ADVANCED MATERIALS AND PROCESSES

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TYPE OF COURSE : Rerun | Elective | PG
COURSE DURATION : 12 weeks (20 Jul’20 - 9 Oct’20)
EXAM DATE : 17 Oct 2020

INTENDED AUDIENCE : M.E/M.Tech, M.S, PhD,
PRE-REQUISITES : Physical Metallurgy, Mechanical Metallurgy, Phase transformation, Solidification Processing

COURSE OUTLINE :

ABOUT INSTRUCTOR :
Dr. Jayanta Das is working as a faculty member since 2010 at IIT Kharagpur. His research activities have mainly encompassed the areas of alloy design, processing of bulk metallic glasses and their composites by rapid solidification and mechanical alloying, high entropy alloys and synthesis of bulk nanostructured alloys by cryo-rolling, their characterization, structure-property correlations, micromechanics of deformation of these advanced metastable alloys. Dr. Das has to his credit more than 120 research publications in peer-reviewed journals of international repute, which were cited more than 4000 times and has contributed 3 book chapters. He was the recipient of DAAD Fellowship in 2002, and Marie Curie Fellowship in 2004. He has been awarded Institute Silver Medal and Greaves Foseco Cash Prize of IIT Kharagpur in 2003, Young Scientist Award of German Society of Materials Research in 2006, Deutsche Bank Junior Award in 2009 (IFW Dresden, Germany), and IEI Young Engineers Award of Institution of Engineers India in 2012.

COURSE PLAN :
Week 01 : Introduction to metastable and functional alloys
Week 02 : Bulk Metallic glasses Part I: Fundamental concepts
Week 03 : Bulk Metallic glasses Part II: Mechanical and Functional properties
Week 04 : Shape memory alloys and Psuedoelasticity
Week 05 : Shape memory alloys: Applications and case studies
Week 06 : Introduction to high temperature materials
Week 07 : Superalloys: Alloy design, Microstructure and Properties
Week 08 : Nano-materials Part I
Week 09 : Nano-materials Part II
Week 10 : Soft and hard magnetic materials
Week 11 : Non-equilibrium Processes, Single Crystal Growth, Rapid Solidification, Inert Gas Condensation
Week 12 : Advanced Functional Alloys