30.7.2020

FEBRUARY

27 Thursday

058-307 • WK 09

JANUARY 2014

			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	
S	M	T	W	T	F	S

SC1541 ADVANCED BIOMOLECULAR ARCHITECTURE

by prof. abhijeet mitra.

first course on the basis of design principles of nature at the molecular level, which would provide breadth in structural and biophysical approaches and 'schemenable' students to understand structures and interactions in biology.

- mole concept
- atomic structure and the periodic table.
- quantum mechanical approach to atomic structure and bonding
- bonding and intermolecular forces
- nomenclature and isomerism
- configuration and confirmation
- structure and properties of molecules
- computation of energies of molecules and their interactions
- small biomolecules

2014

30.7.2020

2 FEBRUARY

Friday 28

WK 09 • 059-306

MARCH 2014

M	T	W	T	F	S	S
31	4	5	6	7	1	2
3	11	12	13	14	8	9
10	18	19	20	21	15	16
17	25	26	27	28	22	23
24					29	30

- biological macromolecules: proteins, nucleic acids and carbohydrate.

1-2) design principles of nature - chemistry at atomic level

3-4) structure of atom & chemical arithmetic

5) quantum mechanical structure of the atom

6) periodic table and its organization - the electronic configuration of atoms and periodic properties of atoms in their free and bonded state

7) bonding & molecular properties - theory of bonding

8) bonding & molecular structure - theories of bonding electron distribution in molecules and their representation hybridization resonance and aromaticity

9) bonding, structure and intermolecular forces, bond length, bond angle and shape of molecules, hybridization resonance and aromaticity.

10) isomerism
structural and stereo isomers, nomenclature.

11-13) configuration and conformation I
Chirality and optical activity
representation of configuration & stereochemical nomenclature
sugars and carbohydrates

2014

30.7.2020
3

MARCH

2	3	4	5	6	7	1
9	10	11	12	13	14	8
16	17	18	19	20	21	15
23	24	25	26	27	28	22
S	M	T	W	T	F	S

FEBRUARY 2014

1 Saturday
060-305 • WK 09

14-15) configuration and conformation III
9 concept of prochirality
conformations - energy barriers, torsion angles and representations
10 conformations of cyclic compounds including cyclic sugars

11

12 16) structure and properties of molecules
bond energy and type of bond breaking
1 basics of thermodynamics and kinetics
acids and bases
2 familiarity with different amino acids and their classification

3

17) equilibria in aqueous solutions I
general characteristics of amino acids in aqueous solutions.

18) equilibria in aqueous solutions II
study of buffers
amino acid pK values and iso electric points (non ionizable side chains)

2 Sunday

19) equilibria in aqueous solutions III
amino acid pK values and isoelectric points (ionizable side chains)
dry lab on structure building and visualizing tool.

2014

20-22) Study of amino acids and proteins
investigation of dipeptides and torsion angles
levels of protein structure and forces stabilizing them
primary structure and its relation with higher order structure
secondary structure and ramachandran plot
dry lab on structure visualising tool.

23-25) Study of nucleic acids
DNA - components, chemical structures
base pairing and hydrogen bonding
types of DNAs A, B, Z and their structure parameters
nucleic acid databases.
comparing DNA and RNA
nucleic acid protein interactions
dry lab on structure analysis tool.

TEXT BOOKS

1. bio-chemistry - Stryer

2. biochemistry - voet, voet, and pratt.

3. ralph H petrucci - general chemistry: principles & ~~modern~~ modern applications, 8th ed. addison wesley longman (2003)

4. PW atkins; elements of physical chemistry, 5th ed.; of oxford university press (2010).