SHORT-TERM COURSE TITLE: Characterization and Testing of Components Following Laser Materials Processing including Surface Engineering and Additive Manufacturing

Performance evaluation is an important step for ensuring the quality of the manufactured product and ensuring its application for the purpose it was designed to. However, the characterization and testing techniques to be applied depend on materials, processing technique applied for manufacturing and the final application of the product. Though a large numbers of characterization and testing techniques are available, however, not all the techniques may be applied for all materials or all purposes. Hence, the present course aims at extending knowledge on the different structural characterisation, functional characterization may be applied on solid components developed by different laser based processing routes like laser cutting, laser welding, laser surface engineering and laser surface cladding.

The Indian Institute of Technology Kharagpur in association with Birla Institute of Technology (BIT) Mesra, and the Kharagpur Chapter of the Indian National Academy of Engineering (INAE), New Delhi is organizing a short term course on "Characterization and Testing of Components Following Laser Materials Processing including Surface Engineering and Additive Manufacturing" in virtual mode during 18th - 26th March, 2023.

In this course, talks will be delivered by experts in materials processing and materials characterisation who have thorough knowledge and expertise both in materials, characterization and testing techniques.

The course will be conducted in two modules of 40 hours duration – (a) Module 1: Characterization Techniques; (b) Module 2: Testing Methods.

The tentative schedule for the course is as follows:

Lecture No.	Date and Time	Name of the Speaker	Title of the talk and Duration	YouTube Link
1	18.03.2023 (Saturday) (10:00 A.M – 12:00 P.M.)	Prof. Indranil Manna BIT Mesra and IIT Kharagpur	Evolution of microstructures in solids	https://youtube.com/live/yjIKZ7MCnMg?feature=share
2	18.03.2023 (Saturday) (4:00 P.M. – 6:00 P.M.)	Prof. Indranil Manna BIT Mesra and IIT Kharagpur	Materials Characterization by X-Ray Diffraction Technique	https://youtube.com/live/-bBlWk6VD0M?feature=share
3	19.03.2023 (Sunday) (10:00 A.M. – 12:00 P.M.)	Prof. Jyotsna Dutta Majumdar IIT Kharagpur	Classification of microstructural characterization and its importance in laser material processing of components	https://youtube.com/live/0sT3MbeinKY?feature=share
4	19.03.2023 (Sunday) (4:00 P.M. – 6:00 P.M.)	Prof. Rahul Mitra IIT Kharagpur	Advanced microstructural	https://youtube.com/live/M0o7cN

			characterization and testing methods	oaVso?feature=share
5	20.03.2023 (Monday) (4:00 P.M. – 6:00 P.M.)	Prof. Anirban Chowdhury, IIT Patna	Utilisation of Thermal Analyses and Raman Spectroscopy in High Temperature Materials	https://youtube.com/live/GFuCiMepy_E?feature=share
6	20.03.2023 (Monday) (6:00 P.M. – 8:00 P.M.)	Prof. Indrani Sen IIT Kharagpur	Microstructure-Mechanical Property Correlation for Laser based Additively Manufactured Metallic Systems	https://youtube.com/live/NN5k0GSK2jc?feature=share
7	21.03.2023 (Tuesday) (4:00 P.M. – 6:00 P.M.)	Prof. Siddhartha Roy IIT Kharagpur	Hardness, nanomechanical properties and non-destructive testing	https://youtube.com/live/JL9-DJX5sjg?feature=share
8	21.03.2023 (Tuesday) (6:00 P.M. – 8:00 P.M.)	Prof. Jyotsna Dutta Majumdar, IIT Kharagpur	Studies on the kinetics and mechanism of corrosion of different systems developed by laser material processing	https://youtube.com/live/Xw105VI2v7U?feature=share
9	22.03.2023 (Wednesday) (4:00 P.M. – 6:00 P.M.)	Dr. Debdutt Patro DUCOM Instruments	Friction and wear behaviour of materials	https://youtube.com/live/Exo284S-sF0?feature=share
10	22.03.2023 (Wednesday) (6:00 P.M. – 8:00 P.M.)	Prof. Bikramjit Basu IISc Bangalore	Bio-compatibility assessment	https://youtube.com/live/hHParbEaO34?feature=share
11	23.03.2023 (Thursday) (4:00 P.M. – 6:00 P.M.)	Prof. Amitava Mitra IIT Jodhpur	Optical, Electrical and Magnetic Properties	https://youtube.com/live/R2_rNQzHt70?feature=share
12	23.03.2023 (Thursday) (6:00 P.M. – 8:00 P.M.)	Prof. Niloy Krishna Mukhopadhyay IIT (BHU) Varanasi	Materials characterization by Transmission Electron Microscopy	https://youtube.com/live/ZWPxOOGHFzs?feature=share
13	24.03.2023 (Friday) (4:00 P.M. – 6:00 P.M.)	Prof. Samit K. Ray IIT Kharagpur	Thin-film characterization	https://youtube.com/live/Cj4mlag8Ry0?feature=share
14	24.03.2023 (Friday) (6:00 P.M. – 8:00 P.M.)	Dr. Soumitra Tarafder NML Jamshedhpur	Mechanical testing of materials part-2: Creep and fatigue behaviour	https://youtube.com/live/d4DlqkvVWV0?feature=share
15	25.03.2023 (Saturday) (10:00 A.M. – 12:00 P.M.)	Prof. Satyam Suwas IISc Bangalore	The importance of texture in microstructure and the	https://youtube.com/live/TZH--y9eEQU?feature=share

			tools for texture analysis	
16	25.03.2023 (Saturday) (4:00 P.M. – 6:00 P.M.)	Dr. Rohan Pascal Fernandes Christ University	Surface characterization by X-Ray photoelectron Spectroscopy (XPS), Auger Electron Spectroscopy (AES),Ultraviolet photoelectron spectroscopy (UPS)	https://youtube.com/live/8u1jtkeAut0?feature=share
17	25.03.2023 (Saturday) (6:00 P.M. – 8:00 P.M.)	Prof. Shivbrat Singh, IIT Kharagpur	DSC, DTA and with detailed discussion on Dilatometry	https://youtube.com/live/oYGt0Dbl7Ro?feature=share
18	26.03.2023 (Sunday) (10:00 A.M. – 12:00 P.M.)	Prof. Debalay Chakrabarti IIT Kharagpur	A Review of the Fatigue and Impact Behaviour of Additively Manufactured Steel Components	https://youtube.com/live/6Oz894ZhkJ8?feature=share
19	26.03.2023 (Sunday) (4:00 P.M. – 6:00 P.M.)	Prof. Gour Gopal Roy IIT Kharagpur	Principles of welding and related characterisation and testing	https://youtube.com/live/XfTQWmDEmks?feature=share
20	26.03.2023 (Sunday) (6:00 P.M. – 8:00 P.M.)	Prof. Sumantra Mandal IIT Kharagpur	High temperature corrosion and oxidation	https://youtube.com/live/tdtaj3H50pM?feature=share

The course is open to all undergraduate (4th Year and Dual-Degree), postgraduate (M.Sc/M.Tech), PhD students in addition to external participants of any background. At the end of the course, certificates will be distributed to the participants. All interested candidates are requested to register online (click on the link for registration: https://forms.gle/n7j5DRjhz87NZ4uz7) on or before 17th March, 2023.

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