

**Topics covered in CSIR NET Online coaching (243 topics)**

	<b>Topic Name (Unit 3 – Lecture 1) 13</b>	
1	Meselson stahl experiment	
2	DNA polymerization and ligation	
3	DNA polymerase	
4	DNA replication initiation in e.coli	
5	DNA replication elongation in e.coli	
6	Topoisomerase and supercoiling of DNA	
7	Types of Replication	
8	DNA replication termination in e.coli	
9	Eukaryotic replication Issue	
10	End replication problem in eukaryotes	
11	tRNA charging	
12	Transpeptidation reaction	
13	Translation animation in prokaryotes	
	<b>Unit 3 Lecture 2 - 12</b>	
1	Transcription Overview (Prokaryotic)	
2	RNA polymerase	
3	Gene elements in transcription	
4	Prokaryotic Transcription initiation	
5	Prokaryotic Transcription elongation	
6	Prokaryotic Transcription Termination	
7	Eukaryotic transcription factors	
8	Eukaryotic transcription initiation	
9	5 prime capping and 3 prime polyadenylations	
10	mRNA splicing and alternative splicing	
11	RNA editing	
12	RNAi – siRNA, miRNA, shRNA	
	<b>Unit 2 – Lecture 1 - 11</b>	
1	Cell membrane composition	
2	Lipid mobility and lipid asymmetry	
3	Membrane fluidity and role of cholesterol	
4	Lipid Rafts	
5	Membrane proteins	
6	Diffusion and osmosis	
7	Passive transport	
8	Active transport	
9	Bulk transport	
10	Organelles structure and functions	
11	Cytoskeleton structure and function	
	<b>Unit 2 – Lecture 2 -7</b>	
1	Motor proteins	
2	Intercellular junctions	
3	Vesicular transport basics	

4	Nuclear Transport and mitochondrial translocation of protein	
5	Chromatin structure Regulation	
6	Nucleosome remodelling	
7	Gene silencing and DNA methylation	
	<b>Unit 2 – Lecture 3 - 4</b>	
1	Protein vesicular trafficking details	
2	Lac operon	
3	Tryptophan Operon	
4	Arabinose operon	
	<b>Unit 1 – Lecture 1 - 11</b>	
1	Enzyme kinetics and turnover number	
2	Enzyme inhibition	
3	Enzyme classification	
4	Stereochemistry basics	
5	Disaccharides and polysaccharides	
6	Amino acid chemistry titration etc.	
7	Polypeptide properties	
8	Ramachandran plot	
9	Protein secondary structure	
10	Domain and motif of proteins	
11	Tertiary and quaternary structure of proteins	
	<b>Unit 1 – Lecture 2 - 6</b>	
1	Fibrous and globular proteins	
2	Haemoglobin and myoglobin	
3	Cellular metabolism overview	
4	Glycolysis and regulation of glycolysis	
5	Glycogen metabolism	
6	Gluconeogenesis	
	<b>Unit 1 – Lecture 3 - 6</b>	
1	The cori cycle	
2	TCA cycle	
3	Pyruvate dehydrogenase complex	
4	TCA cycle regulation	
5	Electron transport chain and regulation	
6	Biochemistry math problems	
	<b>Unit 10 – Lecture 1 - 14</b>	
1	Ecosystem ecology basics	
2	Tolerance model and law of tolerance	
3	Ecological rules with example	
4	Soil profile	
5	Ocean profile	
6	Ecological pyramid	
7	Ecological succession basics	
8	Keystone/Umbrella/flagship species	

9	Population ecology J and S shaped curve	
10	Survivorship curve	
11	Age structure diagram basics	
12	Ecological footprint	
13	Regulation of Population growth and r and k species	
14	Pollution overview	
	<b>Unit 10 – Lecture 2 - 12</b>	
1	Habitat and niche concept	
2	Fundamental vs realized niche	
3	Niche interactions – Competitive exclusion principle	
4	Habitat fragmentation	
5	Character displacement	
6	Community interactions	
7	Species richness and dominance	
8	Types of biodiversity	
9	Lotka Volterra model basics	
10	Biodiversity conservation	
11	IUCN Data List	
12	Biomes	
	<b>Unit 10 - Lecture 3 - 8</b>	
1	Age structure diagram	
2	Metapopulation dynamics	
3	Life table	
4	Lotka Volterra model graph analysis	
5	Primary productivity	
6	Common ecosystems	
7	Nitrogen cycle in atmosphere	
8	Ecological succession- Different models and cause	
	<b>Unit 8 – Lecture 1 - 9</b>	
1	Bacterial conjugation	
2	Bacterial Transformation	
3	Bacterial transduction	
4	Transposable elements	
5	Types of DNA damage	
6	DNA repair mechanisms NER,BER and MMR	
7	Double strand break repair model	
8	DNA mutation causing agents	
9	Chromosomal numerical aberrations	
	<b>Unit 8 – Lecture 2 - 15</b>	
1	Mendel's Law	
2	Nonmendelian ratio	
3	Leathal allele	
4	Multiple alleles	
5	Co-dominance and incomplete dominance	
6	Epistasis types	
7	Penetrance and expressivity	

