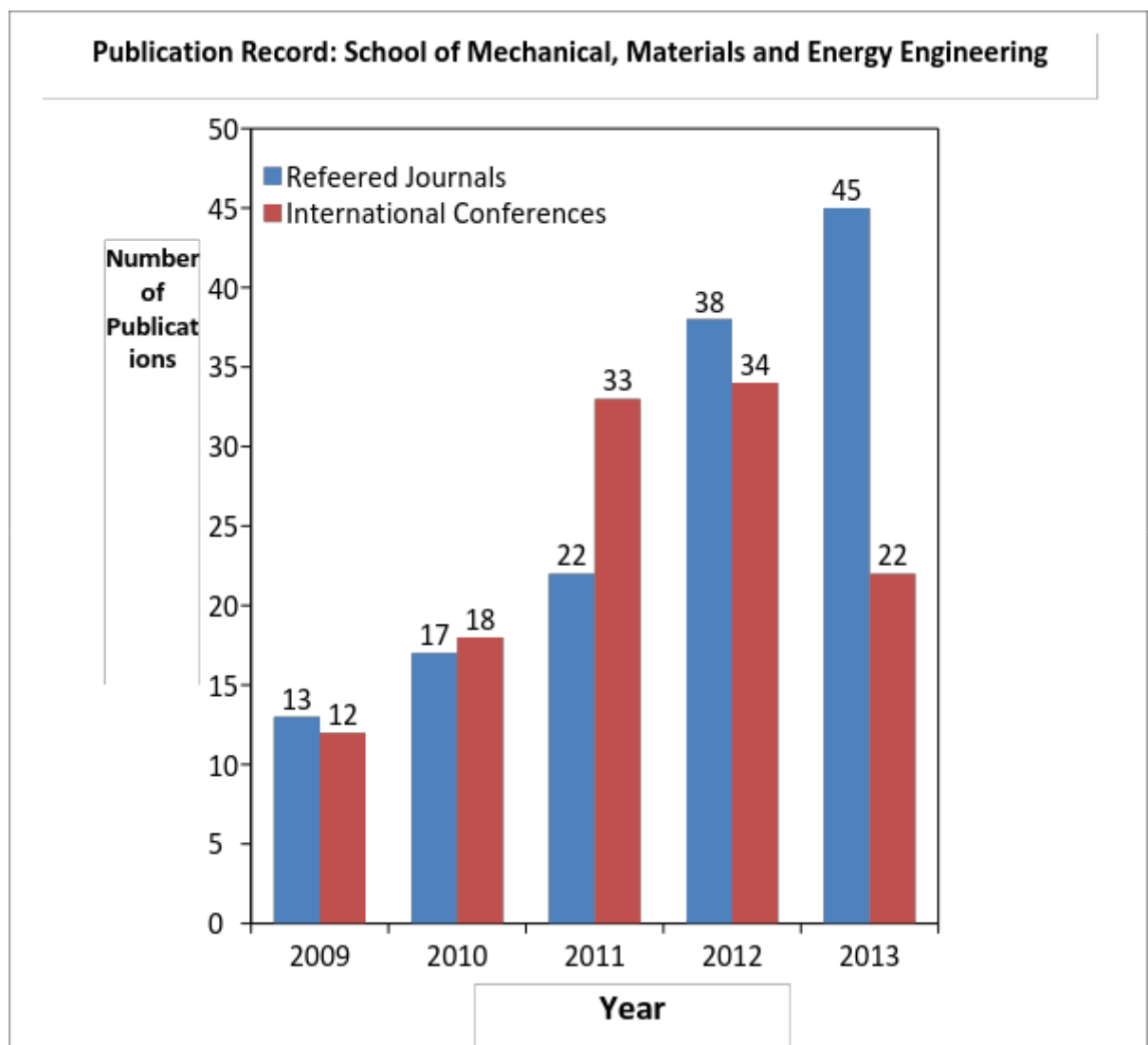
## Handbook Chapter

1. Jayal, A. D., 2014, “Sustainability Issues in Micromanufacturing,” In “Introduction to Micromachining,” Ed.: Jain, V. K., Narosa Publishers, to be published in 2014.
2. Singh, H., and Dhindaw, B. K., 2011, “Metal Matrix Composites: Aluminum,” in Handbook of Composites, Wiley.
3. Rubrecht S., Singla E., Padois V., Bidaud P., Broissia M., 2011, "Evolutionary design of a robotic manipulator for a highly constrained environment". *New Horizons in Evolutionary Robotics*, Springer-Verlag.
4. Sudarsan Rachuri, Prabir Sarkar, Anantha Narayanan, Jae Hyun Lee, Paul Witherell, 2011. Towards a Methodology for Analyzing Sustainability Standards using the Zachman Framework. In Jürgen Hesselbach and Christoph Herrmann (Eds.) Globalized Solutions for Sustainability in Manufacturing. ISBN: 978-3-642-19691-1. Springer.
5. Prabir Sarkar and Amaresh Chakrabarti, 2009. Analyzing Creativity Methods. In Amaresh Chakrabarti (Eds.), Research into Design: Supporting Multiple Facets of Product Development, Research Publishing Services.
6. Prabir Sarkar and Amaresh Chakrabarti, 2008. Studying engineering design creativity- developing a common definition and associated measures. In, John Gero (Ed.) Studying Design Creativity, Springer Verlag, 2008.
7. Prabir Sarkar and Amaresh Chakrabarti, 2008. Assessing innovation through product analysis. In Regalla Srinivasa Prakash and Kuldip Sangwan (Eds.), Product Design and Manufacturing: A Product Lifecycle Approach.

## Edited books

1. Amaresh Chakrabarti, Sudarsan Rachuri, Prabir Sarkar, and Srinivas Kota (Eds.), 2010. Designing Sustainable Products, Services and Manufacturing Systems, Research Publishing Services, Singapore. ISBN: 978-981-08-5466-9.
2. Special issue book: Sudarsan Rachuri, Prabir Sarkar, Dimitris Kiritsis, Masaru Nakano (Eds.), 2009. Developing sustainable products, processes and services. International Journal of Product Lifecycle Management, Vol 4, No 1-3. ISSN no. for the journal is 1743-5110.

### International Refereed Journals



### **Year: 2014**

1. Bhowmik, A., Repaka, R., Mishra, S. C., and Mitra, K., "Analysis of radiative signals from normal and malignant human skins subjected to a short-pulse laser", 68, 2014, pp. 278-294, International Journal of Heat and Mass Transfer.
2. Mallick, A., and Das, R., (2014), Application of simplex search method for predicting unknown parameters in an annular fin subjected to thermal stresses, Journal of Thermal Stresses, Vol. 37 (2), pp. 236-251
3. P. Jindal, M.Goyal and N.Kumar, (2014), Mechanical characterization of multiwalled carbon nanotubes-polycarbonate composites, Materials and Design, 54,Pages 864–868.
4. Ruzimuradov, O., Nurmanov, S., Hojamberdiev, M., Prasad, R.M., Gurlo, A., Broetz, J., Nakanishi, K., Riedel, R., 2014, "Preparation and Characterization of Macroporous TiO<sub>2</sub>-SrTiO<sub>3</sub> Heterostructured Monolithic Photocatalyst," Materials Letters, Vol. 116, pp. 353-355.

### **Year: 2013**

1. Kumar, M., Singh, H. and Singh, N., (2013), "Production of a Nano-Crystalline Ni-20Cr Coating for High-Temperature Applications", J. Thermal Spray Technol., *accepted for publication*.
2. Arora, H.S., Grewal, H.S., Singh, H. and Mukherjee, S., (2013), "Zirconium Based Bulk Metallic Glass - Better Resistance to Slurry Erosion Compared to Hydroturbine Steel", Wear, Vol. 307, p. 28-34.
3. Arora, H.S., Grewal, H.S., Singh, H., Dhindaw, B.K., McPhail, D.S., Barbara, S., Chater, R., and Mukherjee, S., (2013), "Microstructure-Property Relationship for Friction Stir Processed Magnesium Alloy", Adv. Eng. Mater., Doi: 10.1002/adem.201300205.
4. Arora, H.S., Grewal, H.S., Singh, H., Dhindaw, B.K. and Mukherjee, S., (2013), "Enhancing the Mechanical Properties of AE42 Magnesium Alloy through Friction Stir Processing", Adv. Eng. Mater., *accepted for publication*
5. Arora, H.S., Grewal, H.S., Singh, H., Dhindaw, B.K. and Mukherjee, S., (2013), "Unusually High Erosion Resistance of Zirconium Based Bulk Metallic Glass", J. Mater. Res., DOI: 10.1557/jmr.2013.298.
6. Joshi, R. S., and Singh, H., (2013), "Using X-Ray Diffraction for Studying the Effect of Modulation and Machining Parameters on Deformation Level in Brass Particulate Produced by Modulation Assisted Machining", Powder Diffraction J., *accepted for publication*.
7. Joshi, R. S., and Singh, H., (2013), "An Investigation on Flank Wear Mechanism of Tungsten Carbide Drills during Conventional and Modulation Assisted Drilling", Machining Sci. Technol., *accepted for publication*.
8. Grewal, H.S., Agrawal, A., and Singh, H., (2013), "Identifying Erosion Mechanism: A Novel Approach", Tribol. Lett., DOI: 10.1007/s11249-013-0156-4.
9. Arora, H. S., Singh, H. and Dhindaw, B. K., (2013), "Wear Behaviour of a Mg Alloy Subjected to Friction Stir Processing", Wear, Vol. 303, No. 1-2, pp. 65-77.

10. Grewal, H.S., Singh, H., and Agrawal, A., (2013), "Understanding Liquid Impingement Erosion Behaviour of Nickel-Alumina Based Thermal Spray Coatings", *Wear*, DOI: 10.1016/j.wear.2013.01.063.
11. Kaushal, G., Kaur, N., Singh, H. and Prakash, S., (2013), "Effect of Zirconium addition in HVOF-sprayed Ni-20Cr Coating", *Surf. Eng.*, Vol. 29, No.1, pp. 46-54
12. Grewal, H.S., Arora, H.S., Agrawal, A., and Singh, H., (2013), "Surface Modification of Hydroturbine Steel using Friction Stir Processing", *Appl. Surf. Sci.*, Vol. 268, No. 1, pp. 547-555.
13. Grewal, H.S., Singh, H., and Agrawal, A., (2013), "Microstructural and Mechanical Characterization of Nickel-Alumina Thermal Sprayed Coatings", *Surf. Coat. Technol.*, Vol. 216, pp. 78–92.
14. Grewal, H.S., Agarwal, A., Singh, H., (2013), "Design and Development of High-Velocity Slurry Erosion Test Rig using CFD", *J. Mater. Eng. Perform.*, Vol. 22, pp. 152–161.
15. Arora, H. S., Singh, H. and Dhindaw, B. K., (2013), "Corrosion Behaviour of a Mg Alloy AE42 Subjected to Friction Stir Processing", *Corros.*, Vol. 69, No. 2, pp. 122-135.
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3. Bala, N., Singh, H. and Prakash, S., (2010), "Erosion-Corrosion Behaviour of Cold Spray Ni-20cr Coating on SA 516 Steel in Actual Boiler Environment", Proc. '49<sup>th</sup> Annual International Conference of Metallurgists (COM 2010)', October 3-6, held at Vancouver, BC, Canada.
4. Bala, N., Singh, H. and Prakash, S., (2010), "Evaluation of Hot-corrosion Performance of Cold Spray Ni-20Cr Coating on SAE 213-T22 Boiler Steel", Presented in 'The Cold Spray Conference-2010', September 27-28, held at Akron, Ohio, USA.
5. Kaushal, G., Singh, H. and Prakash, S., (2010), "Cyclic Oxidation Behavior of Detonation Gun Sprayed Ni-20Cr Coating on a Boiler Steel at 900°C", TMS 2010, 139<sup>th</sup> Annual Meeting & Exhibition, Seattle, WA, USA, Supplemental Proceedings, Volume 3: General Paper Selections, pp. 307-314.
6. Singh, S., Singh, H. and Pandey, R., (2010), "Design of T-Slotted Type Variable Flange Coupling for Shafts of Different Diameters", Proc. '3<sup>rd</sup> International Conference on Advances in Mechanical Engineering', January 4-6 held at Sardar Vallabhbhai National Institute of Technology, Surat (Gujarat) India, pp. 367-371.
7. Bhandari, S., Grewal, H.S., Singh, H., and Kansal, H.K., (2010), "To Investigate Slurry Erosion Performance of Hydroturbine Steel and Detonation gun coating using Taguchi Method", Proc. '2<sup>nd</sup> International Conference on Production and Industrial Engineering (CPIE 2010)', December 3-5, held at NIT Jalandhar, Punjab, India, pp. 261-268.
8. Bhandari, S., Grewal, H.S., Singh, H., and Kansal, H.K., (2010), "Slurry Erosion Performance Study of 13Cr4Ni and 16Cr5Ni Steels using Taguchi Methodology", Proc. 'International Conference on Emerging Trends in Mechanical Engineering (ICETME 2011)', February 24-26, held at Thapar University, Patiala, Punjab, India, pp. 1025-1033.
9. Kaur, M., Singh, H., and Prakash, S., (2010), "Erosion-corrosion Behaviour of HVOF Sprayed Cr<sub>3</sub>C<sub>2</sub>-NiCr Coatings on SAE-347H Steel in Actual Boiler Environment",



presented at ‘International Conference & Exposition on Corrosion (CORCON 2010)’, during September 23-26, held at Goa, India.

