

PRINCIPAL SUBJECT AREA

CHEMISTRY

Compulsory courses for the General degree: CH 101, CH 102, CH 108, CH 109, CH 211, CH 218, CH 221, CH 228, CH 231, CH 238, CH 328, CH 331, CH 338, CH 348

Compulsory courses for the Special Degree: CH 101, CH 102, CH 108, CH 109, CH 211, CH 212, CH 218, CH 221, CH 222, CH 228, CH 231, CH 232, CH 238, CH 317, CH 319, CH 321, CH 324, CH 326, CH 329, CH 330, CH 331, CH 332, CH 339, CH 341, CH 342, CH 351, CH 369, CH 416, CH 417, CH 425, CH 426, CH 435, at least two out of (CH 436, CH 437, 438), CH 443, CH 448, CH 455, CH 491, CH 492, CH 499.

200 LEVEL COURSES

CH 211 Inorganic Chemistry I (2 credits)

(Prerequisites: CH 101, CH 102)

Some selected trends in the chemistry of elements; Co-ordination chemistry: Co-ordination complexes, structures, stability constants, nomenclature, co-ordination numbers, reaction mechanism, crystal field theory, magnetochemistry, spectra of co-ordination complexes; Solid state chemistry, crystalline state, crystal systems, symmetry elements; Powder diffraction methods.

Recommended Texts:

1. JD Lee (1999) *Concise Inorganic Chemistry*,
2. SFA Kettle (1999) *Coordination Chemistry*, Appleton Century,
3. G.F. Liprot (1993) *Modern inorganic chemistry*, ELBS series with CollinsEducational.

CH 212 Inorganic Chemistry II (1 credit)

(Prerequisite: CH 211)

Organometallic chemistry; Nuclear and radiochemistry; Non-aqueous and ionic solvents.

Recommended Texts:

1. FA Cotton and G Wilkinson (1997) *A Textbook of Inorganic Chemistry*, Wiley Interscience
2. G.F. Liprot (1993) ELBS series with CollinsEducational.

CH 218 Inorganic Chemistry Laboratory I (1 credit)

(Prerequisite: CH 108, CH 211)

Gravimetric analysis, determination of anions and cations by gravimetry, complexometric titrations involving EDTA, synthesis of inorganic complexes and their analysis, qualitative analysis of simple mixtures.

Recommended Texts:

1. A.I. Vogel, *Qualitative Inorganic Analysis* (2004), Longman Scientific
2. A.I. Vogel, *Quantitative Inorganic Analysis* (2004), Longman Scientific

CH 221 Organic Chemistry I (2 credits)

(Prerequisites: CH 101, CH 102)

Organic Reaction Mechanisms I (15 L): Energetics – thermodynamics and kinetics of organic reactions; Concerted reactions, multi-step reactions; Electrophilic and nucleophilic addition to double bonds; Reactions of carboxylic acids and derivatives; Reactions of carbonyl compounds – carbanions, enols, enolates; Rearrangements reactions;

Spectroscopy I (15 L): UV, IR, $^1\text{H-NMR}$ and $^{13}\text{C-NMR}$ spectroscopy; one dimensional and two dimensional NMR spectroscopy; Mass spectrometry EI-MS, CI-MS

Recommended Texts:

1. RT Morrison and RN Boyd (1998) *Organic Chemistry*, Prentice Hall;
2. RJ Fessenden and JS Fessenden (1990) *Organic Chemistry*, Brooks/Cole Publishing Co;
3. S. Ege (1994) *Organic Chemistry*, DC Heath & Co;
4. GP Wannigama (2000) *Organic Reaction Mechanisms*, SEU, University of Peradeniya;
5. TW Graham Solomon, CB Fryhle (2002) *Organic Chemistry*, John Wiley;
6. RM Silverstein, GC Bassler and TC Morrill (1991) *Spectrometric Identification of organic compounds*, John Wiley.

