**SYLLABUS OF GENERAL ANIMAL BIOLOGY (Zoo-109)**

**COURSE CONTENTS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Campbell’s Biology Book | | | | |
| Lecture | **6th**  **edition** | **8th edition** | **9th edition** | Subject |
| **Pages** | | |
| 1 | **64** | **68** | **114** | Macromolecules |
| **69**  **70** | **115** | Carbohydrate  Monosaccharides Fig. 5.3 |
| **65** | **71** | **116** | Disaccharides (Fig. 5.4,5.5) |
| 2 | **66** | **72** | **116** | Polysaccharides Storage poly Fig. 5.6 |
| **67** | **73** | **118** | Structural poly, Cellulose Fig. 5.7 |
| **68-69** | **74-75** | **120** | Lipid structure, bonds Fig. 5.10 |
| **69** | **75-76** | **120** | Triacylglycerol = triglyceride  Saturated, unsaturated fatty acids Fig. 5.11 |
| **70** | **76-77** | **122** | Phospholipids, Structure, Behavior toward water |
| **71** | **77-79** | **123** | Proteins: polypeptide, Amino acids, R group, (Fig.5.15) |
| **329** | **384** | **427**  **428**  **429** | Viral genomes Fig 19.3 sizes  Types of genomes , Names of viruses Capsids & Envelopes  Capsid & Structrane (capsomeres )  Viral envelopes: Origin, structure  Bacteriophages |
| **330-331** | **389** | **430** | Why virus need host cells: = Ribosomes, metabolic enzymes (Fig. 19.4) |
| 3 |
| **331-332** | **385** | **431** | Lytic cycle & virulent virus (Fig. 19.5) |
| **332** | **386** | **432** | Lysogenic cycle & temperate virus (Fig. 19.6) |
| **332,333, 334** | **388** | **432** | Lysogenic cycle Fig. 19.6, structure of viral envelopes. |
| **334** | **387,** | **433** | Enveloped virus, Fig 18.6 DNA virus (Herpes) |
| **335,336** | **389** | **435** | RNA virus Example HIV & Aids + Figure 19.8 |
| 4 | **112** | **98** | **146** | A panoramic view of the cell  Prokaryotic cells & Prokaryotes |
| **112** | **98** | **144** | Fig 6.5 structure of Prokaryotes |
| **114,115** | **100, 101** | **144** | Figs. Only (6.8) |
| **528** | **556-557** | **616** | Function of prokaryotic cell wall (three Functions) |
| **528-529** | **557-559** | **618-619** | Gram stain Fig. 27.5  Fig. 27.2\* pili |
| **529-530** | **558-559** | **145-146** | Capsule & pili  Methods: The gram stain & structures  Many prokaryotes are motile. Flagellar action |
| **530** | **557** | **557** | Fig. 27.5 Nucleoid region |
| **532** | **564** | **610** | Prokaryotes, nutrition groups: photoautotrophs, Chemoautotrophs, Photohetrotrophs, Chemoheterotrophs, Saprobs, Parasites |
| Cell Organelles | | | | |
| 5 | **138-143** | **125-128** | **171-173** | Cell membrane from page |
| (A) Membrane models Fig 7.3,7.4 A & B  (B) A membrane is a fluid mosaic of lipids -What is a fluid Fig. 7.3 |
| **114-117** | **102-104**  **117, 118** | **148-149**  **150**  **148** | Nucleus Fig 6.9, Structure & function of the following  a) Nuclear Membrane  b) Nuclear Pores  c) Nuclear Lamina  d) Chromatin  e) Nucleolus  Ribosomes build a cell's protein, Fig 7.1 0 |
| 6 | **118** | **104-105** | **151** | Types of ER, the difference between SER & RER Fig 7.11 |
| **119** | **104-105** | **151** | Functions of SER, Rough ER & Synthesis of Glycoproteins, Transport vesicles |
| **119** | **105** | **151** | Cell membrane, RER |
| **120** | **105** | **152** | Structure and Function of Golgi apparatus Fig.7.12 |
| 7 | **121-122** | **107** | **153** | Lysosomes are digestive Fig. 7.13 & 7.14 |
|  | **109-110** | **154-157** | Mitochondria structure & function & Fig. 7.17 |
| **126** | **112** | **158** | The cytoskeleton Fig. 7.21 |
| **127** | **113** | **159** | Microtubules |
| **128** | **114** | **160** | Centrosomes & centriols Fig. 7.22 |
| **128,129,130** | **114-115** | **160** | Cilia & Flagella Fig. 7.23\*, 7.24 & 7.25 |
| **130-132** | **116** | **162** | Microfilaments Fig.7.27 |
| How things get into and out of cells | | | | |
| 8 | **138-142** | **125-128** | **171** | "Membrane models have..."  the term; Amphipathic |