10. Soni, S., Tyagi, H., and Kumar, A., "Role of Blood Flow and Thermal Response of a Cancerous Tissue During Hyperthermia", Paper No. FMFP2010-153, 37th National and 4th International Conference on Fluid Mechanics and Fluid Power, IIT Madras, Chennai, India, Dec. 16-18, 2010.
11. Khullar, V., and Tyagi, H., "Application of Nanofluids as the Working Fluid in Concentrating Parabolic Solar Collectors", Paper No. FMFP2010-179, 37th National and 4th International Conference on Fluid Mechanics and Fluid Power, IIT Madras, Chennai, India, Dec. 16-18, 2010.
12. Otanicar, T. P., Phelan, P. E., Taylor, R. A., and Tyagi, H., "Tuning the Extinction Coefficient for Direct Absorption Solar Thermal Collector Optimization", Paper No. ES2010-90022, ASME 4th International Conference on Energy Sustainability, Phoenix, Arizona, USA, May 17-22, 2010.
13. Taylor, R. A., Phelan, P. E., Otanicar, T. P., Tyagi, H., and Trimble, S., "Applicability of Nanofluids in Concentrated Solar Energy Harvesting", Paper No. ES2010-90055, ASME 4th International Conference on Energy Sustainability, Phoenix, Arizona, USA, May 17-22, 2010.
14. Bain, S.D., Prasad, J., Poliachik, S.L., Threet, D., Srinivasan, S. and Gross, T.S., 2010, "Trabecular bone homeostasis is modulated by neuromuscular proprioception," 32nd annual meeting of the American Society for Bone and Mineral Research (ASBMR), October 15 - 19, 2010, Toronto, Canada.
15. Srinivasan, S., Threet, D., Prasad, J., Ausk, B.J., Bain, S.D., and Gross, T.S., 2010, "Timing skeletal loading to enhance bone formation," 32nd annual meeting of the American Society for Bone and Mineral Research (ASBMR), October 15 - 19, 2010, Toronto, Canada.
16. Vicente Chulvi; Elena Mulet; Amaresh Chakrabarti; Srinivasan V; Prabir Sarkar, 2010. Quantitative measure of creativity related to SAPPhIRE-based method. Design computing and cognition, DCC 2010, 12–14 July 2010, University of Stuttgart, Stuttgart, Germany.
17. Agrawal, A., Ziegert, J., Smith, S., Woody, B., Cao, J., Comparison of Dimensional Repeatability of Deformation Machined Components with Sheet Metal Components, Transactions of NAMRI/SME, Volume 38, 2010, Pages 571-576 (North American Manufacturing Research Conference, NAMRC 38).

#### **Year: 2009**

1. Kaur, M., Singh, H., and Prakash, S., (2009), "Evaluation of High Temperature Oxidation Behaviour of Detonation-gun Spray WC-Co coatings on SAE-213-T22 Boiler Steel in Air Environment", presented at ‘International Conference & Exposition on Corrosion (World CORCON 2009)’, September 29-October 1, held at Mumbai, India.
2. Gitanjaly, Singh, H. and Prakash, S., (2009), "High Temperature Corrosion of Some Superalloys in the Presence of MgO as an Oxide Additive", Proc. ‘Material Science and Technology (MS&T) 2009 Conference and Exposition,’ October 25-29 held at Pittsburgh, Pennsylvania, USA, Vol. 3, pp. 1939-1950.

3. Kaushal, G., Singh, H. and Prakash, S., (2009), "A Comparative Study on Role of Zirconium as Minor Addition in HVOF-Spray Ni-20Cr Coatings in Enhancing Life of Boiler Steel", 'Thermal Spray 2009: Proceedings of the International Thermal Spray Conference (ITSC2009),' May 4-7, held at Las Vegas, Nevada, USA, pp. 685-690.
4. Kaur, M., Singh, H., Singh, B. and Singh, B., (2009), "Studies on the Sliding Wear Performance of Plasma Spray Ni-20Cr and Ni<sub>3</sub>Al Coatings", 'Thermal Spray 2009: Proceedings of the International Thermal Spray Conference (ITSC2009),' May 4-7, held at Las Vegas, Nevada, USA, pp. 1169-1174.
5. Sarao, T.P.S., Singh, H., Singh, H., Saheet H.S. and Chhibber R., (2009), "Surface Modification Techniques for Metallic Implants used in Biomedical Applications", Proc. Materials Science & Technology Conference (MS&T09), October 25-29, held at Pittsburgh, USA, pp. 2542-2553.
6. Bala, N., Singh, H. and Prakash, S., (2009), "High Temperature Corrosion Behavior of Cold Spray Ni-20Cr Coating on Boiler Steel in Molten Salt Environment at 900 °C", 'Thermal Spray 2009: Proceedings of the International Thermal Spray Conference (ITSC2009),' May 4-7, held at Las Vegas, Nevada, USA, pp. 679-684.
7. Singh, S. and Singh, H., (2009), "Design and Static Stress Analysis of T-Slotted Type Variable Flange Coupling", Pro. 'ICCMS09', December 1-5, IIT Bombay, INDIA, pp.107-08.
8. Tyagi, H., Phelan, P. E., and Prasher, R., "Thermochemical Conversion of Biomass Using Solar Energy: Use of Nanoparticle-Laden Molten Salt as the Working Fluid", Paper No. ES2009-90039, ASME 3rd International Conference on Energy Sustainability, San Francisco, California, USA, Jul. 19-23, 2009.
9. Gupta, R., Debnath, B.K., and Das, R., (2009), "CFD analysis of two-bucket Savonius rotor using fluent package, European Wind Energy Conference & Exhibition", Marseille, France.
10. Prasad, J., Wiater, B.P., Huber, P., Nork, S.E., Bain, S.D. and Gross, T.S., 2009, "The osteogenic response to skeletal injury is enhanced by strain deprivation," Journal of Bone and Mineral Research, Vol. 24 (Suppl. 1). Presented at ASBMR 31st annual meeting, September 11 - 15, 2009, Denver, Colorado.
11. Bain, S.D., Prasad, J., Wiater, B.P., Huber, P., Nork, S.E. and Gross, T.S., 2009, "Transient muscle paralysis blocks the osteogenic response to skeletal injury," Journal of Bone and Mineral Research, Vol. 24 (Suppl. 1). Presented at ASBMR 31st annual meeting, September 11 - 15, 2009, Denver, Colorado.
12. Prasad, J., Bain, S.D., and Gross, T.S., 2009, "Validation of a novel in-vivo paradigm to assess the role of mechanical stimuli in bone healing," Transactions of the Orthopaedic Research Society, Vol. 34. Presented at 55th annual meeting of the Orthopaedic Research Society (ORS), February 22 - 25, 2009, Las Vegas, Nevada.

## **National Conferences**

### **Year: 2013**

1. Dhage, S. B., Goindi, G. S., Jayal, A. D., and Sarkar, P., 2013, "Influence of Cutting Tool Flank Surface Texture in Mechanical Micromachining of AISI 1045 Steel,"

Proceedings of the National Conference on Manufacturing: Vision for Future, IIT Guwahati, Guwahati, India, October 12-13, 2013, pp. 81-89.

2. Singla, R.K., and Das, R., 2013, "Multi-objective optimization of a cooling tower using Newton-Raphson method, National Conference on Frontiers in Aeronautical, Aerospace and Automotive Engineering", Noorul Islam University, Kanyakumari, India, March 1-2, 2013.

#### **Year: 2012**

1. Arora, H.S., Singh, H. and Grewal, H.S., (2012), "Fabrication of Al Based Nanocomposite Using Friction Stir Processing" Proc. 'Nano Science and Technology (NanosciTech 2012)', February 15-18, held at Punjab University, Chandigarh, India.
2. Arora, H.S., Singh, H. and Grewal, H.S., (2012), "Cavitation Studies on Friction Stir Processed Al Based Nanocomposite" Proc. 'Nano Science and Technology (NanosciTech 2012)', February 15-18, held at Punjab University, Chandigarh, India.
3. A. Bhowmik, Ramjee Repaka and Subhash C. Mishra, Short-pulse Laser Transport in Biological Tissue with and without Malignant Lesion, 2<sup>nd</sup> International Conference on Biomedical Engineering and Assistive Technologies, 6-7 December 2012, Jalandhar, India.
4. Grewal, H.S., Agrawal, A., Singh, H., "Development of New Mathematical Model for Slurry Erosion Prediction", Third Asian Conference on Mechanics of Functional Materials and Structures (ACMFMS 2012), Organized by Department of Applied Mechanics, IIT Delhi, 5-12 December 2012.
5. Grewal, H.S., Singh, H., Agrawal, A., Arora, H.S., "Evaluation and Development of Economically viable coatings for Erosion Protection of Hydroturbines", International Conference on Advances in Materials and Processing challenges and opportunities (AMPCO 2012), Organized by Department of Metallurgical and Materials Engineering, Indian Institute of Technology Roorkee, Roorkee, 2-4 November 2012
6. Grewal, H.S., Agrawal, A., Singh, H., Arora, H.S., "Cavitation Erosion Studies on Friction Stir Processed Hydroturbine Steel", Fifth International Conference on Solidification Science and Processing, Organized by Indian Institute of Technology Bhubaneswar (ICSSP 2012), Bhubaneswar November 19- 20, 2012

#### **Year: 2011**

1. Bala, N., Singh, H. and Prakash, S., (2011), "Comparative Performance of Cold Sprayed Ni-20Cr and Ni-50Cr Coatings on T22 Boiler Steel in Different Aggressive Environments", Proc. 'National Conference on Advancements and Futuristic Trends in Mechanical and Materials Engineering (AFTMME'11)', October 7-8, held at Punjab Technical University Jalandhar, Punjab, India.
2. Kaur, M., Singh, H., and Prakash, S., (2011), "Studies on Role of Detonation-gun Sprayed WC-Co Coatings to Combat High Temperature Corrosion of Boiler Steel", Proc. 'National Conference on Advancements and Futuristic Trends in Mechanical and Materials Engineering (AFTMME'11)', October 7-8, held at Punjab Technical University Jalandhar, Punjab, India.

3. Kumar, H., Goyal, D.K. and Singh, H., (2011), “Slurry Erosion Performance of Uncoated and HVOF Sprayed Diamalloy 4700 (CoNiCrAlY) Coated CA6NM Steel”, Proc. ‘First National Conference on Advances in Mechanical Engineering (NCAME-2011)’, May 20-21, held at UIET, Panjab University, Chandigarh, India.
4. Grewal, H.S., Agrawal, A. and Singh, H., (2011), “CFD Modeling for Evaluation of Slurry Erosion of Hydroturbine Materials”, Proc. ‘Advancements & Futuristic Trends in Mechanical & Materials Engineering (AFTMME 2011)’, October 7-8, held at Punjab Technical University, Jalandhar, Punjab, India.
5. Agrawal, A., Ziegert, J., Smith, S., Woody, B., Fatigue Life Study of Deformation Machined Components,. Cao, Indo-Japan Seminar, IIT Delhi, New Delhi, March 21-25, 2011.

**Year: 2010**

1. Grewal, H.S., Bhandari, S. and Singh, H., (2010), “Slurry Erosion Performance of Hydroturbine Steel and Thermal Spray Coating”, Proc. ‘National Conference on Futuristic Trends in Mechanical Engineering (FTME 2010)’, October 29-30, held at GNDEC, Ludhiana, Punjab, India.