CH 222 Introductory Organic Synthesis (1 credit)

(Prerequisite: CH 221)

Oxidations - alcohols, alkenes, Sharpless asymmetric epoxidation; Reductions-carbonyl compounds using hydride reducing agents, catalytic hydrogenation; Reactions of carbonyl compounds-methods of generating enolates, C-alkylation, O-alkylation, nitrogen analogues of enols and enolates, organocuprates; Carbonyl condensation reactions-aldol reactions; Robinson annulation, Claisen ester condensation, Dieckmann condensation, Thorpe nitrile condensation, Knoevenagel condensation; C=C formation - Wittig reaction and its modifications; Diels Alder reaction; Cope rearrangement; Claisen rearrangement

Recommended Texts:

1. S. Ege (1994) *Organic Chemistry*, DC Heath & Co.;
2. RT Morrison and RN Boyd (1998) *Organic Chemistry*, Prentice Hall.

CH 228 Organic Chemistry Laboratory I (1 credit)

(Prerequisites: CH 109, CH 221)

Techniques in organic chemistry; Separation of mixtures; Synthesis of simple derivatives of organic compounds; Use of spectroscopic methods in identification of organic compounds.

Recommended Texts

1. RJ Fessenden and JS Fessenden (1993) *Organic Laboratory Techniques*, Brooks/Cole Publishing Co.
2. AI Vogel, (1989), *A Textbook of Practical Organic Chemistry*, Longman Scientific.

CH 231 Physical Chemistry I (2 credits)

(Prerequisites: CH 101, CH 102)

Quantum Mechanics (10 L): Evidence for quantization, the Schrödinger equation, quantum mechanical principles, postulates in quantum mechanics, operators and observables, superposition and expectation values, the uncertainty principle, probability functions, solutions of Schrödinger equation for 1-, 2-, and 3-dimensional systems, including the hydrogen atom.

Atomic Structure and Atomic Spectra (10 L): Bohr theory and quantum mechanical description of the atom, orbital shapes, radial distribution curves, contour diagrams and polar plots, hybrid orbitals, LCAO method, alkali metal spectra.

Electrochemistry (10 L): Conductometry, electronic and ionic conductors, conductivity and molar conductivity, strong and weak electrolyte solutions, determination of limiting molar conductivity, Kohlrausch's law of independent migration of ions, determination of ionic concentrations, equilibrium constants and rate constants. Conductometric titrations, electrodes, electrochemical cells, applications of potentiometry, factors effecting cell e.m.f., Thermodynamic functions from emf measurements, potentiometric titrations.

Recommended Texts:

1. P.W. Atkins and Julio de Paula, (2006), *Physical Chemistry*, Freeman and Co., New York.
2. D.A. McQuarrie, (1983) *Quantum Chemistry*, University Science Books.

CH 232 Molecular Properties, Molecular Spectroscopy and Spectroscopic Instrumentation (1 credit)

(Prerequisite: CH 231)

Electrical properties, dipole moment, intermolecular forces, magnetic properties, magnetic susceptibility, permanent and induced magnetic moments; Introduction to molecular spectroscopy; Rotational Spectra, vibrational spectra, electronic spectra, basic components of spectroscopic instrumentation.

Recommended Texts:

1. P.W. Atkins and Julio de Paula, (2006), *Physical Chemistry*, Freeman and Co., New York.
2. W.J. Moore (2005), *Introduction to Molecular Spectroscopy*, Pergamon Press.

CH 238 Physical Chemistry Laboratory I (1 credit)

(Prerequisite: CH 231)

Introduction to physical chemistry laboratory, apparatus and measurements; Error analysis; Equilibria; Thermochemistry; Problems in quantum mechanics and spectroscopy.

Recommended Texts:

1. D.P. Shoemaker, C.W. Garland, J.W. Nibler, (1996) *Experiments in Physical Chemistry*;
2. A Findlay, *Findlay's Practical Physical Chemistry*; Revised Edition, Oxford University Press.
3. P Mathews (1985), *Experimental Physical Chemistry*, Oxford University Press