

# Degree College Teachers Training programme

in

## Chemistry

22<sup>nd</sup> November to 12<sup>th</sup> December, 2019



Center of Excellence in Science and  
Mathematics Education

Indian Institute of Science

at its

Challakere Campus, Chitradurga-577536

Under

Pandit Madan Mohan Malaviya National  
Mission on Teachers and Teaching  
(PMMMNMTT), MHRD, Govt. of India.



The IISc at Challakere Campus offers a great opportunity for degree college chemistry teachers. This is a three week (21 days) residential training program equal to UGC refresher courses approved by MHRD, Govt. of India and supported by L&T Technology Services under CSR. There will be **80**

hours of lecture and 100 hours of experiments on the topics covering entire BSc Chemistry subjects as per the UGC guidelines:

- Electronic structure of atoms, molecules, chemical bonding, valence, oxidation state, photoelectron spectroscopy.
- Gases, liquids and thermodynamics.
- Solutions- chemical equilibrium.
- Electrochemistry.
- Inorganic Chemistry – s, p, d and f block elements and the periodic table, coordination chemistry, organo-metallic and nuclear chemistry.
- Solids – Solid state chemistry, adsorption, kinetics of reactions, catalysis and photochemistry.
- Organic Chemistry, Spectroscopy – organic and inorganic molecules.

Lectures are given by IISc Professors. Learning theory by doing experiments is the specialty of this program. New experiments to understand theory have been designed and teachers will be doing these experiments individually.

First three days will be devoted to essential mathematics and Electronics for Chemistry teachers. Teachers will learn to plot various functions including s, p, d, f orbitals employing a PC and find how the shapes emerge using orign program in PC.

We have designed over 100 experiments on the B.Sc Chemistry to learn theory. Each day, teachers will be doing 4 to 5 experiments. Experiments include: Resistance vs Temperature for metals and semiconductors (SC), measurement of band gap; Digital thermometers and temperature measurements from 77 to 1000 K; black body radiation-Planck's equation verification, Photoelectric effect, atomic spectra of H, He, Na, Li, and term symbols determination, Rydberg constant, electromagnetic spectrum; atomic and molecular orbitals from Quantum Mechanical (DFT) calculations, plots of s, p, d and f orbitals, Boyles' law, Charles' law, absolute zero, Cp/Cv, determination of universal gas constant-R, specific heat of metals; elevation of boiling point,

depression of freezing point, vapor pressure of liquids and Clausius -Clapeyron equation, heat of vaporization, Raoult's law, osmotic pressure, reverse osmosis; pKa determination, buffers, determination of electrode potentials, cyclic voltammetry, Avogadro number determination, molecular spectra, charge transfer spectra, determination of 10 Dq, complementary colours, X-ray diffraction, determination of lattice parameters and Miller Indices, Langmuir adsorption, vacuum techniques, gas-solid reaction kinetics, CO oxidation, NO reduction, temperature programmed reduction, gas chromatography and separation of inorganic and organic molecules, synthesis of organic compounds along with IR, UV and NMR spectroscopy.

Applications are invited from Indian Citizen who teach Chemistry for BSC students from any part of India. Guest faculty, Contract Lecturers and also those who have attended two UGC refresher courses can also apply.

*Selection will be based on the first come first serve bases.*

*Download application form and Send your application form to*

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**Last date to receive application:**  
**October 20, 2019**