**4. Activities conducted in the School**

<b>Name of the Visitors, Designation and Institute/organization</b>	<b>Topic of the seminar/talk</b>	<b>Date</b>
Prof. Sudipto Mukherjee, IITD Mehra Chair professor of Design and Manufacturing at IITD	Incremental Knowledge Innovation	16-Dec-2013
Dr. Rakesh Kumar Maurya, Assistant Professor, SMMEE, IIT Ropar	Homogeneous Charge Compression Ignition (HCCI): Alternative Engine Combustion Mode	08-Oct-2013
Dr. N. Venkata Reddy, Professor, Department of Mechanical Engineering, Indian Institute of Technology Hyderabad	Incremental Sheet Metal Forming: Recent Developments and Challenges	30- Sep- 2013
Prof. D. Sudhakar Rao (Director, Bone & Mineral Research Laboratory, Henry Ford Hospital, USA.	Role of histomorphometry in bone research	09-Sep-2013
Prof. Balveen Kaur (Professor, Dept of Neurological Surgery, Ohio State University)	Viral Therapy for Brain Tumor	23-Aug-2013
Dr B.P.S. Parmar (Parmar Hospital, Ropar)	Laparoscopic Bariatric Surgery	14-Aug-2013

Dr. V. Jayaram (Principal Research Scientist , Solid State and Structural Chemistry Unit, IISc Bangalore	Materials under extreme thermodynamic conditions-an experimental investigation	21-May-2013
Dr. Raghupatruni Prasad (Postdoctoral Research Scientist, High Temperature Energy Materials Research Center, Korea Institute of Science & Technology )	Structure, magnetic and mechanical properties of rapidly solidified Ni-base magnetic shape memory alloys and Fe, Ni-Au alloy, barcode	29-Apr-2013
Mr. Abhishek Kumar Tiwari, Research Scholar, SMMEE, IIT Ropar	Bone's Adaptation to Mechanical Environment	12-Apr-2013
Dr. Supreet Singh Bahga ( PhD from Stanford University, USA)	Propagation and Interaction of Ion Concentration Shock Waves in Microfluidics	09-Apr-2013
Dr. Namrata Gundiah (Assistant Professor, Department of Mechanical Engineering, Indian Institute of Science, Bangalore)	Mechanics of Living Tissues: In Sickness and in Health	05-Apr-2013
Dr. Philip A. Davies (Associate Professor, Sustainable Environment Research Group, School of Engineering and Applied Science, Aston University, UK)	DesaLink: Solar powered desalination of brackish groundwater giving high output and high recovery	01-Apr-2013
Prof. S. K. Saha (Naren Gupta Chair Professor, Department of Mechanical Engineering, IIT Delhi)	RoCK-BEE: Robotics Competition Knowledge Based Education in Engineering	22-Mar-2013
Dr. Sriram Venkatesan ( Post-Doctoral researcher, Center for NanoScience, Ludwig-Maximilians-Universität München, Munich, Germany )	Structure, Chemistry and Interface of Epitaxial Systems	13-Mar-2013
Prof. Rudra Pratap (Professor, Department of Mechanical Engineering, IISc Bangalore)	Initiation and Execution of Big Interdisciplinary Research Projects: The Role of Vision, Teamwork, and Infrastructure Development	08-Mar-2013
Prof. K. Chattopadhyay (Professor, Department of Materials Engineering, IISc Bangalore)	Doing research in India: pages from personal experience	08-Mar-2013
Prof. S. K. Das (Professor, Department of Mechanical Engineering, IIT Madras	Thermal ablation of tumor using nanoparticle assisted LASER irradiation	24-Dec-2012

Dr. Robert A. Taylor (Lecturer, School of Mechanical and Manufacturing Engineering, University of New South Wales, Australia)	Recent Trends in Solar Thermal Energy	07-Nov-2012
Dr. Prodyut Ranjan Chakraborty (Post-Doctoral fellow (DAAD Fellowship), Institute for Material Physics in Space, German Aerospace Center, Köln, Germany)	Evolution of dendritic morphology during coarsening of mushy zone	06-Nov-2012
Dr. Dhiraj K. Mahajan (Post Doctoral Research Associate, Interdisciplinary Centre for Advanced Materials Simulation, Ruhr University Bochum, Germany)	Multiscale Modeling of Polymeric and Metallic Materials based on Molecular Dynamics	01-Nov-2012
Dr. Prabir Sarkar, Assistant Professor, SMME, IIT Ropar	Automobile Design	19-Oct-2012
Dr. Marcelo H. ANG (Associate Professor, Department of Mechanical Engineering, National University of Singapore)	Human-centered Robotics	06-Sep-2012 (via NKN)
Dr. Suhasini Gururaja (Assistant Professor, Department of Aerospace Engineering, Indian Institute of Science, Bangalore)	Processing and Secondary manufacturing effects on advanced composites	20-Apr-2012
Dr. Sudhakar Sagi, Aston University, UK	Decentralised Off-grid Electricity Generation for the Rural Communities in India	17-Apr-2012
Dr. Mangal Roy (Assistant Research Professor, School of Mechanical and Materials Engineering Washington State University, USA)	Engineered Bioceramics for Next Generation Implants	12-Jan-2012
Dr. Krishna Vijayaraghavan (Assistant Professor, Mechatronics Systems Engineering, Simon Fraser University, CANADA)	Energy Harvesting and Energy Storage for Transportation and Sustainable Energy Applications	09-Jan-2012
Prof Suresh Chandra, North Carolina A&T State University, USA	Pursuing Research in a US University	18-Nov-2011

Mr Kulbir S. Bhogal, M/S Simon Carves India Ltd.	Welding Operations in Projects	13-Oct-2011
Dr. Anshu Dhar Jayal, Assistant Professor, SMME, IIT Ropar	Career Planning for Mechanical Engineers	12-Oct-2012
Mr Patel Amit Rajnikant, PhD Scholar, SMME, IIT Ropar	Study Analysis and Development of Commercially Viable Biomass Gasifier Assisted Hot Air Generator System	15-Sep-2011
Mr. Subhendu Roy, Consultant, A.T. Kearney	Discussion Session for Career Planning/Advice	10-Sep-2011
Mr Vikas Shahi, DesignTech Systems Ltd.	Fused Deposition Modelling (FDM)-based rapid prototyping machines	18-Apr-2011
Mr Anuj Pratap Singh, Oceaneering Inc.	Modern-day aircraft engines in general and high bypass turbofan engines	16-Apr-2011
Dr. Krishna Vijayaraghavan, Simon Fraser University, Canada	Energy harvesting and energy storage for transportation and sustainable energy applications	09-Jan-2011

### Workshops Conducted

1. Organized a joint research colloquium for the faculty and students of Aston University, UK and IIT Ropar during April 12-17, 2010.
2. Dr. Himanshu Tyagi organized a joint Indo-US workshop on *Recent Advances in Micro/Nanoscale Heat Transfer and Applications in Clean Energy Technologies*, during Dec 21-22, 2013 at IIT Ropar. Funding for this workshop was provided by IUSSTF (Indo-US Science & Technology Forum).
3. Dr. Himanshu Tyagi co-organized (as international collaborator) a *Sustainable Energy Fellowship Workshop & Collaborative Joint Projects*, during Apr 10-12, 2012 at UNSW (University of New South Wales), Sydney, Australia. Funding for this workshop was provided by the University of New South Wales.
4. Four students from IIT Ropar (1 PhD student - Mr. Vikrant Khullar, and 3 B.Tech students - Mr. Vivek Vishwakarma, Mr. Rahul Gulati and Mr. Ashwanth Reddy) were selected to participate in the workshop in Sydney along with students from UNSW.
5. Dr. Navin Kumar co-organised *VETOMAC-VI* (Vibration Engineering and Technology of Machinery) International Conference *IIT Delhi*, Dec 13-15, 2010.
6. Dr. Navin Kumar Co-Organized New York City metro area conference on Nano Materials, Jan, 2009. Hoboken, USA.
7. Dr. Navin Kumar, Advisory committee in International Conference on Intelligent Robotics, Automation and Manufacturing (IRAM) 2013, IIT Indore.

## **Faculty Development Programs**

Dr. Harpreet Singh coordinated a faculty development programme on 'Industrial Tribology' during January 3-8, 2011.

## **Foreign Students Hosted**

1. Dr Daniela Proprentner, Research Associate, Royal School of Mines, Materials, Imperial College London - Feb 18-22, 2013 under UKIERI Grant.
2. Two students from Simon Fraser University, Burnaby, CANADA (Mr. Manpreet Singh and Mr. Shahzada Randhawa) were co-supervised by Dr. Himanshu Tyagi at IIT Ropar for a duration of 3 months (Sep - Nov 2012). The students worked on a research project related to solar-wind hybrid systems and the work done by them resulted in a conference paper titled "Wind Solar Hybrid Power System Modelling and Analysis" which was presented at the ASME 2013 7th International Conference on Energy Sustainability and 11th Fuel Cell Science, Engineering and Technology Conference, Minneapolis, Minnesota, USA, Jul. 14-19, 2013.

## **Design Fair**

The School of Mechanical, Materials and Energy Engineering (SMME) at Indian Institute of Technology (IIT), Ropar organized two design events: Design exhibition and Industrial Internship poster presentation on November, 2012, and Design exhibition and B.Tech. project display in April 2013. Students from all branches displayed their products designed in the Product design and realization I (guided by Dr. Prabir Sarkar) course. Some of the innovative products that were displayed in the design fair are: laser leveler for civil engineers and architects (can also be used while constructing any building), energy generation from water recycling system in tall buildings, portable low cost cloth dryer (to be used during rainy season), semi-automatic Jalebi-maker, wood cutter using manual power, electric number lock, industrial waste water purification device, solar water heater, device to increase gas efficiency (save 30% on your next LPG cylinder), and disposable syringe crusher to be used during mass vaccination. Patents would be applied for some of these designs.

Creative products from Product design and realization II guided by Dr. Harpreet, Dr. Anupam, Dr. Prabir, Dr. Anshu and Dr. Ekta were also displayed, including energy from vehicles, solar refrigerator, bat knocking machine, and ceiling fan cleaner. Final year students also displayed their posters (coordinated by Dr. Anupam Agrawal) on their industrial internships projects at different organizations such as BHEL, TERI, Aston University, and DRDO.

## **5. Activities by the faculty**

### **Foreign Visits:**

### **Year: 2013**



- Dr. Anupam Agrawal attended and chaired a session in the “19th Wear of Materials conference”, Portland, Oregon, USA, 14-18 April 2013
- Dr. Ekta Singla attended IEEE 6th Robotics and Mechatronics Conference, Durban, South Africa, October 30-31, 2013.
- Dr. Harpreet Singh visited Imperial College, London, UK under UKIERI Project from June 10-24, 2013
- Dr. Harpreet Singh attended International Thermal Spray Conference and Exposition (ITSC-2013) at Busan, South Korea during May 13-15, 2013 and chaired a session on “Cold Sprayed Powders”
- Dr. Himanshu Tyagi attended ASME 2013 4th Micro/Nanoscale Heat & Mass Transfer International Conference at University of Hong Kong, Hong Kong, China, during Dec 2013.
- Prof. M. K. Surappa visited University of Colorado, Denver and Georgia Institute of Technology, Atlanta, USA for seminar and research collaboration work.
- Prof. M. K. Surappa participated in the PAN IIT Global Conference’ 2013 as a Guest of Honor held in Houston(Texas), USA during 6th to 8th December 2013.
- Dr. Ramjee Repaka attended and presented technical papers in ASME 2013- International Mechanical Engineering Congress and Exposition (IMECE) held at San Diego, California, USA during 15-21 November 2013.

#### **Year: 2012**

- Dr. Harpreet Singh attended International Conference on X-Rays & Related Techniques in Research & Industry 2012 (ICXRI 2012) at Penang, Malaysia during July 3-5, 2012
- Dr. Himanshu Tyagi visited University of New South Wales, Sydney, Australia as part of the *Sustainable Energy Fellowship Workshop & Collaborative Joint Projects*, during Apr 2012.
- Dr. Himanshu Tyagi attended ASME 2012 3rd Micro/Nanoscale Heat & Mass Transfer International Conference at Georgia Tech, Atlanta, USA, during Mar 2012.
- Prof. M. K. Surappa visited Imperial College London with Dr. Yogesh Chawla, Director, PGIMER, Chandigarh during 28.10.2012 to 02.11.2012.
- Prof. M. K. Surappa participated in the Administrator Enrichment Programme at RWTH Aachen University during 17-09-2012 to 20-09-2012.
- Dr. Navin Kumar, Visited Glasgow University as a part of Indo UK joint research collaboration. (May, 2012-June 2012).
- Dr. Ramjee Repaka attended, presented technical papers and chaired a technical session in 9<sup>th</sup> International Conference on Flow Dynamics which was held at Sendai, Miyagi, Japan during 19 – 21 September 2012.

#### **Year: 2011**

- Dr. Anupam Agrawal attended and chaired a session in the “ASME 2011 International Manufacturing Science and Engineering Conference MSEC2011”, June 13-17, 2011, Corvallis, Oregon, USA.
- Dr. Ekta Singla attended Int. Conf. of CAD/CAM, Robotics and Factories of the Future, Kuala Lumpur, Malaysia, July 2011.