8	Pleiotropy	
9	Polygenic inheritance	
10	Cytoplasmic inheritance	
11	Linkage theory	
12	Sex linked, limited and influenced characteristics	
13	X inactivation	
14	Genomic imprinting	
15	Some common genetic disorders	
	<b>Unit 8 – Lecture 3 - 4</b>	
1	Lac operon math problems	
2	Hfr Mapping problems	
3	Linkage mapping problems	
4	Pedigree problems	
	<b>Unit 11 – Lecture 1 - 11</b>	
1	Origin of life on earth	
2	Speciation	
3	Types of evolution	
4	Laws of evolution	
5	Types of Natural selection	
6	Geological timescale	
7	Extinction examples	
8	Animal behavior	
9	Altruism basics	
10	Kin selection	
11	Reciprocal altruism	
	<b>Unit 11 – Lecture 2 - 7</b>	
1	Population genetics basics	
2	Genetic drift	
3	Natural selection and fitness idea	
4	Hardy Weinberg math problems	
5	Mimicry types and use	
6	Biorhythm	
7	Geological timescale animation	
	<b>Unit 9 - 6</b>	
1	Classification hierarchy	
2	Invertebrate classification	
3	Vertebrate classification	
4	Comparable heart anatomy among vertebrate classes	
5	Cladogram theory	
6	Cladogram analysis and problems	
	<b>Unit 12 – Lecture 1 - 5</b>	
1	Gene therapy	
2	Fermentation technology basics	
3	Types of fermentation	
4	Plant tissue culture	

5	Somatic embryogenesis	
	<b>Unit 12 – Lecture 2 - 3</b>	
1	Plant biotechnology basics	
2	Agrobacterium mediated gene delivery system Ti plasmid	
3	Plant biotechnology animations	
	<b>Unit 5 – Lecture 1 - 6</b>	
1	Developmental biology basics	
2	Sea urchin fertilization and polyspermy prevention	
3	Cleavage pattern	
4	Blastula stage	
5	Gastrulation	
6	Developmental biology animations	
	<b>Unit 5 – Lecture 2 - 6</b>	
1	Organizer concept	
2	Specification types	
3	Limb development in tetrapod	
4	Vulva development in c.elegans	
5	Metamorphosis in insects	
6	ABC model of flower development	
	<b>Unit 5 – Lecture 3 - 3</b>	
1	Drosophila development and genetics complete	
2	Sex determination in human and other systems	
3	Eye lens induction in frog	
	<b>Unit 13 – Lecture 1 - 5</b>	
1	Molecular cloning	
2	Cloning vectors	
3	DNA libraries	
4	PCR technique and types of PCR	
5	Animations	
	<b>Unit 13 – Lecture 2 - 2</b>	
1	Immunological methods Precipitation based	
2	Immunological methods Agglutination based	
	<b>Unit 13 – Lecture 3 - 10</b>	
1	DNA sequencing dideoxy model or Sanger model	
2	Maxam Gilbert DNA sequencing	
3	Shotgun sequencing	
4	Pyrosequencing	
5	Next generation sequencing	
6	DNA Markers basics	
7	RFLP	
8	RAPD	
9	AFLP	
10	Microsatellite and minisatellite – SSR and ISSR	

	<b>Unit 13 – Lecture 4 - 5</b>	
1	IR spectroscopy	
2	X ray crystallography	
3	Mass Spectroscopy	
4	CD spectroscopy	
5	NMR spectroscopy	
	<b>Unit 4 – Lecture 1 - 10</b>	
1	Cell signaling	
2	Cell cycle regulation basics	
3	Cyclins and CDK	
4	Cell cycle checkpoint regulation	
5	Receptor tyrosine kinase pathway	
6	Checkpoint regulation	
7	Role of p53 in cell cycle	
8	Apoptosis pathways	
9	Necroptosis	
10	Autophagy	
	<b>Unit 4 – Lecture 2 - 7</b>	
1	Cancer Biology basics with cancer treatment	
2	Basics of Infection	
3	Epidemiology overview	
4	Steps of pathogenesis	
5	Endotoxins	
6	Exotoxins mode of action	
7	Endotoxin vs exotoxin	
	<b>Unit 4 – Lecture 3 - 18</b>	
1	Innate immunity cell mediated	
2	Complement system	
3	Adaptive immunity	
4	VDJ Recombination	
5	Immune response	
6	Viral modification	
7	Cells of immune system	
8	CD markers	
9	Tissue of immune system	
10	How immune system works?	
11	Innate immune response inflammatory response	
12	Adaptive immune response	
13	Antigen structure and function	
14	Antibody structure and functions	
15	Immune response and respective antibodies	
16	Immune system disorders	
17	Hypersensitivity	
18	Autoimmune diseases	
	<b>Unit 4 – Lecture 4 - 7</b>	

1	Types of Cancer	
2	Cause of cancer	
3	Hallmarks of cancer	
4	Routes of cancer	
5	Cancer cell theory	
6	Cell signalling and cancer	
7	Cancer immunology and cancer immunotherapy	

Shomu's Biology