

भौतिकशास्त्र विभाग,  
लोकमान्य टिळक भवन,  
विद्यानगरी, सांताक्रुझ (पूर्व),  
मुंबई - ४०० ०९८ (भारत).

दूरध्वनी : २६५२ ६२५०, २६५३ ३०५१,  
२६५४ ३३५८

विस्तारीत क्र. ३५८

टेली फॅक्स : २६५२ २२२२, २६५३ ३०५१

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University of Mumbai



मुंबई विद्यापीठ

DEPARTMENT OF PHYSICS

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05 June 2017

## Notice

The University Department of Physics (Autonomous) is organising a bridge course in Statistical Mechanics in the week of June 14 – June 20, 2017.

The bridge course in Statistical Mechanics is for students who will be taking admission to M. Sc. II this year (2017-18). The idea is to refresh/strengthen topics already taught upto B. Sc. and cover the gaps in the students' preparation for the forthcoming year, through interactive lectures/tutorial sessions emphasizing problem-solving.

A maximum of 100 students will be accepted in the programme. Prior registration is a must. Admission will be on first-come-first-served basis. The registration fee for the programme is Rs. 100. Fee waiver may be considered on case by case basis. Interested students can contact the University Department of Physics office and register themselves from June 05, 2017 onward.

Bridge Course in Statistical Mechanics

Instructor: Siddharth Kasthurirangan

June 14 2017 – June 20 2017

Sessions: 10 am – 11.30 am; 11.45 am – 1.15 pm; 2 pm – 3.30 pm (tutorials)

Venue: Physics Department Seminar Room,

3<sup>rd</sup> Floor, Tilak Bhavan, Kalina Campus, University of Mumbai.

*Vaishali A. Bambole*

Prof. Vaishali A. Bambole  
Head, Department of Physics

Professor & Head  
Department of Physics  
University of Mumbai

*M. R. Press*

*Nitin Bijewar*

Dr. M. R. Press/Nitin Bijewar  
Co-ordinators



## **Bridge Course in Statistical Mechanics**

**Date:** June 14 to June 20, 2017

**Time:** 10 am-11.30 am ; 11.45am-1.15 pm; 2.00 pm-3.30 pm (tutorials)

**Venue:** Physics Department Seminar Room

**Course Instructor :** Siddharth Kasthurirangan

### **June 14 2016: Preliminaries**

Macroscopic systems, statistical approach, equilibrium and fluctuations, irreversibility and approach to equilibrium, concept of 'randomness', order-of-magnitude estimates

### **June 15 2017: Basic probability concepts**

The ensemble approach, probability relations, the binomial distribution, mean and dispersion, standard deviation, mean value calculations

### **June 16 2017: Foundations of statistical mechanics**

Specification of the system state, statistical ensemble, postulates of statistical mechanics, probability calculations

### **June 17 2017: Counting particle states**

Number of states accessible to a macroscopic system – simplistic calculation, equilibrium and irreversibility – constraints, interaction between systems, infinitesimal general interaction, energy partitioning between macroscopic systems

### **June 19 2017: Thermal interactions - 1**

Equilibrium, entropy and temperature as statistical concepts, absolute temperature, small heat transfer, system in contact with a heat reservoir, mean values for an ideal gas, paramagnetism, examples The Maxwell-Boltzmann velocity distribution, the equipartition theorem, Planck's radiation formula, harmonic oscillator, specific heat of solids

### **June 20 2017: Thermal interactions - 2**

Dependence of system state on external parameters, quasi-static adiabatic process, equilibrium conditions, statistical thermodynamics, system in contact with a general reservoir, Gibbs free energy, phase equilibria, chemical potential, examples



# **University of Mumbai**

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**June 17, 2017: Counting particle states**

**June 19, 2017: Thermal interactions - 1**

**June 20, 2017: Thermal interactions - 2**

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