- Dr. Ekta Singla was a member of Indo-Russian Joint Workshop on Computational Intelligence and Modern Heuristics in Automation and Robotics, held at Novosibirsk, Russia, September 10-12, 2011.
- Dr. Harpreet Singh attended International Thermal Spray Conference and Exposition (ITSC-2011) at Hamburg, Germany during September 27-29, 2011
- Dr. Harpreet Singh was a visiting faculty at Imperial College, London, UK under UKIERI Program from March 14-25, 2011
- Dr. Himanshu Tyagi Visited Simon Fraser University, Burnaby, Canada as part of the BC-India Mobility Initiative, during Nov 2011.
- Dr. Ramjee Repaka attended, presented technical papers and chaired a technical session in 8<sup>th</sup> International Conference on Flow Dynamics held at Sendai, Japan, 9 – 11 November 2011.

**Year: 2010**

- Dr. Harpreet Singh attended Cold Spray Conference 2010 at Akron, Ohio, USA during September 27-28, 2010
- Dr. Harpreet Singh attended the 49<sup>th</sup> Annual International Conference of Metallurgists (COM 2010) at Vancouver, BC, Canada during October 3-6, 2010

**Year: 2009**

- Dr. Navin Kumar: Attended Nanotech conference and exposition, 2009, Houston, TX, USA.

**Invited Talks (In India)**

**Year: 2013**

- Dr. Anshu Dhar Jayal delivered invited lectures on “Sustainability Issues in Micromanufacturing” at the *Short Term School on Advanced and Micromanufacturing, PEC University of Technology*, 03 – 07 Jun, 2013, and at the *KC College of Engineering and IT, Nawanshahr*, 24 Sep, 2013.
- Dr. Anshu Dhar Jayal delivered an invited lecture on “Sustainable Manufacturing: Recent Trends and Future Developments” at the *International Conference on Global Technology Initiatives, Rizvi College of Engineering, Mumbai*, 29-30 Mar, 2013.
- Dr. Anupam Agrawal delivered an invited lecture on “Introduction to Micro Manufacturing” at the ICRIME-2013 held at GNDEC Ludhiana from 24-26th October 2013.
- Dr. Ekta Singla delivered a lecture on *Performance Indices for Robotic Manipulators* in TEQIP II sponsored Short term Course on Recent trends in Materials, Manufacturing and Safety, at GZS CET Bathinda, Dec. 2-6, 2013.
- Dr. Ekta Singla delivered invited lecture in Chandigarh University on *Evolutionary Robotics*, Oct. 10, 2013.
- Dr. Ekta Singla delivered a lecture on *Latex: A Powerful Tool for Document Drafting*, in PTU sponsored FDP on Research Methodologies and Design of Experiments at SUSCET Tangori, Punjab, July 22-26, 2013.

- Dr. Ekta Singla delivered a series of lectures on *Optimization through Matlab* in TEQIP-II sponsored short term program on Matlab for Chemical Engineers, at Thapar University, Patiala, June 4-7, 2013
- Dr. Ekta Singla delivered a lecture on *Optimal Design of Robotic Manipulators* in TEQIP-II sponsored short term program on Design and Development of Robots with Practical Approach at Dr. Ambedkar Institute of Technology, Bangalore, March 25-29, 2013.
- Dr. Ekta Singla delivered a lecture on *Performance measures for Robotic Arms* in TEQIP-II sponsored short term training program on Advanced robotics: Design, Planning and Control, at Thapar University, Patiala, March 21-23, 2013.
- Dr. Ekta Singla delivered an invited talk on Fundamentals of Robotics at Chandigarh University, March 5, 2013.
- Dr Ekta Singla delivered a lecture on *Evolutionary Algorithms: Concepts and Applications* in TEQIP-II sponsored STTP on Optimization Techniques and their Applications in Engineering Reserach, at UIET Punjab University, Chandigarh, Jan 21-25, 2013.
- Dr. Harpreet Singh delivered an invited talk on “*Development of Nano-structured Materials and Coatings through Mechanical Processing*” during AICTE Sponsored National Conference “Recent Advancements in Mechanical Engineering (RAME-2013)” on December 12, 2013 at CT Institute of Engineering, Management & Technology, Jalandhar, India.
- Dr. Harpreet Singh delivered an expert talk on “*Developing Nano-Structured Materials and Coatings through Some Mechanical Routes-Our Experiences at IIT Ropar*” during Faculty Development Programme (FDP) under TEQIP-II on November 26, 2013 at Punjab University, Chandigarh, India.
- Dr. Harpreet Singh delivered an expert talk on “*Development of Nano-structured Materials and Coatings through Some Mechanical Routes*” during Short Term Course on “Recent Trends in Materials, Manufacturing and Safety” on December 2, 2013 sponsored by TEQIP II at Giani Zail Singh Punjab Technical University Campus, Bathinda, India.
- Dr. Harpreet Singh delivered an invited talk on “*High Temperature Behavior of HVOF Sprayed Nano-structured Ni-20Cr Coating*”, during International Conference on “Advancements and Futuristic Trends in Mechanical and Materials Engineering (AFTMME-2013)”, October 3-6, 2013 held at Punjab Technical University Jalandhar, Kapurthala, India.
- Dr. Himanshu Tyagi delivered an expert lecture on “*Utilizing Nanoparticles for Harnessing Solar Thermal Energy*” at NIT Hamirpur as part of the National Workshop on Power Generation from Renewable Energy Sources sponsored by Ministry of New and Renewable Energy, India, 2013.
- Dr. Himanshu Tyagi delivered the invited lecture on “*Applicability of Nanoparticle Suspensions in High Flux Solar Collectors*” during the 'Short Term Training Programme on Solar Energy and its Applications' (STTP-SEA) at MANIT Bhopal, India, 2013.
- Dr. Himanshu Tyagi delivered as Guest of Honour the inaugural lecture on “*Technology Advances in Sustainable Energy Applications*” during the 'Short Term Training Programme on Solar Energy and its Applications' (STTP-SEA) at MANIT Bhopal, India, 2013.

- Dr. Himanshu Tyagi delivered an invited lecture on “*Opportunities in Solar Thermal Collectors*” at Chandigarh University, India, 2013.
- Dr. Himanshu Tyagi delivered the plenary lecture on “*Clean and Renewable Energy Resources*” at the International Conference on Advancements and Futuristic Trends in Mechanical and Materials Engineering, Punjab Technical University, Jalandhar, India, 2013.
- Dr. Himanshu Tyagi delivered an invited lecture on “*Applications of Nanoparticles in Harnessing Solar Thermal Energy*” during the International Conference on Interdisciplinary Areas with Chemical Sciences (ICIACS 2013) at Panjab University, Chandigarh, India, 2013.
- Dr. Himanshu Tyagi delivered an invited session talk on “*Harvesting Solar Energy Using Nanotechnology*” during the Indo-US Workshop on Recent Advances in Micro/Nanoscale Heat Transfer and Applications in Clean Energy Technologies at IIT Ropar, India, 2013.
- Prof. M. K. Surappa presented a talk in the 36th Annual Science Festival at the National College, Bangalore on 20th July 2013.
- Dr. Navin Kumar, Inaugural expert lecture in in FQIP Panjab University Chandigarh on 15th and 16th July, 2013.

#### **Year: 2012**

- Dr. Anshu Dhar Jayal delivered an invited lecture on “Sustainable Micromanufacturing” at the *Short Term School on Micromanufacturing, IIT Kanpur, 05 – 10 Nov, 2012*. Another invited lecture is scheduled for the next such short term school at IIT Kanpur on 01 Apr, 2014.
- Dr Ekta Singla delivered a series of lectures in *Evolutionary Algorithms: Applications in multidisciplinary fields* in PTU sponsored FDP on Recent Tools in Research: Matlab, Latex and Evolutionary Robotics at Rayat Bahra College of Engineering and Nano Technology for Women, Hoshiarpur, Punjab, India, July 2-6, 2012.
- Dr Ekta Singla delivered a lecture on *Customized Manipulators: Concept, Planning and Design Approach* at PTU sponsored FDP on Robotics in Industrial Automation and Advanced Manufacturing at SSIET, Derrabassi, Punjab, India, July 2-5, 2012.
- Dr. Harpreet Singh chaired a session on Hot Corrosion and delivered an invited talk titled “*Comparative High Temperature Corrosion Behaviour of Ni-20Cr Coatings deposited by Various Thermal Spraying Techniques*” during International Conference on “Corrosion in Infrastructure & Chemical Industries (CICI 2012)”, December 6-8, 2012 at ITM Universe Vadodara, India.
- Dr. Harpreet Singh chaired a session and delivered an invited talk on “*Slurry Erosion in Hydroturbines and its Protection*” during International Conference on “Advancements & Futuristic Trends in Mechanical & Materials Engineering”, October 5-7, 2012 held at Punjab Technical University, Jalandhar, India on October 7, 2012.
- Dr. Harpreet Singh delivered an expert lecture on “*Slurry Erosion in Hydroturbines and its Protection*” during Punjab Technical University sponsored Symposium on “Recent Advances in Emerging Surface Engineering Practices” at RIMT College of Engineering and Technology, Mandi Gobindgarh, Punjab, India on July 20, 2012.
- Dr. Harpreet Singh delivered an expert lecture on “*Friction Stir Processing of a Mg-based Alloy*” during AICTE-sponsored Faculty development Program, CGS Colleges, Ghuraun, India on May 15, 2012.

- Dr. Himanshu Tyagi delivered an expert lecture on “*Role of Nanotechnology in Harnessing Renewable Energy*” at RBCEBTW College, as part of Faculty Development Program on 'Emerging Trends in Nanoscience and Technology' sponsored by PTU (Punjab Technical University), India, 2012.
- Dr. Navin Kumar delivered an expert Lecture on ”Charaterization of nano materials” Recent innovation in engineering and Technology, March, 25, 2012, Galaxy Global Educational Institutes, Ambala, India.
- Dr. Prabir Sarkar delivered invited expert lecture on sustainability and eco-design at Lovely Professional University, Jalandhar, 2012.
- Dr. Prabir Sarkar delivered talk on automobile design to the society of mechanical engineers (SME), IIT Ropar chapter, 2012.

### **Year: 2011**

- Dr. Anshu Dhar Jayal delivered an invited lecture on “Tribological Issues in Machining” at the *Faculty Development Program on Industrial Tribology, IIT Ropar, 03 – 07 Jan, 2011.*
- Dr Ekta Singla delivered an invited talk on *Industrial Robotic Arms*, at Yadavindra College of Engineering, Punjab, India, October 22, 2011.
- Dr. Harpreet Singh delivered an expert lecture on “*Friction Stir Processing of a Mg-based Alloy*” during National Conference on “Advances and Futuristic Tends in Mechanical and Materials Engineering (AFTMME 2011)” at Punjab Technical University, Jalandhar India on October 7, 2011.
- Dr. Harpreet Singh delivered an expert lecture on “*An Introduction to the Recent R&D Activities in Mechanical and Materials Engineering*” during Faculty Development Programme on “Advances in Materials and Manufacturing Technology” at Malout Institute of Management and Information Technology, Malout, India on July 19, 2011.
- Dr. Harpreet Singh delivered an expert talk on “*Recent R&D Activities in Mechanical Engineering*” during “National Conference on Advances in Mechanical Engineering (NCAME-2011)” at University Institute of Engineering and Technology, Punjab University, Chandigarh on May 21, 2011 and chaired one technical session.
- Dr. Harpreet Singh delivered a keynote address on “*Renewable Energy Potential*” during National Conference on “Advances in Renewable Energy Resources” at Indo-Global College of Engineering, Abhipur on April 29, 2011.
- Dr. Harpreet Singh delivered a keynote address on “*Advances in Mechanical Engineering*” during “National Seminar on Advances in Mechanical Engineering” at Institute of Engineering & Technology, Bhaddal, Ropar on April 26, 2011.
- Dr. Prabir Sarkar delivered Invited expert lecture at Rayat Institute of Engineering and Information Technology, Ropar Campus, on July 19th, 2011 in the Faculty development Program on “Approaching education related issues using creative problem solving techniques”.

### **Year: 2010**

- Dr. Harpreet Singh delivered an invited lecture on “*Friction Stir Welding-Technology and Future Potential*” during National Conference on Advances and Futuristic Trends in

Mechanical and Materials Engineering (AFTMME 2010) at Yadwindra College of Engineering, Talwandi Sabo, India on February 20, 2010.

- Dr. Navin Kumar delivered an invited Lecture on “*Modeling mechanical behavior of nanoscale structures and materials*” in Indo Austrian Symposium on Materials Engineering. 8-9 Dec 2010 Nonferrous Materials Technology Development Centre Hyderabad.
- Dr. Navin Kumar delivered an expert lecture on “*Nano Composite: Thermal Conductivity*” Punjab University Chandigarh, March 2010.

### **Invited Talks (Abroad)**

#### **Year: 2013**

- Dr. Harpreet Singh delivered an expert talk on “*High Temperature Corrosion Behavior of Plasma Sprayed Coatings on Some Superalloys*” at Korean Institute of Science and Technology (KIST) Seoul, South Korea on May 16, 2013.
- Prof. M. K. Surappa presented a talk in the MS&T’2013 conference held in Montreal, Canada during the period 27th to 31st October 2013.

