

**Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot
(Autonomous)**

Affiliated to Saurashtra University, Rajkot

**Department of Biotechnology
B. Sc. BIOTECHNOLOGY**

For Students Admitted from A.Y. 2016-2017 & Onwards

Skill Enhancement Course (SEC) – II

CO CURRICULAR COURSES

16UBTCOC3	Co-Curricular Courses 3: Preparation for Competitive Exams for Life Science Academic Vertical Mobility	Duration of Course & Semester 1 Year (100 hrs) Odd to Even	Student opting in Semester V	1 Credits
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Scheme of Instruction and Guidelines:

Course Code	Paper no.	Paper Title	Instruction per week	Exam Duration	Maximum Marks		Credit
					CIE	Total	
	1	Life Sciences for competitive exams	4 hrs	2 hrs	100	200	1
	2	General Sciences for competitive exams	4 hrs	2 hrs	100		

Paper I: Life Sciences for competitive exams

Objectives:

After completion of this course, student will be able to:

1. Able to identify solutions to problems encountered in context of competitive exam.
2. Explain and apply appropriate analytical concepts to various competitive exams.
3. Able to recognize the component of various subjects and its weightage.

Course Content:

Unit 1: General Biology

(10 hrs)

- Cell organelles and their function, internal transport systems of plants and animal.

- Cellular reproduction and regulation
- Cytoskeleton, Signaling, Cancer Biology.
- populations and communities, genesis and diversity of organisms, evolution;
- Plant and animal diseases.

Unit 2: Basics of Biochemistry (10 hrs)

- Vitamins & Enzyme mechanisms and kinetics
- Carbohydrates structure and function catabolism & anabolism
- Protein structure, amino acid metabolism
- Fatty acid catabolism, Beta oxidation
- Fatty acid anabolism, Cholesterol & its derivatives

Unit 3: Molecular genetics (10 hrs)

- Problems on Mendelian principles & penetrance and expressivity
- linkage and crossing over, sex linkage
- Mutagen and mode of action, Genome organization, population genetics.
- Replication, Transcription & Translation
- Gene regulation in prokaryotes & eukaryotes

Unit 4: Microbiology & Immunology (10 hrs)

- General character & classification of algae, fungi & bacteria,
- Antibiotics & mode of action, bacterial genetics, archaeobacteria, virus,
- Type of immunity, cell & organ of immune system, Antigen and Antibody.
- MHC, compliment system, cytokine, hypersensitivity,, vaccine,
- Autoimmunity, HIV & other immunodeficiency.

Unit: 5 Applied Biotechnology (10 hrs)

- Basics of Microbial fermentation & Downstream processing
- Vaccine production, Basics of cell culture methods for plants
- Basics of cell culture methods for animals
- Method of DNA delivery, transgenic animals and plants
- Molecular approaches to disease diagnosis

Reference Books

- 1 Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. 4th edition, John Wiley and Sons. U. S.A.
- 2 Gyton C. and Hall J.E. (2011) Textbook of Medical Physiology, 11th edition, Elsevier, USA.

- 3 Odum, E.P. (2005). Fundamentals of ecology. 5th edition Cengage Learning India Pvt. Ltd., New Delhi.
- 4 Nelson & Cox (2013) Lehninger. Principles of Biochemistry, 6th Edition, W. H. Freeman, USA
- 5 Voet & Voet (2011) Fundamentals of Biochemistry, 4th Edition, John Wiley & Sons, USA
- 6 Raghavan, V. (2000) Developmental Biology of Flowering plants, Springer, Netherlands
- 7 Cooper, G. M., & Hausman, R. E. (2000) The cell, Sunderland: Sinauer Associates.

Paper II: General Sciences for Competitive Exams

Unit 1: Physical science- I (10 hrs)

- Laws of Motion, Work, Energy and Power,
- Thermodynamics, Heat engine
- Gravitation, simple harmonic motion.
- Circular motion, Projectile Motion
- Work, energy & power, Friction

Unit 2: Physical Science –II (10 hrs)

- Optics & Dual Nature of Matter and Radiations
- Electrostatics & Current electricity
- Magnetic Effects of Current
- Electromagnetic induction
- Semiconductor Devices & logic gates

Unit 3: Chemical Science-I (10 hrs)

- Bohr's theory and Schrodinger wave equation
- Chemical bonding, Properties of s, p, d and f block elements, Coordination compounds
- Chemical equilibrium & kinetics, Acid-base concepts.
- Colligative properties of liquid.

