



# STATISTICAL THERMODYNAMICS FOR ENGINEERS

## PROF. SAPTARSHI BASU

Department of Mechanical Engineering  
IISc Bangalore

**PRE-REQUISITES :** Calculus, Basics of Probability Theory and Statistics, Fundamentals of Thermodynamics

**INTENDED AUDIENCE :** UG, PG, PHD

**INDUSTRY SUPPORT :** General Electric, Siemens, Pratt and Whitney, HPCL, GTRE

### **COURSE OUTLINE :**

This course introduces the fundamentals and applications of Statistical Thermodynamics from an engineering sciences point of view with particular emphasis on spectroscopy, and laser based diagnostics techniques applied to thermal sciences. The course begins with an introduction to the fundamentals of statistical thermodynamics. Then the course delves into the study of Quantum Mechanics and Spectroscopy to understand the relevant fundamentals before diving into applications involving laser based diagnostics. The course covers several applications like laser induced fluorescence techniques used for measurement of species concentration and temperature.

### **ABOUT INSTRUCTOR :**

Prof. Saptarshi Basu is a Professor at the Department of Mechanical Engineering, Indian Institute of Science (IISc), Bengaluru. Before joining IISc, Dr. Saptarshi Basu was an Assistant Professor in the Department of Mechanical, Materials and Aerospace Engineering at University of Central Florida from August 2007-May 2010. Dr. Saptarshi Basu received his M.S. and Ph. D. degrees in Mechanical Engineering from University of Connecticut in 2004 and 2007 respectively. Prof. Basu's research includes multiphase transport phenomena in fluid thermal systems, advanced laser diagnostics measurements in thermo-fluid sciences and engineering and Combustion. Further he also works in bio-fluidics, AI based machine learning for pattern detection in evaporating droplet systems and has several contributions in the field during COVID-19. He has taught many courses that includes Thermodynamics, Convective Heat Transfer, Heat Transfer and Combustion in Multiphase Systems.

### **COURSE PLAN :**