#### **Year: 2012**

- Dr. Himanshu Tyagi delivered a research seminar on “*Harvesting Solar Energy Using Nanofluids-Based Concentrating Solar Collection*” at the School of Photovoltaic and Renewable Energy Engineering (SPREE), University of New South Wales (UNSW), Sydney, NSW, Australia, 2012.
- Prof. M. K. Surappa presented a talk at the Young Investigators Meeting in Berlin on 14.09.2012.
- Prof. M. K. Surappa visited University of Bochum and delivered lecture on 17.09.2012.
- Dr. Navin Kumar delivered a research seminar on “*Active constrained layer damping*” at the school of Engineering, Glasgow University, UK.

#### **Year: 2011**

- Dr Ekta Singla delivered a talk on *Performance Indices on Robotic Arms* at National University of Singapore (NUS), Singapore – Mechanical Department, July 29, 2011.
- Dr. Himanshu Tyagi delivered a lecture on “*Development and Usage of Clean Energy Resources*” at the Simon Fraser University, Burnaby, British Columbia, Canada, 2011.
- Dr. Himanshu Tyagi delivered a talk on “*Solar Energy: Nanofluids-Based Direct Absorption Solar Collectors*”, at the Simon Fraser University, Surrey, British Columbia, Canada, 2011.
- Dr. Himanshu Tyagi delivered a lecture on “*New and Renewable Energy Resources in India*”, at the NRC Institute for Fuel Cell Innovation, Vancouver, British Columbia, Canada, 2011.
- Dr. Himanshu Tyagi delivered a talk on “*Energy Sustainability: An Indian Context*” at the Powertech Labs Inc., Surrey, British Columbia, Canada, 2011.

#### **Year 2010**

- Dr. Navin Kumar delivered expert lecture on “*Molecular Dynamics application in Mechanical Characterization*” in New York Metro Area Conference, Hoboken, New Jersey. USA.

### **Session Chairs**

#### **Year: 2013**

- Dr. Anshu Dhar Jayal chaired two sessions at the *International Conference on Global Technology Initiatives, Rizvi College of Engineering, Mumbai, 29-30 Mar, 2013*.
- Dr. Anupam Agrawal chaired a session in the “*19th Wear of Materials conference*”, Portland, Oregon, USA, 14-18 April 2013.
- Dr Ekta Singla chaired a session on *Mechatronics in International Conference of Mechanisms and Machines*, held at IIT Roorkee, India, on December 18-20, 2013.
- Dr. Harpreet Singh chaired a session on “*Cold Sprayed Powders*” during International Thermal Spray Conference and Exposition (ITSC-2013) at Busan, South Korea during May 13-15, 2013.
- Dr. Harpreet Singh chaired a session during International Conference on “*Advancements and Futuristic Trends in Mechanical and Materials Engineering (AFTMME-2013)*”, October 3-6, 2013 held at Punjab Technical University Jalandhar, Kapurthala, India.
- Dr. Himanshu Tyagi chaired a session during International Conference on *Advancements and Futuristic Trends in Mechanical and Materials Engineering (AFTMME-2013)*, October 3-6, 2013 held at Punjab Technical University Jalandhar, Kapurthala, India.

#### **Year: 2012**

- Dr. Anshu Dhar Jayal chaired two sessions at the *International Conference on Global Technology Initiatives, Rizvi College of Engineering, Mumbai, 29-30 Mar, 2012*.
- Dr. Harpreet Singh chaired a session on Hot Corrosion during *International Conference on “Corrosion in Infrastructure & Chemical Industries (CICI 2012)”*, December 6-8, 2012 at ITM Universe Vadodara, India.
- Dr. Harpreet Singh chaired a session during International Conference on “*Advancements & Futuristic Trends in Mechanical & Materials Engineering*”, October 5-7, 2012 held at Punjab Technical University, Jalandhar, India on October 7, 2012.
- Dr. Ramjee Repaka chaired a technical session in *9<sup>th</sup> International Conference on Flow Dynamics* which was held at Sendai, Miyagi, Japan during 19 – 21 September 2012.

#### **Year: 2011**

- Dr. Anupam Agrawal chaired a session in the “*ASME 2011 International Manufacturing Science and Engineering Conference MSEC2011*”, June 13-17, 2011, Corvallis, Oregon, USA.
- Dr. Harpreet Singh chaired a session during National Conference on “*Advances and Futuristic Trends in Mechanical and Materials Engineering (AFTMME 2011)*” at Punjab Technical University, Jalandhar India on October 7, 2011.
- Dr. Harpreet Singh chaired a session during “*National Conference on Advances in Mechanical Engineering (NCAME-2011)*” at University Institute of Engineering and Technology, Punjab University, Chandigarh on May 21, 2011.

- Dr. Ramjee Repaka chaired a technical session in 8<sup>th</sup> *International Conference on Flow Dynamics* held at Sendai, Japan, 9 – 11 November 2011.

## 6. Awards, Honours, Recognition

### UG Students

#### **2013**

Mr. Rahul Gulati, Director gold medal, IIT Ropar, 2012-13.

Mr. Rahul Gulati, President of India Gold Medal, IIT Ropar, 2012-13.

### **Internships**

#### **Companies Name for Summer Internship B.Tech-2008 Batch**

Sr . No.	Company/Institute/University Name
1	KIRLOSKAR ELECTRIC COMPANY LTD.
2	Swaraj Majda
3	Minda Silca Engineering Ltd.
4	Hindustan Aeronautics Limited (HAL)
5	ABB
6	HPCL
7	Central Scientific Instruments Organisation
8	DCM Engineering Products,Ropar
9	Aston University
10	Masamb Electronics
11	VIOM NETWORKS LIMITED
12	Abilities India Pistons & Rings Ltd.
13	The energy and resources institute(TERI)
14	Indian Institute of Tropical Meteorology, Pune
15	Tech Mahindra Limited
16	Notion Ink Design labs
17	Bharat Electronics Limited, Ghaziabad
18	Indian Institute of Tropical Meterology, Pune
19	Aston University
20	Indian Institute of Technology, Bombay
21	India Yamaha Motors
22	NFL, Bathinda
23	Institute for Research and Development in Banking Technology (IDRBT)

#### **Companies Name for Summer Internship B.Tech-2009 Batch**

Sr . No.	Company/Institute/University Name
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1	ASTON
2	Terminal Ballistics Research Laboratory (TBRL) - DRDO
3	NFTDC
4	Abilities India Pistons & Rings Ltd
5	COMSOL
6	Oceaneering
7	TERI - The Energy and Resources Institute
8	Bosch – Jaipur
9	TATA STEEL
10	NTPC
11	DMRL (DRDO)
12	IIT Delhi
13	MAX Speciality Films-Chandigarh
14	Yamaha
15	Volvo
16	ADA (Bangalore)
17	BHEL

**Companies Name for Summer Internship B.Tech-2010 Batch**

Sr. No.	Institute/University/Company Name & Contact
1	DAAD Germany
2	Zeus Numerix Pvt Ltd
3	Aston
4	Bloom Energy Mumbai India
5	Sustainability Solutions Group
6	Max India Limited
7	DRDO
8	INDIA YAMAHA MOTOR PVT. LTD.
9	Timetooth Technologies
10	Technology Centre Pvt. Ltd.
11	Ashok Leyland Limited
12	Volkswagan India Pvt.Ltd.
13	Tata Motors Ltd,
14	Suprajit Engg Ltd. Tata Motors
15	Hero MotoCorp Ltd
16	Abilities India Pistons & Rings Ltd.
17	FORTUNE METALS LTD
18	ALSTOM
19	Renault Nissan Automotive India Private
20	NFTDC,
21	National Engineering Industries
22	FORTUNE METALS LTD
23	"MAHLE Engine Components India Pvt. Ltd."

24	Maruti Suzuki India Limited
25	National Fertilizers Limited,
26	DCM Engineering Products,

## **PG Students**

### **2013**

- Harpreet Singh Grewal, TTRF Young Tribologist Award, Malaysia, 2013.
- Harpreet Singh Grewal, Travel grant of US \$1000 by Council of Scientific and Industrial Research for attending the Malaysian International Tribology Conference 2013 at Kota Kinabalu, Malaysia.
- Arka Bhowmik, Awarded International Travel Grant support for attending conference by CSIR on November 2013.

### **2012**

- Arka Bhowmik, Best technical session paper award in Second International Conference on Biomedical Engineering and Assistive Technologies at NIT Jalandhar, 6-7 December 2012.
- Harpreet Singh Grewal, Fellowship awarded by British Council under UKIERIA for visiting Imperial College London for three months.
- Harpreet Singh Grewal, Scholarship awarded by Structural Materials Division of TMS (The Minerals, Metals and Materials Society) of US \$ 650 for presenting the paper at 141<sup>st</sup> TMS Annual meeting.

## **Faculty**

### **Dr. Anupam Agrawal**

- Recipient of the International Travel Award awarded by the Department of Science and Technology (DST), Govt. of India, for attending the “19th Wear of Materials conference”, Portland, Oregon, USA, 14-18 April 2013.

### **Dr Ekta Singla**

- Selected for DFG funded Post Doctoral fellowship for pursuing research at UPMC Paris, France, for the duration 2009-2010.
- Recipient of National Doctoral Fellowship, AICTE, India, 2004-2007.
- Received DFG funding for student research assistantship at Technical University, Berlin, Germany, for 6 months in 2005.
- Recipient of Institute Medal in M.Tech at Thapar University, Punjab, India, in 2002.

### **Dr. Harpreet Singh**

- Career Award for Young Teachers (CAYT) for the year 2006-07 by All India Council for Technical Education, New Delhi for his contribution to technical education and research proposal on ‘Role of Post-Coating Treatments on the Erosion-Corrosion Performance of the Thermal Spray Coatings’. The award consists of a research and development grant of Rs. 10.5 lac

- Maharashtra State National Award for the Best Research Work done by Teachers of Engineering Colleges for the year 2007 by Indian Society for Technical Education, New Delhi.
- Young Scientist Award for the year 2006 by Punjab Academy of Sciences, Patiala during the 9<sup>th</sup> Punjab Science Congress held at Guru Nanak Dev Dental College and Research Institute, Sunam on February 8, 2006
- The findings of the Ph.D. work along bio-data appeared in “Meet Our New Colleagues” column of International Journal of Thermal Spray Technology, Vol. 14, No. 3, September 2005 published by ASM, USA
- ARCI Best Technical Paper Award worth Rs. 2500/- at International Symposium of Research Scholars on ‘Material Science & Engineering,’ December 20-22, 2004, IITM, Chennai, INDIA
- Certificate of Merit in recognition of research paper at XIII National Conference of Indian Society of Mechanical Engineers (ISME-2003) held at Indian Institute of Technology Roorkee, Roorkee, December 2003
- Was awarded QIP fellowship by AICTE, New Delhi for pursuing Ph.D. at Indian Institute of Technology Roorkee, Roorkee from July 2002 to July 2005
- Working as a Reviewer for several journals of reputed publishers such as Scimedirect/Elsevier/IMech

#### **Dr. Himanshu Tyagi**

- Recipient of the International Travel Award awarded by the Department of Science and Technology (DST), Govt. of India, for attending the ASME MNHMT Conference held at Atlanta, GA, USA, Mar 2012.
- Delivered as Guest of Honour the inaugural lecture on “Technology Advances in Sustainable Energy Applications” during the 'Short Term Training Programme on Solar Energy and its Applications' (STTP-SEA) at MANIT Bhopal, India, Jun 2013.
- Recipient of Travel Fellowship awarded by Centre for International Co-operation in Science (CICS), for attending the ASME MNHMT Conference held at Hong Kong, China, Dec 2013.

