



# CHEMISTRY - II

**PROF. K. MANGALA SUNDER**

Department of Chemistry  
IIT Madras

**TYPE OF COURSE** : Rerun | Core/Elective | UG/PG**COURSE DURATION** : 8 Weeks (18 Jan' 21 - 12 Mar' 21)**EXAM DATE** : 21 Mar 2021**PRE-REQUISITES** : Mathematics at the High school level;

Students should have a basic background in chemistry, calculus and elementary linear algebra;

Knowledge of elementary thermodynamics and atomic structure will be helpful.

**INTENDED AUDIENCE** : Students of UG B.Sc., I Year of PG**INDUSTRIES APPLICABLE TO** :**COURSE OUTLINE** :

Molecular Spectroscopy is a fundamentally important branch of Physical Chemistry and is vital for all practicing chemists, biologists and material scientists. It is also the field providing experimental verification of a large number of quantum mechanical concepts and enables researchers to obtain some of the most basic and important information about molecules such as bond length, bond angles, bond strengths, optical and magnetic properties. Primarily studied through the interaction of molecules with electromagnetic radiation of different types, molecular spectroscopy is studied through responses of molecules to radiation..

**ABOUT INSTRUCTOR** :

Mangala Sunder Krishnan is a Professor in the Chemistry Department and specializes in the area of theoretical molecular and magnetic resonance spectroscopies, quantum chemistry and quantum information. He obtained his Ph. D. in theoretical chemistry from McGill University, Montreal, Canada in 1988 and has spent several years in Canada as post-doctoral research fellow in Canada before returning to India as a faculty in IIT Madras. In addition, he is one of the founder-coordinators of the NPTEL project and has been associated with it since 2001.

**COURSE PLAN** :**Week 1:** Introduction to Spectroscopy**Week 2:** Introductory Quantum Mechanics**Week 3:** Elementary introduction to Vibrational (Infra-red) Absorption Spectroscopy of Diatomic Molecules**Week 4:** Vibrational (Infra-red) Absorption Spectroscopy of Polyatomic Molecules: Normal Modes**Week 5:** Vibrational Raman Spectra of Diatomic and Polyatomic Molecules**Week 6:** Microwave Spectroscopy of Diatomic molecules**Week 7:** Microwave Spectroscopy of Polyatomic Molecules and Elementary Electronic Spectroscopy**Week 8:** Molecular Interactions and Rotation-Vibration and Vibration-Electronic Coupling