

## School of Chemical and Material Sciences

### Courses List

Course Code	Course Title	Credit Structure			
		L	T	P	C
CH801/CH802	Trends in Chemistry	3	0	0	6
CHS801/CHS802	Graduate Seminar	2	0	0	4
CHL801/CHL802	Analytical Techniques Laboratory	2	0	4	8
CH 811/CH 812	Advanced Inorganic Chemistry	3	0	0	6
CH 813/ CH 814	Advanced Organometallic Chemistry	3	0	0	6
CH 841/ CH 842	Application of spectroscopy	3	0	0	6
CH 843/ CH 844	Methods in Organic Synthesis	3	0	0	6
CH 845/ CH 846	Stereochemistry and Asymmetric Synthesis	3	0	0	6
CH 871/ CH 872	Quantum chemistry	3	0	0	6
CH 873/ CH 874	Light matter interaction	3	0	0	6
CH 875/ CH 876	Statistical thermodynamics and its applications to chemical systems	3	0	0	6

**CH801/CH802** **Trends in Chemistry** **3-0-0-6**

The contents for this course will be decided by the respective instructors. The course will be covering different aspect of chemistry and introduce the students towards modern scientific research happening across the globe.

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**CHL801/CHL802** **Analytical Techniques Laboratory** **2-4-0-8**

Safety methods in chemistry laboratories, Schlenk technique; Modern instrumentation and operation of UV-vis, IR spectrophotometers, fluorescence spectrometer, HPLC-MS, Thermo-gravimetry, Cyclic Voltammetry (or any other techniques). Data handling and interpretation of selected techniques.

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**CHS 801/ CHS 802** **Graduate Seminar** **2-0-0-4**

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**CH 871/ CH 872**

**Quantum chemistry**

**3-0-0-6**

Need for quantum theory, Postulates in Quantum chemistry, Uncertainty principle, Exactly solvable models in Quantum chemistry: particle in a box, Harmonic oscillator, Rigid rotor, Hydrogenic systems. Approximate methods: Variation theorem and perturbation theory, Multi electron atoms, Bonding in diatomic molecules, time dependent perturbation theory.

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**CH 873/ CH 874**

**Light matter interaction**

**3-0-0-6**

Introduction to spectral energy domains and measurement of spectra, Implications of discrete energy levels, Population of States – Boltzmann Distribution, Time dependent perturbation theory, Selection rules, Atomic spectra, Rotational and vibrational spectroscopy of molecules. Raman spectroscopy. Electronic spectroscopy of molecules in their ground and excited states. Impact of group theory on spectroscopy. Mechanism of spin relaxation and their impact on NMR spectroscopy of simple systems.

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**CH 875/ CH 876 Statistical thermodynamics and its applications to chemical systems**  
**3-0-0-6**

Concepts of distribution, thermodynamic probability and most probable distributions. Thermodynamic ensembles. Partition functions. Applications of statistical thermodynamics to Ideal gases, Electrolytes in solutions, Theories of reaction rates in gases and solutions, Polymers.

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