#### **Prof. M. K. Surappa**

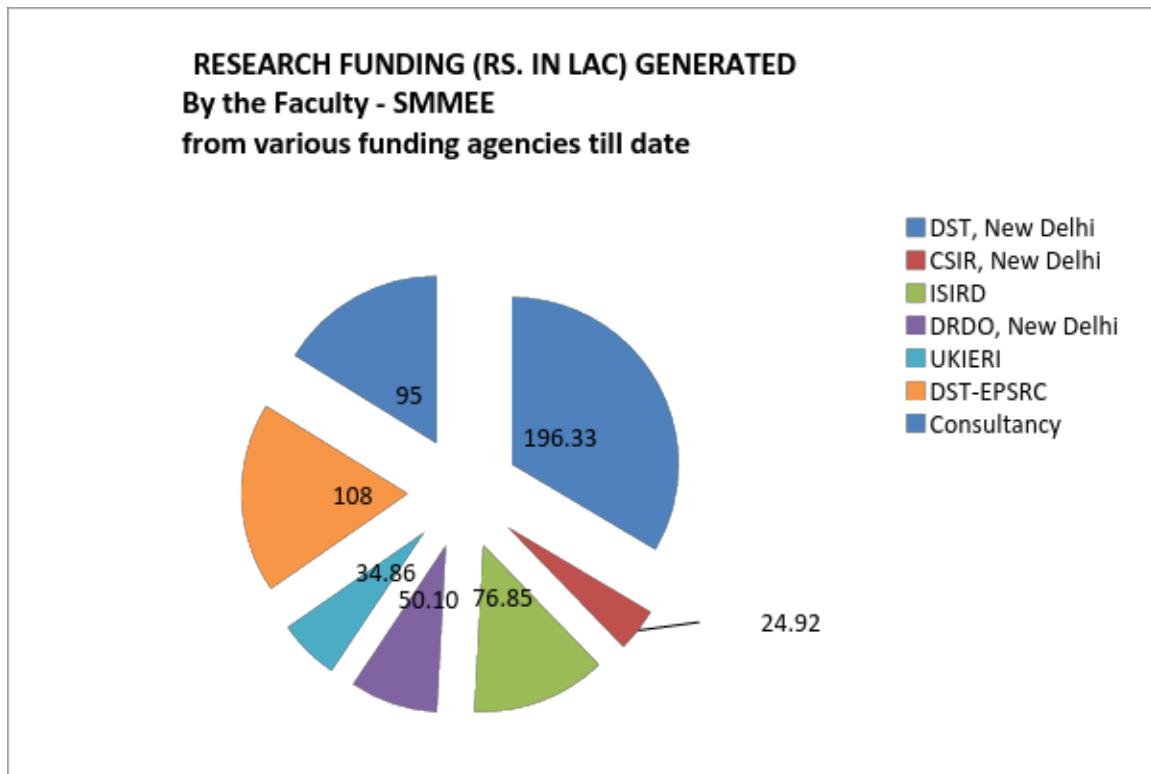
- Fellow, Indian National Science Academy
- Fellow, Indian National Academy of Engineering
- AMULYA-2012 Award by the Karnataka State Innovation Council, Govt. of Karnataka.
- Prof. Rustom Choksi Award for Excellence in Research in Engineering for the year 2007 by the Indian Institute of Science.
- MRSI-ICSC Super Conductivity and Materials Science Annual Prize for the year 2007 by Materials Research Society of India.
- Suvarna Karnataka Rajyotsava Award in the area of Science and Technology for the year 2006 by the Government of Karnataka.
- Indian Co-Ordinator for Joint European Master Degree Programme in Advanced Materials Science and Engineering, 2005 –
- Visiting Professor to the Sir M. Visveswaraya Chair, University of Mysore, 2003-2004.

- Metallurgist of the Year Award for the year 1998 by the Ministry of Mines and Steels (Govt. of India) and the Indian Institute of Metals.
- MRSI Medal for the year 1997 by the Materials Research Society of India.
- JSPS Invitation Fellowship (Senior), Japan (May – June, 1997).
- Jawaharlal Nehru Memorial Trust (UK) Scholarship (1983).
- Chief Guest at the Orientation Programme at B. T. Lakshman Institute of Technology & Management, Bangalore on 07.09.2012
- Delivered 8th Convocation Address at Shaheed Udham Singh College of Engineering & Technology, Tangori, on 10.11.2012
- Chief Guest for the 10th Convocation of Punjab Technical University, Jalandhar on 15.10.2012.
- Chief Guest for the 1st Convocation of Rayat Bahra Group of Institutes, Education City, Hoshiarpur, Punjab on 22nd March 2013.
- Chief Guest for the Inaugural Ceremony of the International Workshop on “Exploring Science of Transportation System (TS-2013)” at NIT Hamirpur on 11th April 2013.
- Chief Guest in the Annual Convocation of GNDEC, Ludhiana held in 15th November 2013
- Chief Guest in the Teachers Day of Chandigarh University held in 5th September 2013
- Participated in the 2nd MSME Summit on “Innovation – An Imperative for Competitiveness & Sustainable Development” as a Panelist on 14th March 2013 at New Delhi.
- Participated in the NASI – Scopus Young Scientist Awards 2012, In Engineering Award category as a Jury member on 2nd May 2013 at New Delhi.

#### **Dr. Ramjee Repaka**

- Recipient of the International Travel Award awarded by the Department of Science and Technology (DST), Govt. of India, for attending the 8<sup>th</sup> International Conference on Flow Dynamics held at Sendai, Japan, 9 – 11 November 2011.
- Recipient of the International Travel Partial Financial Assistance by CSIR to attend the ASME 2013-International Mechanical Engineering Congress and Exposition (IMECE) held at San Diego, CA, USA during 15-21 November 2013.
- Received best technical session paper award in 2<sup>nd</sup> International Conference on Biomedical Engineering and Assistive Technologies 2012, NIT Jalandhar, Punjab, India.

#### **7. Sponsored Research Projects**



**Dr. Anshu Dhar Jayal**

- A research project entitled: *Surface Engineering of Cutting Tools for Sustainable Machining* under ISIRD Grant from Indian Institute of Technology Ropar worth Rs. 9 Lacs (2011 - 2013).

**Dr. Anupam Agrawal**

- ISIRD Project “A Study of New Forming Techniques for Metals at Macro and Micro Scale”, Indian Institute of Technology Ropar 2011-2013. Rs. 8.50 Lakhs.
- DST-SERC Fast track scheme for young scientists “Development and analysis of deformation machining: A new hybrid process”, Three years, Rs. 21.82 Lacs, June 2013- onwards.

**Dr. Ekta Singla**

- Pursuing a research project entitled *Optimal Design of Task-based Modular Manipulators* under ISIRD grant from IIT Ropar, worth Rs. 10 lac, for the period 2011-2013.
- Pursuing a research project entitled *Optimal design and analysis of modular manipulators for constrained environments*, under the DST-SERC Fast Track Proposals for Young Scientists (Start-Up Research Grant) worth Rs. 25 lacs for 2013-2015.
- A research grant approved by DST-EPSC for a collaborative project entitled *Engineering driven sustainable supply networks – A UK-India Collaborative study*, worth Rs. 1 crore 8 lacs in 2013 for a period of three years.

**Dr. Harpreet Singh**

- A research project entitled “*Development of Slurry Erosion Resistant Coatings for Hydro Turbines*” from Council of Scientific and Industrial Research, New Delhi worth Rs. 15.92 lac-2012
- Pursuing a research project entitled “*Development of Magnesium Alloy based In-situ Nano-composites for improved Material Properties using Friction Stir Processing*” from DRDO, New Delhi worth Rs. 14.10 lac-2011
- Pursuing a research project entitled “*Surface Engineering to Control Erosion-Corrosion of Steam Generating Plants by Nano-particle Coatings*” from Department of Science and Technology, Ministry of Science and Technology, Govt of India, New Delhi worth Rs. 42.5 lac-2010
- A research project entitled “*Development and Performance Evaluation of Bioactive Coatings for Biomedical Applications*” under ISIRD Grant from Indian Institute of Technology Ropar worth Rs. 7 lac- (2009-2011)-Completed
- A research project entitled “*Investigations on the Role of Cold Spray Coatings to Control Hot Corrosion of Steam Generating Plants*” from Council of Scientific and Industrial Research, New Delhi with Dr. Niraj Bala worth Rs. 9 lac-(2007-2010)-Completed
- A research project entitled, “*Characterization & Machining Performance of Cryogenically Treated Cutting Tools*” under Research Promotion Scheme of All India Council for Technical Education, New Delhi with Dr Rupinder Singh worth Rs. 8 lac-(2008-2011)-Completed

**Dr. Himanshu Tyagi**

- Pursuing a research project entitled “*Investigation into Direct Absorption of Solar Energy using Nanofluids*” from DST-SERC Fast Track, Govt of India, New Delhi worth Rs. 23 lac-2013
- A research project entitled “*Experimental Investigation of Concentrated Direct Absorption Solar Collector (DAC) Using Nanofluids*” under ISIRD Grant from Indian Institute of Technology Ropar worth Rs. 7 lac- (2010-2012)-Completed

**Prof. M. K. Surappa**

- Processing of Nano-particle dispersed Al MMCs (Nano MMCs) via melt route, Aluminium Company of America (ALCOA), USA, 2006-2010, (Rs. 75 Lakhs).
- Friction and Wear Behaviour of Aluminium MMC Brake disc/ Brake pad during Sliding Wear, Department of Science and Technology, 2003-2006, (Rs. 17.55 Lakhs).
- Studies on Friction and Wear Behaviour of Hypereutectic Al-Si alloys in Relation to Al MMCs, Hydro Aluminium - Norway, 2001-2002, (Rs. 10 Lakhs).

**Dr. Navin Kumar:**

- Pursuing a research project entitled Hyper velocity impact induced deformation of the target-projectile system, DRDO New Delhi, 36 Lakhs for period of three years.

- Research grant approved by DST for a project entitled “Closed loop drug delivery system” worth Rs. 60 lakhs (approx.)
- Pursuing a research project entitled *Active vibration control* under ISIRD grant from IIT Ropar, worth Rs. 17 lac.

#### **Dr. Ramjee Repaka**

- A research project entitled: Characterization of a biological system using time resolved optical technique under ISIRD Grant from Indian Institute of Technology Ropar worth Rs. 2.55 Lakhs (2010-12) - Completed.
- Research grant approved by DST-SERC for a project entitled “Assessment of Thermally Induced Damage of Healthy Cell Volume During Radiofrequency Ablation of Breast Malignant Tissues” worth Rs. 24 lakhs (approx.) for a period of three years.

#### **Dr. Ranjan Das**

- A research project entitled: *Inverse analysis and unknown parameter estimation in natural and forced draught cooling towers* under ISIRD Grant from Indian Institute of Technology Ropar worth Rs. 6 Lakhs (2013 - onwards) - Ongoing.

#### **Dr. Prabir Sarkar**

- A research project entitled: *Project 1: Creative sustainable product design methodology with standards compliant, and project 2: A support for measuring product sustainability in early design* under ISIRD Grant from Indian Institute of Technology Ropar worth Rs. 9.8 Lakhs (2012 - 2014).
- A research grant approved by DST-EPSRC for a collaborative project entitled *Engineering driven sustainable supply networks – A UK-India Collaborative study*, worth Rs. 1 crore 8 lacs in 2013 for a period of three years.

## **8. National and International Collaborations**

### **International Collaborations**

#### **Dr Ekta Singla**

- Project titled, “Engineering Driven Sustainable Supply Networks - A UK/India Collaborative Study” under the UK & India Partnership in Advanced Manufacturing Research, in which teams from IIT Ropar, IIM Lucknow and University of Cambridge are participating, Role: Co-PI (India).

#### **Dr. Harpreet Singh**

- Project titled, “Engineering Driven Sustainable Supply Networks - A UK/India Collaborative Study” under the UK & India Partnership in Advanced Manufacturing Research, in which teams from IIT Ropar, IIM Lucknow and University of Cambridge are participating, Role: PI (India)
- Principal Investigator, Aston University-IIT Ropar Bioenergy Research Program, Role: PI (India)
- Got a grant of 40000 GBP from British Council (UKIERI) for carrying out collaborative work with Drs. David McPhail and S. Barbara, Materials Department,

Imperial College London in the field of surface engineering and friction-stir processing

**Dr. Himanshu Tyagi**

- Co-organized (as international collaborator) a Sustainable Energy Fellowship Workshop & Collaborative Joint Projects, during Apr 10-12, 2012 at UNSW (University of New South Wales), Sydney, Australia.
- Co-PI, Aston University-IIT Ropar Bioenergy Research Program, Role: Co-PI (India).
- Organized a joint Indo-US workshop (along with University of Texas at Arlington, USA) on *Recent Advances in Micro/Nanoscale Heat Transfer and Applications in Clean Energy Technologies*, during Dec 21-22, 2013 at IIT Ropar.

**Navin Kumar**

- Joint research with Durham University UK
- Joint research, project and student with Aston University UK.
- Joint research with Henry ford hospital, Detroit USA.

