

**A Short Term Course
on
ADDITIVE MANUFACTURING**

February 05 – February 09, 2018

(Application form should contain the following
Information. It should be printed (not hand written)
on A4 size paper)

Name: _____
Position: _____
Department: _____
Institution/Organization: _____
Address: _____
E-mail Address: _____ Mobile No.: _____

Educational Background (starting from B.E./B.Tech):

Degree	Field of Specialization	Institution	% marks/ CGPA/CPI	Year	Rank in the class
B.E./B.Tech.					
M.E./M.Tech.					
Ph.D.					

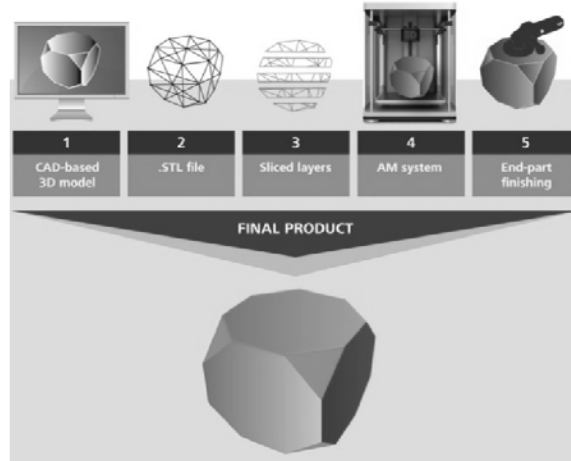
Areas of Research Interest: _____
Have you attended any course on "Additive Manufacturing" at IITK or elsewhere: Yes / No
(If yes, please give details.....)

Note: Candidates from the teaching institutions should send the demand draft only after getting the confirmation of their selection.

Payment details
Demand draft no. _____ dated _____
Amount in Rs. _____ drawn at _____

Recommendation **Signature of applicant**

Signature of Head of the Department
/ Head of the organization (with seal).



Additive Manufacturing Process Flow (Source: DUPress.com)

***IMPORTANT DATES**

For College Teachers

- Receipt of application through email: Dec. 25 , 2017
- Information to the selected candidates: Jan. 04, 2018
- Receipt of the draft: Jan. 15, 2018

For Participants from Industries and R&D Labs

- Receipt of application through email: Jan. 05, 2018
- Information to the selected candidates: Jan. 14, 2018
- Receipt of the draft: Jan. 21, 2018

ADDRESS FOR CORRESPONDENCE

Dr. Arvind Kumar/ Dr. Niraj Sinha
Department of Mechanical Engineering
Indian Institute of Technology Kanpur
Kanpur- 208016
E-mail: arvindr@iitk.ac.in / nsinha@iitk.ac.in
Phone-: 0512-259 7484(O); 259 7196(O)

**A Short Term Course
On
Additive Manufacturing**

*For Engineering College Teachers,
Practicing Engineers and Scientists*

February 05 – February 09, 2018

*Sponsored by
All India Council of Technical Education,
New Delhi*

Coordinators: Dr. Arvind Kumar, Dr. Niraj Sinha



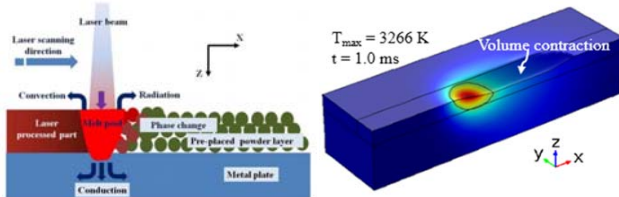
Department of Mechanical Engineering All India Council of Technical Education,
Indian Institute of Technology, Kanpur New Delhi

INTRODUCTION

An intensive course on **Additive Manufacturing** will be offered from February 05 to February 09, 2018, under the Continuing Education Programme of I.I.T. Kanpur. It is sponsored by Quality Improvement Programme, All India Council of Technical Education, New Delhi. The course is designed to cater the needs of teachers, scientists from R & D houses and Labs, and practicing engineers from industries. This programme will be specifically useful for persons who are concerned with training / teaching, research, and industrial applications of additive manufacturing, manufacturing of complex parts, CAD for additive manufacturing, bio-additive manufacturing, modelling, to name a few.