| **142** | **126** | **173** | Fluid mosaic model |
| **142-144** | **128-130** | **174** | "Membranes as Mosaics of structure & Function" Term; integral proteins, peripheral proteins, "carbohydrates and cell to cell recognition" Figure 8.5 |
| 9 | **144** | **131** | **177** | "Permeability of the lipid Bilayer" "Transport proteins" |
| **145** | **132** | **178** | "Passive transport is diffusion. ...," Terms; concentration gradient. Passive transport.  "Osmosis is the passive transport. ..." Terms; hypertonic, isotonic. |
| **146-147** | **133-135** | **179-180** | Terms; osmosis, osmoregulation Page 140  The term; facilitated diffusion |
| **148-149** | **135-136** | **180** | The term; active transport  e.g. Sodium-Potassium pump, Figure 8.14 = 8.15\* |
| **149-151** | **136-137** | **180** | The term; membrane potential, co- transport |
| **151-152** | **138-139** | **184** | "Exocytosis & endocytosis. ..."  Phagocytosis, pinocytosis. Receptor-mediated endocytosis  (Case study: Familial hypercholesterolemia) |
| Enzymes | | | | |
| 10 | **96** | **151** | **198** | Enzymes speed up metabolic reactions by lowering energy barriers (Fig 6.9 6.10) = 6.12, 6.13\* |
| **97** | **153** | **199** | Enzymes are substrate specific |
| **98** | **154** | **200** | The active site, Catalytic center Fig. 6.12 = 6.15\* |
| **99-100** | **155-156** | **202** | A cell's physical and chemical environment affects enzyme active, cofactor, Enzy inhibitors. (Fig. 6.13, 6.14) |
| 11 |  |  | **204** | Metabolic control often depends on allosteric. |
| **101** | **157** | **205** | Feedback inhibition, coperativity (Fig.6.15, 16) |
| **101,102** | **159** | **206** | The localization of Enz. within a cell (Fig. 6.17) = 6.20\* |
| Energy Production - Cellular Respiration | | | | |
| 12 | **155-156** | **162-164** | **214** | Principles of Energy Harvest |
| **156** | **165** | Cells recycle the ATP. The NAD, NADH (Fig. 9.4) |
| **160, 161** | **166-167** |  | The Process of cellular Respiration  Respiration involves glycolysis (Fig 9.6) |
| **161** | **167-169** | **218** | the Krebs cycle, and Election transport an over views  Glycolysis harvests chemical energy oxidizing glucose to pyruvate Fig. 9.7). |
| 13 | **164** | **170** | **219** | The Krebs cycle (chemiosmosis) Fig. 9.10 |
| **164,165,166** | **170, 171, 173, 174, 175** | **220-222** | The inner mitochondria, Electron Transport. (Fig. 9.11 show only) Fig. 9.12, Fig. 9.13. Fig. 9.15, Fig. 9.16). |
| **167-173** | **177-180** | **222-226** | Chemiosmosis 159) Fig. 9.11. Fermentation (Fig. 9.17, 9.18, 9.19, 9.20). |
| The Cell Cycle: Meiosis and Sexual Life Cycle | | | | |
| 14 | **216-217** | **228-230** | **274** | Cell division distributes identical sets (genome-somatic cells-gametes-chromatin-sister chromatids-centromere- mitosis-cytokinesis- meiosis ) |
| 15 | **218-219** | **230** | **277** | The mitotic cell cycle fig. 12.4 |
| **230-232** | **278** | The stages of mitotic cell division in an animal cell figs.12.5,12.6a |
| **221** | **234** | **280** | Cytokinesis divides fig. 12.8 |
| **236-239** | **251** | **297** | The human life cycle fig. 13.4a = 13.5\*  (karyotype-homol.chrom-sex chrom.autosomes- gametes-haploid cell-  Fertilization or syngamy-zygote-diploid cell-meiosis ) |
| **239** | **252** | **299** | Meiosis reduces chrom. Number fig. 13.5 = 13.6\* |
| **240-241** | **253** | **300** | The stages of meiotic cell division (fig. 13.6) 233 = 13.7\* |
| **239 then**  **p. 242, 244** | **253-257** | **302** | Mitosis and meiosis compared fig. 13.7 = 13.8\* Fig. 13.9 =13.10\* then p. 235 Crossing over fig. 13.9 =13.10\* |
| Information Codes and Genes | | | | |
| 16 | **79** | **86** | **133-134** | Fig. 5.25, Nucleic acids |
| **80,81,82** | **87** | **133-134** | DNA & RNA, Fig. 5.26 = 5.28\*  The nitrogen bases |
| **83** | **87** | **133-134** | Fig. 5.27 = 5.29\* |
| **82-83** | **89** |  | Inheritance is based + Fig. 5.28 = 5.30\* |