**9. Industrial Consultancy/Collaboration**

<b>Faculty member with details</b>	<b>Consultancy/Collaboration details</b>
Dr. Harpreet Singh Coordinator harpreetsingh@iitrpr.ac.in +91-1881-24-2226	Dr. Singh is working for the development of high temperature erosion/corrosion resistant thermal spray coatings for the power plant boilers and other similar applications in collaboration with the following industries, <ul style="list-style-type: none"> <li>• Guru Gobind Singh Thermal Super Power Plant, Ropar, Punjab, India.</li> <li>• Metallizing Equipment Company Pvt. Ltd, Jodhpur, Rajasthan, India</li> <li>• ASB Industries, Inc, Barbeton, Ohio, USA.</li> </ul>
Dr. Himanshu Tyagi Asstt. Prof. SMMEE himanshu.tyagi@iitrpr.ac.in +91-1881-24-2119	Dr. Tyagi provided industrial consultancy for Technology survey of solar energy to RBS Ltd, Bangalore, Rs 3 Lakhs, (2012-2013, completed)
Dr. Navin Kumar Asstt. Prof. SMMEE nkumar@iitrpr.ac.in +91-1881-242170	<ul style="list-style-type: none"> <li>• Dr. Kumar provided consultancy to Design Noise barrier to DRDO India, Rs 17 Lakhs (on going)</li> <li>• Dr. Navin Kumar is collaborating with Sigma vibroacoustic, Germany</li> <li>• Dr. Navin Kumar is collaborating with Leader Valve, Jalandhar</li> </ul>

**10. Alumni Details**

**Number of Students Placed:**



In 2012 (students of 2008-entry batch): 17 (out of 28 eligible students)

In 2013 (students of 2009-entry batch): 22 (out of 25 eligible students)

**Names of Selected Companies, where Students are placed:**

MU-Sigma, DRDO, BPCL, Bank of India, Flipkart, Timetooth Technologies, Oceaneering, SCA Technologies, Larsen & Toubro, HPCL, Indian Oil, ONGC.

**Students in Higher Studies (Including Names of the Institutions):**

**In India:**

Mr. Aditya Khokhar (B.Tech, Mechanical Engg, 2013) is currently pursuing MBA at the Indian Institute of Management Indore.

Mr. Sashwat Tanay (B.Tech, Mechanical Engg, 2013) is currently pursuing PhD at the Tata Institute of Fundamental Research, Mumbai.

**Abroad:**

Mr. Aditya Saini (B.Tech, Mechanical Engg, 2012) is currently pursuing MS at the North Carolina State University, USA.

Mr. Himanshu Kapoor (B.Tech, Mechanical Engg, 2012) is currently pursuing MS at the University of Washington, USA.

Mr. Kartikey Grover (B.Tech, Mechanical Engg, 2013) is currently pursuing MS at the State University of New York, USA.

Mr. Raghav Paul (B.Tech, Mechanical Engg, 2012) is currently pursuing MS at the University of Michigan, Ann Arbor, USA.

Mr. Vivek Vishwakarma (B.Tech, Mechanical Engg, 2012) is currently pursuing PhD at the University of Texas, Arlington, USA.

**11. Extra-Curricular Activities**

<b>Name of the faculty/staff/student</b>	<b>Extra-Curricular Activities</b>
Dr. Anshu Dhar Jayal	<ul style="list-style-type: none"><li>● Editorial Assistant, <i>Machining Science and Technology</i>, Jan 2008 – Jul 2011.</li><li>● Faculty-in-charge at the Training and Placement Cell, IIT Ropar, Jul 2012 – Present, and departmental representative (Mechanical Engineering) from Jul 2011 – Jul 2012.</li><li>● Faculty representative (along with Drs. Nitin Auluck and Navin Kumar) at the Alumni Association, IIT Ropar, Jan 2013 – Present.</li><li>● Faculty advisor for the Society of Mechanical Engineers, IIT Ropar, Jan 2011 – Present.</li><li>● Departmental coordinator (Mechanical Engineering) for B. Tech Projects, IIT Ropar, 2011 – 2012.</li></ul>

	<ul style="list-style-type: none"> <li>● Regular reviewer for the following journals: <i>Machining Science and Technology</i>, <i>International Journal of Sustainable Manufacturing</i>, <i>Proceedings of the IMechE, Part B: Journal of Engineering Manufacture</i>, <i>International Journal of Manufacturing Technology and Management</i>, <i>International Journal of Sustainable Engineering</i>, and <i>Sadhana</i>.</li> <li>● Completed the half marathon run in the Chandigarh Running And Living Marathon, 14th Apr, 2013.</li> </ul>
Dr. Anupam Agrawal	<ul style="list-style-type: none"> <li>● Warden Incharge - Mercury Hostel.</li> <li>● Faculty Incharge- Science and Technology Activities.</li> <li>● Faculty Advisor for 2013ME batch students, IIT Ropar.</li> <li>● Member, Rajbhasha Karyanvayan Samiti.</li> </ul>
Dr. Himanshu Tyagi	<ul style="list-style-type: none"> <li>● Faculty Incharge, Sports Activities, IIT Ropar.</li> <li>● Chairman, AC Committee, IIT Ropar.</li> <li>● Center for Innovation and Business Incubation (CIBI) Governing Board member, IIT Ropar.</li> <li>● Faculty Advisor for 2010ME batch students, IIT Ropar.</li> </ul>
Dr. Navin Kumar	<ul style="list-style-type: none"> <li>● Institute Purchase committee (Computer hardware and Software).</li> <li>● Institute computer user committee.</li> <li>● Departmental representative in Research Program Evaluation Committee (RPEC).</li> <li>● Faculty-In charge -Student Activity Centre (SAC) that consists of Institute Gymnasium, Music Club, Dance Club, Fine art club, IIT Ropar from 2010-Till date.</li> <li>● Faculty incharge/Program officer- NCC, IIT Ropar, 2010-till date.</li> <li>● Faculty incharge Program officer- NSS, IIT Ropar, 2010-till date.</li> <li>● Chairman Institute Transport committee.</li> <li>● Committee faculty member IIT Ropar student alumni association.</li> <li>● Institute student magazine faculty member.</li> <li>● Faculty adviser of Institute SIFE (Students in Free Enterprise) team.</li> </ul>
Dr. Prabir Sarkar	<ul style="list-style-type: none"> <li>● Doctoral Scrutiny Committee (DSC) for four students</li> <li>● Member, web development committee for both institute and department</li> <li>● Member, banner and hoarding committee and guest house facility committee</li> <li>● Member, manufacturing machines, tools, and equipments committee</li> <li>● Member, PhD intake committee of the department</li> </ul>

	<ul style="list-style-type: none"> <li>● Purchase committee of Product design and realization computer laboratory</li> <li>● Founder faculty of design research laboratory</li> <li>● Co-founder faculty of sustainable design and manufacturing laboratory and design studio laboratory</li> <li>● Nodal Officer, Intellectual Property Rights (IPR)s, of IIT Ropar.</li> </ul>
Dr. Ramjee Repaka	<ul style="list-style-type: none"> <li>● Member, Security Committee.</li> <li>● Member, Rajbhasha Karyanvayan Samiti.</li> <li>● Member, Library Committee.</li> <li>● Faculty Advisor for 2011 ME batch students, IIT Ropar</li> </ul>
Dr. Ranjan Das	<ul style="list-style-type: none"> <li>● Member in the selection committee for the following recruitments: <ul style="list-style-type: none"> <li>● 1. Junior Technical Superintendent (EE) (18.07.2013)</li> <li>● 2. Junior Assistant (05.10.2013)</li> <li>● 3. Junior Lab. Assistant (ME)(16.07.2013)</li> <li>● 4. Junior Lab. Assistant (EE) (19.07.2013)</li> <li>● 4. Junior Attendant (Semi-skilled) (ME) (09.05.2013)</li> </ul> </li> <li>● Member in the committee of physical verification of inventories.</li> </ul>
Mr. Dev Gurera, Mr. Bhupender Singh Chugh and Ashish Jindal (Undergraduate students)	<ul style="list-style-type: none"> <li>● Participated in Robowar event in IIT Roorkee's technical fest Cognizance 2012.</li> </ul>
Mr. Dev Gurera, Mr. Somyanshu Arora, Mr. Tarun Mittal, and Mr. Siddharth Saroha	<ul style="list-style-type: none"> <li>● Actively participated and presented posters in Indo-US workshop on Recent Advances in Micro/Nanoscale Heat Transfer and Applications in Clean Energy Technologies held at IIT Ropar</li> </ul>
Mr. Siddhartha Agarwal (UG batch representative of SMMEE)	<ul style="list-style-type: none"> <li>● Organized an intra-college SME quiz during Autumn-2013 semester</li> </ul>
Mr. Ramkumar, Junior Attendant (Semi-skilled) of SMMEE	<ul style="list-style-type: none"> <li>● Won <b>bronze medal</b> in hammer throwing during 2013, 2012 and 2011 inter-IIT sports meet held at IIT Guwahati, IIT Roorkee, and IIT Kharagpur, respectively.</li> </ul>

## 12. Societies/Chapters

- Society of Automotive Engineers: Currently registered as affiliate member club, with Drs. Jitendra Prasad and Harpreet Singh as the faculty advisers.
- Society of Mechanical Engineers: Internal society established by the Mechanical Engineering students of the first batch in 2011. Dr. Anshu Dhar Jayal has been serving as

the faculty adviser since its inception and the enrollment is approximately 30 students per year. Main activities include: periodic seminars and industrial visits (roughly 2 each per semester), semesterly quizzes and annual engineering competitions, annual newsletter, etc.

- Dr. Navin Kumar is serving as Faculty adviser of Institute SIFE (Students in Free Enterprise) team.

### **Memberships by Faculty**

Dr. Anshu Dhar Jayal

- Member, American Society of Mechanical Engineers (ASME)
- Member, Society of Manufacturing Engineers (SME)

Dr. Anupam Agrawal

- Member, American Society of Mechanical Engineers (ASME)

Dr Ekta Singla

- Member, American Society of Mechanical Engineers (ASME)
- Member, Robotics Society of India (RSI)

Dr. Harpreet Singh

- Life Member, Tribology Society of India (TSI)
- Life Member, Indian Institute of Metals (IIM)
- Life Member, Punjab Academy of Sciences India
- Member, Institution of Engineers (AMIE) India
- Life Membership, Indian Society for Technical Education (MISTE) India
- Member, Society for Automotive Engineers (SAE)

Dr. Himanshu Tyagi

- Member, American Society of Mechanical Engineers (ASME)

Prof. M. K. Surappa

- Life member, Indian Institute of Metals
- Life member, Materials Research Society of India
- Life member, Indian Society for Advancement of Materials and
- Life member, Process Engineering
- Life member, Society for Scientific Values
- Joint Treasurer, Materials Research Society of India (2005-2007)
- Joint Secretary, Materials Research Society of India (2007-)

Dr. Ramjee Repaka

- Member, American Society of Mechanical Engineers (ASME)
- Life Member, Indian Society for Heat and Mass Transfer (ISHMT)
- Life Member, Institution of Engineers (India)

Dr. Ranjan Das

- Life Member, Indian Society for Heat and Mass Transfer (ISHMT)

- Member, American Society of Mechanical Engineers (ASME)

Dr. Ravi Mohan Prasad

- Member, Materials Research Society (MRS)

Dr. Prabir Sarkar

- Member of American Society of Mechanical Engineers (ASME), membership number 100037361, member since 2004
- Member of Design Society (DS)
- Member of American Society for Testing and Materials (ASTM)
- Member of SIG, Design Creativity, Design Society
- International Association of Engineers (IAENG) (130646)
- Senior member, Asia-Pacific Chemical, Biological & Environmental Engineering Society (APCBES) (100789)

### **Social Responsibilities by Faculty**

Prof. M. K. Surappa

- President, Bharath Gyan Vigyan Samithi, Karnataka, 2001- 2009
- Member, Local Area Environment Committee constituted by the Supreme Court Monitoring Committee, Government of India (2007).
- Member, Project Executive Committee, Biomass Energy for Rural India Project (2004-2009).

## **13. Industrial Visits**

### **By Students:**

1. NTPC Power Plant, Dadri
2. Mahindra & Mahindra Ltd.( FES ), Swaraj Division – Plant 2, Landran
3. CIPET, Amritsar
4. Cheema Boilers Ltd., Ropar
5. Guru Gobind Singh Super Thermal Power Plant, Ropar
6. DCM Engineering, Ropar

### **By Faculty: (With regard to exploring some collaboration etc)**

1. Cheema Boilers Ltd., Ropar
2. Shreyans Industries, Ropar
3. Jal Ltd., Mohali
4. DCM Engineering, Ropar

## **14. Contributions towards Improving Quality of Technical Education in Other Engineering Institutions**

Dr. Harpreet Singh - Member, Board of Studies, Mechanical/Production/Industrial Engineering, Punjab Technical University, Jalandhar since 2008

Dr. Harpreet Singh - Member, Board of Studies, Mechanical Engineering, Punjab University, Chandigarh since 2012

Dr, Harpreet Singh - Member of the Academic Council of Shaheed Bhagat Singh State Technical Campus, Ferozepur since 201

Dr. Harpreet Singh - Mentor for conducting the 1st round of mentoring at College of Agricultural Engineering & Technology, PAU, Punjab for 2nd cycle institutions under TEQIP II

Dr. Harpreet Singh - Performance audit assignment of Delhi Technological University, Delhi for TEQIP II

Dr. Harpreet Singh - Delivered an expert talk on “*Developing Nano-Structured Materials and Coatings through Some Mechanical Routes-Our Experiences at IIT Ropar*” during Faculty Development Programme (FDP) under TEQIP-II on November 26, 2013 at Punjab University, Chandigarh, India.

