National Institute of Technology Meghalaya

Department of Mechanical Engineering

Certificate course on - 3D Modeling and 3D Printing

About the Department of Mechanical Engineering: The Department of Mechanical Engineering started functioning in July 2013. The department is offering a four-year B. Tech program in Mechanical Engineering with an intake capacity of thirty. Additionally, the department offers a two-year M. Tech program in the specialization 'Fluids and Thermal Engineering' and Ph.D. in various fields of Mechanical Engineering. The B. Tech program of the department is accredited by the National Board of Accreditation (NBA). The students of the department are placed through the leading industries and join the internationally recognized institutions for higher studies. In 2023, 88.9% of B. Tech students who graduated have been placed in various organizations of repute. In the recent past, a faculty from a foreign university visited the department to teach undergraduate students under the 'Fulbright Fellowship' program.

The basic aim of the department is to impart quality education to the students through the understanding of the basic principles and practices in mechanical engineering, which helps them to serve society and address a variety of needs. Another, objective of the department is to come up with interdisciplinary courses keeping in view the advancement of today's world in the fields of digital manufacturing, robotics, mechatronics, sustainable energy, etc., and to achieve the goal of NEP 2020. The department also promotes industry-academia collaboration so that both can complement each other in study, research, and overall development.

About the Central Instrumentation Facility (CIF): The Central Instrumentation Facility (CIF) was inaugurated on 1st April 2022 in NIT Meghalaya Sohra (Cherrapunji) starting with some major sophisticated equipments with an aim to provide a central facility consisting of the latest and advanced analytical Instruments to facilitate multi- disciplinary research and to provide to the needs of academic researchers within and outside NIT Meghalaya. The facilities of CIF are now open for wide uses by UG, PG level, doctoral students and faculty members of the institute. The facility is also extended to various external organizations e.g. academic institutions, R&D Laboratories, Industries in the country on payment basis.

About the Course: Department of Mechanical Engineering, NIT Meghalaya and Central Instrument Facility, NIT Meghalaya jointly planning to offer a three-month certificate course on Additive Manufacturing/3D Printing. The focus of the certificate course is to train the youths in advanced technology of manufacturing. The training will be helpful to boost awareness of rapid manufacturing, i.e. digital manufacturing. Furthermore, the knowledge of additive manufacturing will increase job opportunities among the trainees.

Eligibility: Diploma Engineer, ITI, B. Tech student completed 3rd Semester.

Mode of course: Online\Offline.

Evaluation Process: Continuous and final exam

Theory Course				
Class Test	Assignment	Final Term	Total	Pass Marks
30	20	50	100	30
Lab. Course				
Lab. Practice	Quiz	Viva	Total	Pass Marks
50	30	20	100	50

All trainees must have 75% attendance to appear in the examination.
Course fee: Rs. 5,000/-+GST 18%.

Course Objective:

- The objective of this course on 3D Modeling and 3D Printing to increase the awareness among trainees on rapid manufacturing and additive manufacturing.
- It is aimed to make the trainees literate on conceptual 3D modeling.
- The course aims to impart detailed knowledge of the process of additive manufacturing and its application.
- To provide comprehensive training on 3D Modelling and 3D Printing.

Course Outcome: After successful completion of the course, candidate will be able to,

- Develop 3D model using computer aided design (CAD) software.
- Understand the workflow and technical process for additive manufacturing for polymer, composite and metal.
- Optimum design and development of products using additive manufacturing.

Career Prospects:

3D Printing is an additive manufacturing technology that is much faster growing compared to all conventional manufacturing technologies. As a result, the immediate market with significant value is captured by the 3D Printing technology. Additionally, the **Make in India** mission has triggered the development of 3D printing technology. In this view, in the coming days 3D printing technology will create a huge number of job opportunities.

Syllabus

Module	Details of syllabus	Contact hours
Module-I	**CAD software and modeling:** Techniques for Geometric Modelling Graphic standards, parametric representation of geometry, Bezier curves, Cubic Spline curve, B-Spline curve, parametric representation of line, circle, ellipse & parabola constructive solid geometry (CSG), Boundary representation, wire frame, solid, surface, and parametric modeling.	**3**
Module-II	**CAD modeling** 2D & 3D Transformations (Translation, Rotation, and Scaling & Magnification), Concatenations, Matrix representation, Problems & object-oriented programming on Transformations. Object transformation, mirror transformation, Data Structures for interactive modeling, Bill of materials from attribute data, artificial intelligence in design & manufacturing, representation of knowledge and knowledge base engineering.	**3**
Module-III	Hands on practice on CAD modeling.	**6**
Module-IV	**Introduction to 3D printing:** Introduction to Design, Prototyping fundamentals. Introduction to 3D printing, its historical development, advantages.	**3**
Module-V	**3D Printing:** Data Conversion, and transmission, Checking and preparing, Building, Post processing, RP data formats, Classification of 3D printing process, Applications to various fields.	**3**
Module-VI	Hands on training on 3D printing with polymer, composite, and metal printer.	**18**

List of Trainers

Faculty Members	
Sl. No.	Name and Designation
1.	Prof. Deba Kumar Sarma, Professor, Dean (PD).
2.	Dr. Bikash Kumar Sarkar, Associate Professor.
3.	Dr. Kishore Debnath, Associate Professor and Head of the Department.
4.	Dr. Maneswar Rahang, Assistant Professor.
Technical Staff	
1.	Mr. Souradeep Bhowmick, Technical Assistant
2.	Mr. Ritam Paul, Technician
Industrial Expert	
Industrial experts will also be engaged for some of the sessions as per requirement.	

Registration: Interested candidates can register through the following link. An amount of Rs. (5,000/-+18% GST) = 5,900/- to be paid before registration. Last date of registration is 15th February 2024. The candidature will be considered as per first come first serve.

https://docs.google.com/forms/d/e/1FAIpQLScsBtrdaLFCGtcm7hns5yeaZIQpJGnisUAIHdGKMf2is7rFcA/viewform?usp=sf_link

The course fee is to be transferred through bank transfer to the following account.

Name of the Account: NIT MEGHALAYA R AND D ACCOUNT
Bank Name: UCO Bank
Branch: Laitumkhrah
Account No. : 23730110010280
IFS Code: UCBA0002373)

Important Dates

Sl. No.	Description	Dates
1.	Last date of Registration through online	15th February 2024
2.	Notification of confirmation	21st February 2024
3.	Course duration	1st March 2024 to 30th May 2024

For more details, please contact at-
Email: **certificatecourse.me@nitm.ac.in**
Mobile No.: **9485177038 / 9485177041 / 8131833728 / 9678752275**