COURSE PLAN

MODEL LESSON PLAN

MODULE	Name of the Topic	No. of Lecture Periods
I	Atomic and molecular Structure	10
II	Spectroscopic techniques and applications	8
III	Intermolecular forces	4
IV	Use of free energy in chemical equilibrium	8
V	Periodic properties	4
VI	Stereochemistry	4
VII	Organic reaction and synthesis of drag molecules	4

LESSON PLAN

Sl. No.	Topics to be covered	Teaching Aids	Books
Unit-1: Atomic and molecular Structure			
1	Schrodinger equation	Chalk/LCD	T1, R2
2	Particle in 1D box solution and their applications for simple samples	Chalk/LCD	T1, R2
3	Molecular orbital of diatomic molecules	Chalk/LCD	T1, R2
4	Energy level diagram of diatomic, butadiene and benzene	Chalk/LCD	T1, R2
5	Rules of aromaticity	Chalk/LCD	T1, R2
6	Crystal field theory and energy level diagram of transitional metal ions and their magnetic properties	Chalk/LCD	T1, R2
7	Band structure of solids and the role of doping on band structure	Chalk/LCD	T1, R2
Unit-2: Spectroscopic techniques and applications			
8	Principle of spectroscopy and selection rule	Chalk/LCD	T1, R1
9	Electronic spectroscopy and applications	Chalk/LCD	T1, R1
10	Fluorescence and its applications in medicine	Chalk/LCD	T1, R1
11	Vibrational and rotational spectroscopy of diatomic molecules	Chalk/LCD	T1, R1
12	NMR spectroscopy	Chalk/LCD	R5
13	Surface characterizations techniques	Chalk/LCD	R5
Unit-3: Intermolecular forces			
14	Ionic, dipolar and van Der Waals interactions	Chalk/LCD	T1, R6

15	Equation of state of real gases and critical phenomenon	Chalk/LCD	T1, R6
Unit-4: Use of free energy in chemical equilibrium			
16	First and second law of thermodynamics functions: energy, entropy and free energy	Chalk/LCD	T1, R2
17	Estimation of entropy and free energies	Chalk/LCD	T1, R2
18	Free energy and cell potential, Nernst equation and applications	Chalk/LCD	T1, R2
19	Acid-base, oxidation, reduction and solubility equilibrium	Chalk/LCD	T1, R2
20	Water chemistry, corrosion, Ellingham diagrams	Chalk/LCD	T1, R2
Unit-5: Periodic properties			
21	Effective nuclear charge, penetration of orbitals, varations of s, p, d and f orbital energy of atoms in periodic table	Chalk/LCD	T1, R6
22	Electronic configuration, atomic and ionic size, ionization energy, electron affinity, ionization energy, polarizability	Chalk/LCD	T1, R6
23	Co-ordination number and geometry, HSAB concept, molecular geometry	Chalk/LCD	T1, R6
Unit-6: Stereochemistry			
24	Representation of 3D structures, structural isomer and stereoisomer	Chalk/LCD	T1, R3
25	Configurations, symmetry and chirality	Chalk/LCD	T1, R3
26	Enantiomers, diastereomers, optical activity	Chalk/LCD	T1, R3
27	Absolute configurations, conformational analysis and isomerism in transitional metal compounds	Chalk/LCD	T1, R3
Unit-7: Organic reaction and synthesis of drug molecules			
28	Nucleophilic substitution (SN1 and SN2), Addition reactions	Chalk/LCD	T1, R4
29	Elimination (E1 and E2) reactions	Chalk/LCD	T1, R4
30	Oxidation and reduction reactions, cyclization and ring opening	Chalk/LCD	T1, R4
31	Synthesis of commonly used drug molecules	Chalk/LCD	T1, R4

Text Books:

T1: Engineering chemistry, Rath and Chakraborty

T2: Engineering Chemistry, G.K. Dasmohapatra

Reference books:

R1: Fundamental of molecular spectroscopy, C. N. Banwell

R2: Physical Chemistry, P. W. Atkins

R3: Stereochemistry of organic compounds, D. Nasipuri

R4: Advanced general organic chemistry, S. K. Ghosh

R5: Spectroscopy of organic compounds, P. S. Kalsi

R6: Genaral and inorganic chemistry, R. P. Sarkar

WEB SOURCE REFERENCES:

1	http://bcs.whfreeman.com/vollhardtschore5e/default.asp
2	http://media.wiley.com/product_data/excerpt/80/04719526/0471952680.pdf
3	http://www.colby.edu/chemistry/CH241F/Chapter%204.pdf
4	http://www.chem1.com/acad/pdf/c1xElchem.pdf
5	http://courses.chem.indiana.edu/c341/documents/c341s2010ch9ns.pdf
6	http://nsdl.niscair.res.in/jspui/bitstream/123456789/801/1/Mol_Spectrsocopy.pdf
7	http://djm.cc/library/Principles_of_Organic_Chemistry_Norris_edited.pdf
8	http://library.umac.mo/ebooks/b28113640.pdf