Knowledge required in life sciences and environment

1. Genetics and evolution
   A. CHARACTERISTICS OF MAIN BRANCHES OF THE LIFE PHYLOGENETIC TREE: Bacteria, Eubacteria and Eukaryotes
   B. POPULATION GENETICS: mutation-migration-genetic drift-selection, polymorphism
   C. MENDELIAN GENETICS: allele transmission, genetic relationship (dominance/recessivity)
   D. NOTIONS OF EVOLUTION: Darwin, Wright, Fisher and Kimura’s main contributions

2. Biochemistry and molecular biology
   A. MAIN CELLULAR COMPONENTS BIOSYNTHESIS: Proteins, Lipids, Amino Acids, Sugars
   B. PROTEIN FEATURES AND FUNCTIONS: Hemoglobin, Myoglobin, Enzymes Kinetics (Michaelis-Menten principles), Digestion and blood coagulation, Structure of biological membranes
   C. MAIN METABOLIC FUNCTIONS: Glycolysis, Citrate cycle, Pentose-phosphate pathway and TCA, Fermentation, Photosynthesis
   D. BIOLOGICAL INFORMATION FLUXES: transcription, translation, replication, regulation

3. Plant and animal main physiological functions
   A. NUTRITION
   B. DEVELOPMENT: organs, hormones, immunology, defense
   C. REPRODUCTION

4. Populations, ecosystems and earth system
   A. INTERACTIONS: between living organisms (biotic) and with the environment (abiotic).
   B. ATMOSPHERE, BIOSPHERE, HYDROSPHERE AND GEOSPHERE: description, main features and interactions
   C. NATURAL RESOURCES: different types, distribution, threats, conflicts, preservation