TYPE OF COURSE : Rerun | Core | UG  
COURSE DURATION : 4 weeks (18 Jan' 21 - 12 Feb' 21)  
EXAM DATE : 21 Mar 2021  

PRE-REQUISITES : Basic knowledge of mathematics  
INTENDED AUDIENCE : Interested students  

COURSE OUTLINE :
Thermodynamics is the branch of science that describes the basic laws and principles governing the processes of transfer and transformation of energy along with the changes in properties of the substances affected by such processes. The laws are formulated from observations in nature. The basic principles as corollaries of the laws are established through logical deductions following the laws. The science of thermodynamics also provides the relationships of the properties of substances for their use in determining the changes of properties in physical processes performed by the substances. The subject thermodynamics is of prime importance as a foundation pillar of all branches of engineering, since technological processes and their developments involve transfer and transformation of energy. In the present course we will discuss the laws of thermodynamics and its corollaries. The discussion will be based on physical concepts, mathematical expressions and illustrated examples of practical applications. This will not only clear the physical concepts of the students but will enable the students to get rid of usual misleading concepts in understanding the laws and their applications.

ABOUT INSTRUCTOR :
Prof. Sankar Kumar Som is currently an emeritus Professor (on re-employment) in the department of Mechanical Engineering at the Indian Institute of Technology, Kharagpur. His field of expertise is thermo fluid sciences. His research interest is combustion science, and in particular, droplet and spray combustion. Apart from guiding 16 doctoral students and publishing more than 100 research papers in peer-reviewed international journals, he has served as principal investigator and chief consultant in several industrial projects with different government and private organizations.

Prof. Suman Chakraborty is currently a Professor in the Mechanical Engineering Department as well as an Institute Chair Professor of the Indian Institute of Technology Kharagpur, India, and the Head of the School of Medical Science and Technology. He is also the Associate Dean for Sponsored Research and Industrial Consultancy. His current areas of research include microfluidics, nanofluidics, micro-nano scale transport, with particular focus on biomedical applications. He has been awarded the Santi Swaroop Bhatnagar Prize in the year 2013, which is the highest Scientific Award from the Government of India. He has been elected as a Fellow of the American Physical Society, Fellow of the Royal Society of Chemistry, Fellow of ASME, Fellow of all the Indian National Academies of Science and Engineering, recipient of the Indo-USResearch Fellowship, Scopus Young Scientist Award for high citation of his research in scientific/technical Journals, and Young Scientist/ Young Engineer Awards from various National Academies of Science and Engineering. He has also been an Alexander von Humboldt Fellow, and a visiting Professor at the Stanford University. He has 380+ Journal publications.

COURSE PLAN :
Week 1: Introduction and Fundamental Definitions  
Week 2: First Law of thermodynamics  
Week 3: First Law (continued), Second law of thermodynamics  
Week 4: Entropy and its transport