OBJECTIVE

Additive Manufacturing (AM) is a process of joining materials to make objects from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing methodologies, such as traditional machining. The basic principle of AM is that a model, initially generated using a three-dimensional Computer Aided Design (3D CAD) system, can be fabricated directly. AM technologies have significantly evolved over the last decade. Because of their potential to extensively transform the nature of manufacturing processes, e.g., by enabling “Freedom of Design” several industries have been attracted by these technologies. Using AM, manufacturing of highly complex parts can be an economically viable alternative to conventional manufacturing technologies.



Powder bed based AM process; Temperature map during single layer powder bed based AM and **Crank shaft made using FDM process** (images from left to right)

AM processes can be categorized by the type of material used, the deposition technique or by the way the material is fused or solidified. Over the years, many AM processes have emerged with each of them having their own advantages and limitations.

The primary objective of the present course is to acquaint the participants with the concept of AM, various AM technologies, materials science aspect for AM, modelling of AM processes, and their applications in various fields. Towards modelling in AM, relevant case studies have been included to expose the participants to the mathematical models for AM to describe the transport phenomena such as heat/mass transfer and fluid flow. The course will also cover AM process plan including building strategies and post-processing.

COURSE CONTENT

- **Introduction to Additive Manufacturing**
- **CAD for Additive Manufacturing**
- **Material Science Aspects in Additive Manufacturing**
Different materials used in AM, Use of multiple materials, multifunctional and graded materials in AM, Role of solidification rate.
- **Various Additive Manufacturing Processes**
Powder-based AM processes involving sintering and melting, Printing processes (droplet based 3D printing), Fused deposition modelling (FDM), Laminated object manufacturing, Stereolithography, Micro- and nano-additive manufacturing processes.
- **Modelling in Additive Manufacturing**
Transport phenomena models: temperature and fluid flow, molten pool formation, Various case studies - modelling of fusion based AM process, powder bed melting based process, droplet based printing process.
- **Applications of Additive Manufacturing**
Additive Manufacturing in Aerospace, Automotive, Electronics industries and Biomedical applications.

FACULTY

Speakers shall be drawn from various disciplines of different IITs and other institutions of higher learning, and related industries and R&D organizations of different parts of the country.

COURSE FEE

FOR COLLEGE TEACHERS ONLY

There is no course fee for the sponsored teachers from engineering colleges (**only those approved by AICTE, New Delhi**). They will be paid to and fro 3rd AC class train fare via shortest

Route (**strictly on production of ticket**), and free boarding and lodging in the hostel of IIT Kanpur. The applications of the teachers from the accredited colleges should reach the course coordinator latest by 25th Dec, 2017 giving the information as shown in the Proforma. The engineering College teachers are required to send hard copy applications duly **recommended by the Head of the Institution/Department**. The candidate should have minimum qualification as B.E. / B.Tech. / B.Sc. (Engineering). However, candidates with M.E. / M.Tech. / M.Sc. (Engineering) will be given preference. The candidates with Ph.D. degree with manufacturing specialization are most welcome, and will be given highest priority.

For the selected candidates: The selected candidates will have to send a refundable caution deposit of Rs. 1,000/- to ensure their commitment for participation in this course. This amount will be refundable only to those teachers who attend the course (**Please do not send the money until you get selection letter / e-mail**). Please write your name on the back of demand draft.

FOR PARTICIPANTS FROM INDUSTRIES AND R & D LABS

Private and public sector industries, R & D Labs, teaching Institutions and other organizations are welcome to depute their executives, managers, teachers and engineers to participate in the course. The sponsoring organizations are required to pay a registration fee of Rs. 18,000/- (including tax) per participant. The participants will have to make their own arrangements to meet their travel and other expenses. Boarding and lodging can be arranged in IITK guest house or IITK hostels based upon **prior request and on the payment basis**. Applications on a separate sheet giving the information shown in the proforma should reach the Course Coordinator latest by 10th Jan, 2018.

** For Ph.D. Scholars, the registration fee is Rs. 3,500/-. Please note that the Ph.D. Scholars have to bear their boarding & lodging and travel expenses.

MODE OF PAYMENT

The registration fee or refundable caution money deposit should be sent by bank draft payable at the “State Bank of India, IIT Kanpur” Branch and drawn in favor of “**MFS Course**”.

The list of the selected candidates will also be displayed on the home page of the coordinators, as given below.

Home page: <http://home.iitk.ac.in/~arvindkr/>
<http://home.iitk.ac.in/~nsinha/>