# M.Sc. Biotechnology: Entrance Exam. 2016
## Pt. Ravishankar Shukla University, Raipur CG 492 010

# Syllabus

**The Cell (Prokaryotic & Eukaryotic):**
The cell envelope: Plasma membrane; bilayer lipid structure; functions; the cell wall. Ultra structure and function of nucleus: nuclear membrane; nucleolus and other organelles: Golgi bodies, ER, peroxisomes, Vacuoles. Cell divisions (Mitosis & Meiosis)

**Chromosome organization:**
Morphology; centromere and telomere; chromosome alterations; deletions, duplications, translocations, inversions; variations in chromosome number aneuploidy, polyploidy; sex chromosomes

**DNA the genetic material:**
DNA structure; replication; DNA- protein interaction; the nucleosome model; genetic code; satellite and repetitive DNA. Extranuclear genome: Presence and function of mitochondrial and plastid DNA; plasmids.

**Gene expression:**
Structure of gene; transfer of genetic information; transcription, translation, protein synthesis; tRNA; ribosomes; regulation of gene expression in prokaryotes and eukaryotes; proteins, 1D, 2D and 3D structure.

**Genetic Variations:**
Mutations, spontaneous and induced; transposable genetic elements; DNA damage and repair: Genetic inheritance: Mendelism; laws of segregation and independent assortment: linkage analysis; allelic and non-allelic interactions.

**Genetic engineering:**
Tools and techniques of recombinant DNA technology; cloning vectors; genomic and cDNA library; transposable elements; techniques of gene mapping and chromosome walking

**Biotechnology**:
Functional definition; basic aspects of plant tissue culture; cellular totipotency, differentiation and morphogenesis; biology of *Agrobacterium*; vectors for gene delivery and marker genes; salient achievements in crop biotechnology

**Microbiology**:
General and Applied microbiology; Microbiology of Domestic water and sewage; Microbiology of milk and milk products; Industrial microbiology

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**Biochemistry:**
Amino acids and Peptides - Basic structure and biological function
Carbohydrate and its metabolism - Glycogenesis; Gluconeogenesis; glycolysis, Glycogenolysis
Lipids - Basic structure and biological function.

**Bio-techniques:**
Principles and techniques about the following
pH meter; Colorimeter; Microscopy- Light microscopes, Phase contrast and Electron microscopes; Centrifugation; Separation of bio-molecules by chromatography and Electrophoresis