Dr. Harpreet Singh - Delivered an expert talk on “*Development of Nano-structured Materials and Coatings through Some Mechanical Routes*” during Short Term Course on “Recent Trends in Materials, Manufacturing and Safety” on December 2, 2013 sponsored by TEQIP II at Giani Zail Singh Punjab Technical University Campus, Bathinda, India.

Dr. Navin Kumar, BOG member of Govt Engineering college, Bhatinda, 2013.

## **15. Plans for Future**

### **Engineering Education**

- To disseminate state-of-the-art education in the inter-disciplinary area of mechanical, materials and energy engineering with dynamic curriculum, addressing the need of the times
- To encourage the students to take-up project work to solve the problems of national relevance
- To encourage the spirit of team work in the students by making them work in small groups
- To devise means for overall development of students in the form of extra- and co-curricular activities
- To meet the human resource of the school in terms of faculty and staff
- To enter into MoUs/bilateral agreements with reputed global institutes for faculty, student and technology/research exchange

### **Laboratory Facilities**

- To complete the necessary equipment requirements of various laboratories of the school, as well as substantially increase the number of laboratories, and to equip them with state-of-the-art facilities

### **Research & Development and Industrial Consultancy**

- To initiate further research in the thrust areas related to manufacturing, design & analysis, advanced materials, biomechanics, nanotechnology and energy engineering
- To encourage the faculty to generate R&D grants from various funding agencies so as to develop research facilities for their individual research areas
- To further intensify research in the energy related areas such as renewable energy by establishing centres like Aston-IIT Ropar bio-energy research centre, already in operation
- Establishment of Rural Technology Action Research (RuTAG) centre to assist NGOs to develop technologies for rural people
- To further explore possibilities for industrial consultancy and partnerships
- To assist research activities of the neighboring institutes and industries by providing them access to the state-of-the-art facilities available with the institute such as SEM, XRD analysis, and resources available through National Knowledge Network (NKN)

## **16. Major Research Facilities**

### **Central facilities**

#### **Central Library**

The Central Library functions as the primary information resource centre, and repository of all printed and e-resources for teaching and research activities at the institute. Apart from textbooks and recommended reading material prescribed for each course offered at the institute, the library houses a growing collection of research monographs, reports, multi-volume reference works, dictionaries, encyclopedias, handbooks, and so on. The library facilitates access to a number of journals through its participation in consortia, such as INDEST, UGC-INFLIBNET. The library also subscribes to several e-journals directly from publishers as well as through reputed subscription agencies. At present, users can consult more than 9000 books (available on shelves) and thousands of electronic books and journals. Online access is also provided to citation and scientometric databases such as Scopus and MathSciNet.

#### **X-Ray Diffraction (XRD) Lab**

One of the high-end research equipment that IIT Ropar has is the X-Ray Diffraction (XRD) machine. The PANalytical X'Pert PRO MPD X-ray diffraction system is the basic platform for a wide variety of applications in analytical X-ray diffraction, in both scientific and industrial research environments. The modular design of X'Pert PRO MPD utilizing the PreFIX concept makes it possible to perform more than one type of analysis on one system. XRD is a non-destructive analytical technique used for analyzing various materials and surface properties especially at the atomic and molecular level.

#### **Scanning Electron Microscopy (SEM) /Energy Dispersive Spectroscopy (EDS) Lab**

Another advanced research tool that IIT Ropar possesses is the SEM which produces details of the surface of a given material through sample scanning with a focused beam of electrons. SEM is used for studying surface characteristics of materials.

#### **Nano Indenter Facility (Bio-nano-mechanical characterization laboratory)**

One of the most important facilities is a state-of-the-art comprehensive bio and nanomechanical characterization system from Hysitron Inc (over \$350,000) with Quasistatic nanoindentation, Scratch testing, In situ SPM imaging, ScanningWear, nanoDMA™, AFM imaging, 3D OmniProbe, Thermal control modules. Hysitron Inc is the world's top manufacturer of nanomechanical testing instruments, and Nano Indenter TI950 is their most advanced platform for exploring material properties at the nano and micro scales with ultrahigh resolution: 10 nN for load and 0.006 nm for displacement, and at a temperature up to 200°C.

### **Institute wide initiatives**



**NKN:** The National Knowledge Network (NKN) is a revolutionary state-of-the-art multi-gigabit pan-Indian resource-sharing network aimed at digitally connecting all national universities, colleges and research establishments to create ‘country-wide virtual classrooms’. According to Prof. S. V. Raghavan, chairman, technical advisory committee, NKN, “to begin with 1,200 major institutions including the IITs, CSIR laboratories, space research and atomic energy institutions will be connected digitally. The infrastructure bandwidth will facilitate high speed classroom sessions. You can even transmit satellite television programmes using the facility. With just 4 megabit connectivity an institution can simultaneously conduct up to 250 classroom sessions.”

**RUTAG:** The vision of The Rural Technology Action Group (RuTAG) Centre is to become an innovative rural technology development group comprising academicians, scientists, personnel from NGOs, governmental agencies and technical institutes, traditional craftsmen and artisans, farmers and social entrepreneurs with a passion to serve the rural people. Its mission is to develop state-of-the-art science and technology resources, equipments, human resources and research facilities to innovate rural technologies by utilising the existing and creative know-how with the involvement of people from rural areas and NGOs.

<b>Laboratory name</b>	<b>Facilities available</b>
Bio Materials and Nano Materials Characterization Laboratory	Material properties, such as modulus of elasticity, hardness, yield strength, fracture toughness, scratch hardness and wear properties by computer simulation or by experimental techniques. It can be used for almost all type of hard and soft materials, including biomaterials
Cell Culture & Tissue Engineering Laboratory (Upcoming)	(Upcoming)
Control Engineering Laboratory	Feed back Control systems design and analysis , control system for biomedical application, sensors, actuator, signal processing, various type of transducers.
Design Research Laboratory	Product design , understanding design process, design methods, aesthetics and ergonomics of products,
Design Studio Laboratory	Product design , Engineering design, drafting
Indoor Environment Control Laboratory	Air conditioning test rig, Refrigeration test rig, Heat pump test rig, ice plant test rig and vapor absorption test rig
Machine Design Laboratory	Machine components design, Static and dynamics analysis, of machine components, stress and strain analysis, computer assistant modeling and design, component design using FEM approach.

Materials Science & Engineering Laboratory	Microstructure analysis, Hardness measurement, Universal Testing Machine, Metal casting, High temperature furnace, Electrochemical corrosion testing
Mechatronics with Robotic Applications Laboratory	Robotic arm and related tools from KUKA and SIMPRO. Building systems from LEGO and TETRIX
Product Design & Realization Computer Laboratory	CAD modeling using Solidworks and Catia, FE Analysis using ABAQUS.
Product Design & Realization Manufacturing Laboratory	Product manufacturing, Rapid prototyping , EDM, CMM
Sustainable Product Design & Manufacturing Laboratory	Computer workstations and software tools (commercially available, as well as developed in-house) for sustainability assessment, sustainable design , eco-design, and standards compliance
Thermo-fluids Laboratory	Centrifugal Pump Setup, Gas Turbine Rig, Natural and Forced Convection Heat Transfer
Vibrations and Acoustics Research Laboratory	Vibration testing and measurement, active and passive vibration control, structure vibrations , Noise control, Noise barrier design, Fault diagnosis and condition monitoring, vibration sensors and actuators
Biomedical Engineering laboratory	Upcoming

## 17. Students' Performance Evaluation and Feedback Policy

### Student performance evaluation

The grading reflects a student's own proficiency in the course. The course coordinator and associated faculty for a course formulate appropriate procedure to award grades that are reflective of the student's performance vis-a-vis instructor's expectations. The credit system enables continuous evaluation of a student's performance, and allows the students to progress at an optimum pace suited to individual ability and convenience, subject to fulfilling minimum requirement for continuation. The grades and their description, along with equivalent numerical points where applicable are listed below:

Grade	Grade Points	Description
A	10	Outstanding
A-	9	Excellent
B	8	Very good
B-	7	Good
C	6	Average
C-	5	Below average

D	4	Marginal
E	2	Poor
F	0	Very poor
I	-	Incomplete
W	-	Withdrawal
S	-	Satisfactory completion
Z	-	Course continuation

### Feedback Policy

Following questions are part of the feedback form provided to the students twice during each semester (mid-semester evaluation and end-semester evaluation):

Q1: What in the course so far is new knowledge for you?

Q2: After attending the course so far, how has your awareness or insight of the subject improved?

Q3: Based on the course plan given by the instructor, would you like certain topics to be added, deleted and/or emphasized?

Q4: Any suggestion for improving this course in future classes in terms of teaching, examinations and interaction with students?

Q5: Please fill/tick the appropriate answer:

- No. of lecture attended by you \_\_\_\_\_ out of \_\_\_\_\_ held so far.
- No. of hour/week spent by you on this course outside the class hours \_\_\_\_\_
- Instructor's voice is audible and clear \_\_\_\_\_ Yes/No
- Clarity of black board/OHP transparencies \_\_\_\_\_ Good/ok/Bad
- Pace of teaching \_\_\_\_\_ fast/just right/slow

### 18. Courses

#### UG Courses

GEL 101 Product Design and Realization  
 GEL 102 Material Science and Engineering  
 MEL101 Continuum Mechanics  
 MEL102 Energy Science and Technology  
 MEP103 Engineering Communication  
 MEL201 Fluid Mechanics  
 MEL202 Manufacturing with Metallic Materials  
 MEL203 Manufacturing with Non-metallic Materials  
 MEL204 Machine Element Design  
 MEP205 Product Design and Realization – Intermediate

MEL301 Heat and Mass Transfer  
MEP302 Manufacturing Laboratory  
MEL303 Theory of Machines  
MEP304 Design Laboratory  
MEP305 Control Engineering Laboratory  
MEP401 Thermo-fluids Laboratory  
MEL402 Manufacturing Systems  
MEL411/ MEL451 Transportation Mechanics  
MEL412 / MEL452 Propulsion Technologies  
MEL413/MEL453 Indoor Environment Control  
MEL414 / MEL454 Electric Power Generation  
MEL415 / MEL455 Biomechanics  
MEL416 / MEL456 Tribology  
MEL417 / MEL457 Noise and Vibration  
MEL418 / MEL458 Robotics  
MEL419 / MEL459 Mechatronics  
MEL421 / MEL460 Medical Devices and Equipment  
MEL422 / MEL461 Composite Materials  
MEL423 / MEL462 Micro-manufacturing  
MEL424 / MEL463 Finite Elements Analysis  
MEL425 / MEL464 Engineering Optimization  
MEL426 / MEL465 Introduction to Biomedical Engineering  
MEL466 CFD and Heat Transfer  
MEL467 Design Research  
MEL206/ MEL468 Mechanics of Materials  
MEL427/ MEL469 Clean And Sustainable Energy Engineering

### **PG Courses**

MEL501 Advanced Composites  
MEL502 Advanced Welding Technology  
MEL503 Solidification processing  
MEL504 Advanced Metal Casting Technology  
MEL505 Industrial Robotics  
MEL506 Surface Engineering  
MEL507 Engineering Design Optimization  
MEL508 Advanced Mechanics of Solids  
MEL509 Convective Heat transfer  
MEL510 Rotor Dynamics and Condition Monitoring  
MEL511 Atomistic Simulation and Modeling of Materials  
MEL512 Nanocomposites-Processing, Characterization and Applications  
MEL513 Introduction to Plasticity  
MEL514 Metallic Corrosion  
MEL515 Bone Biology  
MEL516 Orthopedic Biomechanics  
MEL517 Sustainable Design and Manufacturing

MEL518 Robot Manipulators: Kinematics, Dynamics and Control  
MEL519 Biological Materials  
MEP501 Control Engineering Laboratory  
MEP502 Advanced Mechanical and Materials Engineering  
MEL601 Advanced Tribology  
MEL602 Finite Element Methods in Engineering  
MEL603 Machine Vibration Analysis  
MEL604 Vibration and Shock Isolation  
MEL605 Friction and Wear in Machinery  
MEL606 Modern Manufacturing Process  
MEL607 Rapid Prototyping  
MEL608 Mechatronics  
MEL609 Solar Thermal Engineering  
MEL610 Advanced Conduction and Radiative Heat Transfer  
MEL611 Combustion Engineering  
MEL612 Turbulent Flow  
MEL613 Science of Machining  
MEL614 Nonlinear oscillations  
MEL615 Advanced Material Characterization Techniques  
MEL616 Fracture and Fatigue  
MEL617 Biology for Engineers  
MEL618 Molecular, cellular and tissue biomechanics  
MEP601 Advanced Mechanical and Materials Engineering Laboratory  
MEP602 Material Engineering Laboratory