



BITS PILANI, PILANI CAMPUS



आज़ादी का
अमृत महोत्सव



Department of
Science &
Technology,
Government of
India

DEPARTMENT OF SCIENCE & TECHNOLOGY



IIT (ISM), DHANBAD

One week Hands-on Training Workshop on “High End Machining Centers for Computer Integrated Manufacturing”

28th Nov – 04th Dec, 2022

Organized by

DEPARTMENT OF MECHANICAL ENGINEERING

Birla Institute of Technology and Science, Pilani Campus, Pilani - 333031

Under

DST-STUTI PROGRAMME OF INDIAN INSTITUTE OF TECHNOLOGY (ISM) DHANBAD – 826004

An Initiative of Department of Science & Technology (DST), Govt. of India

The one-week training program on “High End Machining Centers for Computer Integrated Manufacturing” will be organized by the Department of Mechanical Engineering, BITS, Pilani under the banner of “Synergistic Training program Utilizing the Scientific & Technological Infrastructure (STUTI)” project of Department of Science and Technology (DST), Government of India. The training content is considered to impart knowledge on the development of competence to work with high end machining centers to be used for computer integrated manufacturing. This module will be beneficial for the researchers actively engaged in research or consultancy work. Participants will have to go through the classroom teaching which will be followed by the laboratory demonstration of each machining center. Therefore, the ways to develop programs and practical operation procedures, and hands on working experience of each center will be imparted in detail. The theory session on all these machining centers integral to CIM will be followed by an experimental session in laboratory for demonstration and working with machines and robots for a better understanding and adoption. Tentative schedules and topics to be covered within this module are as follows:

ACTIVITY	DELIVERABLES
Vertical Milling Machine (DST-FIST Supported)	KODI -40, CNC vertical milling machine, is used for peripheral milling and hole making processes. It has helical cutters oriented vertically on a spindle axis. This machining centre is C programmed and has auto tool Changer (ATC). The cutting tools are changed based on the sequence of machining process and the developed program in CNC. Candidates will get hands on experience to work with the machine and necessary inputs for programming will be provided.
Turning Center (DST-FIST Supported)	DMG MORI turning center is capable to perform turning as well as milling operations without changing the work piece setup. It is highly accurate and productive machine. Mostly used for precise machining of work piece requiring high surface finish. Candidates will get hands on experience to work with this machine and necessary inputs for programming will be provided.
Microwave Furnace and Microwave-based 3D printing	The microwave furnace is used for processing of different materials (metals, polymers, ceramics and composites) by different processes such as curing, sintering, casting, and cladding can be performed on different materials. 3D printing setup is used for layer-by-layer manufacturing of metals, alloys, ceramics and polymers.
Electrochemical micro-machining center	The facility is capable of micromachining, nano finishing and micro-texturing of hard-to-machine (additively manufactured) alloys (with features ranging from 50 um to 500 um). In addition, the facility can also be used as an electrochemical additive micro manufacturing for producing nature inspired/bionic metallic surfaces.
Thermal evaporator (DST-FIST Supported)	The thermal evaporator is device that uses an electric resistance heater to melt the material and raise its vapor pressure to a useful range. In evaporation a material; is heated in vacuum until it boils the resulting vapor then condenses on the substrate to form a thin film. This film can be form a few atoms thick(less than 1 mm) to hundreds or thousands of nm thick. Thermal evaporation is carried out at vacuum, 1×10^{-6} mbar.
6 DOF, Industrial Manipulator	ABB make IRB 1410 is a 6- Axis Robotic manipulator mainly used for welding and material manipulator handling, with 5kg Payload capacity. Further It is also used for research purpose and industrial problems associated with manipulation, inspection and assembly. Candidates will be provided necessary inputs for robot programming.
Wire EDM	This machine is used to create complex shapes that would be difficult to produce with conventional cutting tools. Its cuts extremely hard, challenging and exotic materials for high precision mechanical components.

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About the Program

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Eligibility Criteria for Participants of the Training Program:

- Person of Indian origin;
- Minimum qualification should be B.Tech./B.E. in mechanical engineering or equivalent;
- Professors/Scientists/ Post-Doc Fellows/ Ph.D. fellows/ Industry persons who are actively involved in research and development (R&D);
- Not more than 3 participants from one institute per training should be allowed from outside the host institute

About the Department

Started in 1946, Mechanical Engineering Degree Program is one of the oldest at BITS Pilani. The department is vibrant with several activities round the year. It is a DST-FIST Sponsored (2002-2007) and UGC-SAP Sponsored (2007-2012) Department. The department has research focus that benefits industry, society and the environment. Several faculty members of the department also share administrative duties. The Department offers two Integrated First Degree Programs and three Higher Degree Programs on campus apart from off campus programs under continued education scheme. The curricula are highly demanding and attracts exceptionally meritorious students from all over India. Research emphasis is there in all tiers of education, First Degree, Higher Degree and Ph.D. Students look for challenging careers in best of the organizations within India and abroad. There is huge potential in the department for Consultancy as well as Technology and Product incubation. The Mechanical Engineering Department at BITS Pilani has rich heritage. It was renamed from 'Group' to a 'Department' in October 2010. The Department takes pride in achievements of its alumni, who have shined in various walks of life.

About the Institute

The Birla Institute of Technology & Science, BITS Pilani is an all-India Institute for higher education. The primary motive of BITS is to “train young men and women able and eager to create and put into action such ideas, methods, techniques and information”. The Institute is a dream come true of its founder late Mr G.D.Birla - an eminent industrialist, a participant in Indian freedom struggle and a close associate of the Father of Indian Nation late Mr. Mohandas Karamchand Gandhi (Mahatma Gandhi). What started in early 1900s as a small school, blossomed into a set of colleges for higher education, ranging from the Humanities to Engineering until 1964 when all these colleges amalgamated to culminate into a unique Indian University of International standing. This university was christened as the Birla Institute of Technology and Science, Pilani, known to many as BITS, Pilani. Over the years, BITS has provided the highest quality technical education to students from all over India admitted on the basis of merit. Its graduates may be found throughout the world in all areas of engineering, science and commerce. BITS symbolizes the maturing of Indian technical ability and “can-do” entrepreneurial spirit, especially as derived from the private sector. BITS is located in the Vidya Vihar campus adjacent to the town of Pilani in Rajasthan.



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