CHEMISTRY AND BIOCHEMISTRY

# SYMMETRY AND STRUCTURE IN THE SOLID STATE

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**TYPE OF COURSE** : New | Core| PG
**COURSE DURATION** : 12 weeks (28 Jan'19 - 19 Apr'19)
**INTENDED AUDIENCE** : Research students, Scientists from Pharmaceutical and materials industry and teachers (faculty) at Universities
**EXAM DATE** : 28 Apr 2019
**PRE-REQUISITES** : Basic Mathematics
**INDUSTRIES APPLICABLE TO** : Pharmaceutical and Materials Industry

## COURSE OUTLINE :

Symmetry, point groups and space groups, crystal lattices. Scattering, diffraction, reciprocal lattice. powder diffraction. Single crystal methods. Data collection and processing synchrotron radiation, phase problem in crystallography. Patterson and direct methods, Rietveld refinement, intermolecular interactions electron density analysis. Basics of neutron diffraction, electron diffraction.

## ABOUT INSTRUCTOR :

T. N. Guru Row Professor and Dean (Science Faculty) Solid State and Structural Chemistry Unit Indian Institute of Science, Bangalore. [B.Sc(Hons) Physics,Bangalore University, Bangalore , India.] [M.Sc :Solid state physics, Bangalore University, Bangalore, India.] [Ph.D :Indian Institute of Science, Bangalore, India.]

## COURSE PLAN :

**Week 01** : Basics of symmetry, 2 Point groups
**Week 02** : Space groups, Equivale3nt points, Wycoff notation
**Week 03** : Basics of diffraction, Laue's conditions and Bragg's Law
**Week 04** : Reciprocal lattice concepts, data collection and reduction
**Week 05** : Phase problem
**Week 06** : Patterson Synthesis
**Week 07** : Direct methods
**Week 08** : Single crystal and powder XRD
**Week 09** : Refinement protocols
**Week 10** : Bond lengths, angles and conformation
**Week 11** : Intermolecular interactions
**Week 12** : Applications in Pharmaceutical and materials industry