Unit 4: Chemical Science-II (10 hrs)

- Inductive, electromeric, conjugative effects and resonance
- Mechanism of organic reactions
- Isomerism and resonance

- Chemistry of Functional Groups(alcohols, aldehydes, ketones, carboxylic acids, phenols, diazonium salts)
- Important Aromatic hydrocarbons (halides, nitro and amino compounds, phenols, diazonium salts) carboxylic and sulphonic acids.

Unit 5: Mathematical Sciences

(10 hrs)

- Sets theory, Logarithms Complex numbers.
- Linear and Quadratic equations, Sequences and Series.
- Trigonometry, Straight lines and Circles, Conic Sections.
- Permutations and Combinations, Binomial Theorem, Matrices and Determinants, Probability.
- Functions, limits and Continuity, Differentiation & Integration.

Reference Books:

- 1 Agarwal, R.S. (2013) Quantitative Aptitude for Competitive Examinations, 20th edition, S Chand.
- 2 Morrison R.T. (2010), Organic Chemistry, 7th edition, Pearson Education,USA.
- 3 Lee J.D.(2008) Concise Inorganic Chemistry, Oxford; Fifth edition
- 4 Verma H.C.(2015) Concepts of Physics,vol-1 & 2, Bharati Bhawan,India
- 5 Halliday, D., Resnick, R, Walker,J. (1960) Funamental of Physics, John Wiley & Sons, Inc.

Evaluation Norms for Preparation of Competitive Exams for Life Sciences Academic Mobility

The following are the evaluation norms for the co-curricular course under the SEC category that of the students are going to opt in any (odd) semester between I and IV.

Only theory examination will be conducted to evaluate the students in the following way.

1. Theory

Only theory exam will be of total 200 marks and will have 6 CIE components and 1 final (CIE). There will not be provision for practical exam. Total Seven CIE will be conducted.

- i. Generally CIE - 200 marks
Total - 200 marks
- ii. Components of CIE

Paper I: Life Sciences for competitive exams					
Sr.	Component	Content	Duration	Marks	Sub Total
1.	Test-I (End of 1 st month)	1 st and 2 nd unit	1 hrs (MCQ)	10 (set for 50)	10
2.	Test-II (End of 2 nd month)	3 rd & 4 th unit	1 hrs (MCQ)	10 (set for 50)	10
3.	Test-III (End of 3 rd month)	All 5 units	2 hrs (MCQ)	50 (set for 100)	50
Subtotal =					70
Paper II: General Sciences for competitive exams					
1.	Test-IV (End of 1 st month)	1 st and 2 nd unit	1 hrs (MCQ)	10 (set for 50)	10
2.	Test-V (End of 2 nd month)	3 rd & 4 th unit	1 hrs (MCQ)	10 (set for 50)	10
3.	Test-VI (End of 3 rd month)	All 5units	2 hrs (MCQ)	50 (set for 100)	50
Subtotal=					70
4.	Test VII (Consolidated)	Paper I + Paper II	2 ½ hrs	60 (set for 120)	60
				Grand Total=	70+70+60 =200

Guidelines for CIE of Course:

1. There is no passing minimum for CIE of these Courses, Student will be evaluated based on remarks only.
2. There is no provision for re-appearance or improvement of marks in CIE.
3. The candidate is permitted to appear for the final exam only if he/she has completed at least **75% of the class** in the syllabus.
4. Student will be only permitted for paper-II exam if they successfully completed the paper I.
5. Only remarks will be given at the end of the course
6. A separate certificate on completion of the each course will be issued by the CoE
7. All above are compulsory components
8. In an event of non-completion of the course, the students have to re-do the course or opt for another one.

3. At the end of the year no marks be given, only remarks be given as follows:

Range of Marks (Theory + Practical)	Remarks
180 – 200	Excellent
150 – 179	Very Good
120 – 149	Good
080 – 119	Fair
79 and below	Not completed

4. Continuous Internal Evaluation (CIE) - Question paper pattern and distribution of marks will be as per the modal question paper provided below:

**Skill Enhancement Course - Preparation for competitive exams for Life
Science Academic Vertical Mobility**

(Course Code):

(Course Title):

[Time: ... hours]

[Total Marks:]

Question 1: Answer the following questions (1 marks X 50 = 50 marks)

(Note: Questions will be only of MCQ type)

(i).....?

a.

b.....

c.....

d.....