

**GLOBAL  
INITIATIVE OF  
ACADEMIC  
NETWORKS**

ग्लोबल

# Information Brochure

**Application of System  
Approach for Precision  
Grinding Processes –  
June 6 -10, 2016**



MINISTRY OF  
HUMAN RESOURCE DEVELOPMENT, GOVT. OF INDIA

Confidential



**MHRD**  
Govt. of India



# Overview

## Grinding is critical



- Grinding is a critical and in most cases the final manufacturing process for all precision components manufacturing.
- Grinding is a surface generation process that determines the quality and performance of many critical parts, subsystems and systems.
- Grinding is a process widely used in many manufacturing industries:
  - From Automotive to Aircraft manufacturing
  - From Cutting tools to Carbide manufacturing
  - From Bearings to Semi-conductor manufacturing, etc.
- Total cost, quality, productivity and performance of precision components are all very much impacted by grinding processes.

## Course content



- Participants will learn about the method to look at the manufacturing process “on-the-whole” as a system.
- They will learn how to apply the Science, Engineering and Management principles pertinent to the process together coherently (and not as isolated pockets) to achieve large scale improvements in the process.
- They will learn about the “Microscopic interactions” (e.g) what really happens when the sparks are produced?

Participants will participate in **hands-on, laboratory style experiments**, where they will collect the data and analyse the data during the grinding process.

- There will be guest lectures from industry specialists on selected topics.

<b>Dates for the Course</b>	<b>June 6 – 10, 2016.</b>
<b>Host Institute</b>	IIT Madras
<b>No. of Credits</b>	1
<b>Maximum No. of Participants</b>	50
<b>You Should Attend If...</b>	<ul style="list-style-type: none"> <li>• All engineers, managers and faculty members with over 5 years of experience in precision manufacturing areas.</li> <li>• Anyone with responsibility to improve total cost, quality and productivity of precision components and industrial manufacturing.</li> <li>• Anyone responsible for precision components design and development.</li> <li>• Anyone responsible to develop and implement new manufacturing process solutions.</li> <li>• Anyone in R&amp;D, Research Institutes or academia supporting any of the above developments in the manufacturing sector.</li> </ul>
<b>Course Registration Fees</b>	<p>The participant fees for taking the course is as follows:</p> <p>Student Participants: Rs.1000</p> <p>Faculty Participants: Rs.5000</p> <p>Government Research Organization Participant: Rs.10000</p> <p>Industry Participant: Rs.20000</p> <p>The above fee is towards participation in the course, the course material, computer use for tutorials and assignments, and laboratory equipment usage charges.</p> <p>Mode of payment: Demand draft in favour of “Registrar, IIT Madras” payable at Chennai.</p>
<b>Accommodation</b>	<p>The participants may be provided with hostel accommodation, depending on the availability, on payment basis. Request for hostel accommodation may be submitted through the link: <a href="http://hosteldine.iitm.ac.in/iitmhostel">http://hosteldine.iitm.ac.in/iitmhostel</a></p>

**COURSE DETAILS**

# Learning outcomes:

- Ability to look at the grinding process (and other manufacturing processes) with a broader perspective.
- Grinding process is not a “black box” or random/statistical event. Instead it is a judicious combination of Science, Engineering and Management aspects as required and relevant to the situation to generate surface at the required functionality and cost.
- A template and frame work for The ‘System Approach’, which the students can apply immediately for their precision components manufacturing projects or assignments.
- Ability to “Zoom in” to look at the scientific / technical details and also “Zoom out” to look at the big picture (in terms of engineering and economic issues) as required.
- Ability to build bridges by connecting the knowledge already available from the shop floor, from the engineering departments, from the suppliers, from the machine tool builders and yes, even from the customers!



# Course Instructors

## Course Faculty

**Dr. K. (Subbu) Subramanian** is the President of STIMS Institute Inc., a Knowledge Integration Co., focused on developing physical science based



Technology, Innovation and Management Solutions. He is now actively engaged in Research Collaboration, Industrial Innovation and Work Force Development for the manufacturing sector in India and USA. He has been actively engaged in such collaboration at IIT Madras for the past four years. Dr. Subramanian has worked for over 34 years in various positions in the industrial sector. When he served as the Director, Core Technology – Surface Preparation Technologies (SPT), at the High Performance Materials (HPM) Sector, Saint-Gobain Co, he conceived and implemented a network of Application Technology Centres in Worcester MA. - USA, Hamburg – Germany, Shanghai – China, Kure – Japan, Bangalore – India and other locations across the globe. These technology centres foster surface generation processes used in a wide variety of industries for manufacturing precision industrial components and in a wide variety of industrial and consumer applications. Dr. Subramanian has extensive personal and hands on knowledge in R&D, New Product Development, New Business Development as well HR development for the 21<sup>st</sup> Century Economy.

## Course Coordinator

**Dr. N. Ramesh Babu** is Professor of Manufacturing Engineering at the Department of Mechanical Engineering, Indian Institute of Technology Madras.



His areas of expertise cover abrasive machining processes, advanced machining processes, high precision machine tools and automation in manufacturing. He has about two years industrial experience and more than three decades of teaching and research experience at the Institute. He is consultant to many multinational companies engaged in sheet metal working and abrasive products manufacture and many Indian machine tool and automobile sectors. He is very active in translational research and development activities and has demonstrated the technical feasibility of many advanced machining processes and algorithms for industrial applications.

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DAY	TOPICS
DAY – 1	Topic 1: Introduction to the GIAN Courses and Overview of Surface generation Processes Topic 2: Why should we grind? The System Approach for industrial processes; Framing the grinding process as an Input/Transformation/output system Topic 3: Transformation - Microscopic interactions (the Science of grinding processes) Topic 4: Inputs – Work materials and their response to Grinding Processes Topic 5: Inputs - Operational parameters and their role in the Grinding system
DAY – 2	Topic 1: Measurement and Analysis of Grinding Processes – Part 1 (Translating Science into Engineering) Topic 2: Inputs – Abrasive Tools and their role in Grinding System Topic 3: Measurement and Analysis – Part 2
DAY – 3	Topic 1: Analysis of time in-dependent grinding processes Topic 2: Technical outputs Topic 3: Grinding Process Signal, Data Analysis and application for process problem solving Topic 4: Fundamentals of Tribology as applied to Grinding Processes
DAY – 4	Topic 1: Coolant System Design and optimization for grinding processes Topic 2: Analysis of Belt grinding processes Topic 3: Analysis of grinding processes for brittle materials Topic 4: System outputs for grinding processes; Application of the system approach for Grinding Process
DAY - 5	Topic 1: Real world challenges in the practice of System Approach-Discussion Topic 2: Industry presentation: The need for System Approach in the industrial practice The need for System Approach in research programs Topic 3: Govt./Industry/Research collaboration – Examples in India Classroom problems & solutions on analysis of grinding processes Laboratory Demonstration; Measurement of vital signals during the grinding processes; Data Analysis and interpretation of signals – Exercises; Practical 1: Inputs – Machine Tools (Platform for Grinding Processes)

# Additional Info

- To see an interview of Dr. Subramanian, briefing about the course, click the link below.

<http://www.youtube.com/watch?v=tygcHin5Q70&feature=youtu.be>

- To see the feedback by the participants who attended the same course at Pune, click the link below.

<https://www.youtube.com/watch?v=dxFuJDMDHsl>

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Last date for  
registration  
25<sup>th</sup> May, 2016