| **290-292** | **306, 308, 309** | **351** | "Watson & crick discovered." Figure 16.3, 16.5 -16.6 |
| **293-294** | **312** | **357** | The term; Semiconservative model Figure 16.7-16.8 |
| **295-298** | **312-319** | **360** | "A Large team of enzymes "  The student should know briefly what is the meaning of the following: (Fig. 16;10, 16.12, 16.13, 16,15,16.16) DNAreplication, Origins of replication, Replication fork  DNApolymerase, Leading strand, Logging strand DNA Ligase, Primer, Primase Helicase, Okazaki fragments |
| **304-307** | **328-331** | **374**  **376**  **376** | "'Transcription…..... (Fig. 17.2-17.4) What is transcription? What is translation?  What mRNA & RNA Processing?  "In the genetic code…."  The term; triplet code  The term; template strand |
| 17 | **304-309** | **330** | "Cracking the code " |
| **309- 310** | **330-334** | The student should know the following terms briefly).  RNA Polymerase (Fig. 17.6,7.7)Transcription Unit  Transcription factor |
| **313** | **337** | **385** | "Translation is the RNA. ..,"Terms; tRNA, Anticodon (Fig. 17.21 = 23\* ,22 = 24\*) |
| **316-320** | **338-342** | **385** | "Ribosome "Terms; rRNA, p Site, A Site, E Site  Briefly what is initiation elongation and termination? (Fig. 17.14 = 17.15\* ,15 = 17\*,16 = 18\*,17 = 19\*,19 = 21\*) |
| 18 | **322-325** | **334-346** | **390-395** | "Point mutation" Fig. (17,21 = 17.23\*)  The student should know what is.  Point mutations  Base-pair substitution  Missense mutations  Nonsense mutation  Insertions  Deletion  Frameshift mutation  Mutagens |
| **325** | **347** | What is the gene briefly the definition in page 316 (Fig 17.23 = 17.25\*) |
| Mendel and the Gene Idea  The Chromosomal basis of Inheritance | | | | |
| 19 | **247-248** | **262-264** | **309** | Character- trait -true-breeding -hybridization-monohybrid cross p generation-Fl, F2 generations) By the law of segregation, the two |
| **250-251** | **265-266** | **311** | fig. 14.4 table 14.1 242 = 250\* |
| 20 | **251-252** | **267** | **313** | Some useful genetic vocabulary homozygous- 244 heterozygous-phenotype-genotype The testcross (Fig.  14.6) |
| **252** | **268** | By the law of independent assortment, each pair…. (and first paragraph in p. 246 = 254\* and fig. 14.7b ) |
| 21 | **261** | **277** | **321** | Genetic diseases (briefly) Recessively inherited disorders |
| **262** | **278** | **323** | Cystic fibrosis, Tay-Sachs disease |
| **262** | **278** | **324** | Sickle-cell disease, dominantly inh. Disorders |
| **263-264** | **279-280** | Huntington dis., Multifactorial disorders, heart disease, diabetes, cancer, alcoholism, schizophrenia and manic- depressive disorder. |
| 22 | **278** | **289** | Sex-linked disorders in humans Page 269 =277\* Color blindness Page 270 Hemophilia |
| **280-282** | **299-300** | **336-345** | Human disorders due to chromosomal alterations Page 273 =280\* Down syndrome, klinefelter syndrome Page 274 Cri du chat |
| **276** | **289** | **345** | Sex chromosomes |
| **277** | **290** | **336** | The chromosomal basis of sex varies with the organism 269 (and fig. 15.8) |
| Endocrinology | | | | |
| 23 | **955** |  | **1020-1022** | An introduction to regulatory systems |
| **956** |  | The endocrine system and the nervous fig 45.1 |
| **958** |  | A variety of local regulators affect fig. 46.19 |
| **958-959** |  | **1025** | Chemical signals bind to specific fig. 45.3,4 |
| **960** |  | Steroid hormones, thyroid fig. 45.5 |
| **960** |  | The vertebrate endocrine fig. 45.6 = 45.45\*, tab. 45.1 |
| 24 | **962** |  | The hypothalamus and pituitary fig 45.7 = 45.6\* a,b |
| **962** |  | **1030** | Posterior pituitary hormones |
| **964** |  | **1031** | Anterior pituitary hormones |
| **964** |  | the pineal gland is |
| **965** |  | **1033** | Thyroid hormones function figs. 45. 8,9 = 45.7, 8\* |
| **966** |  | **1035** | Parathyroid hormone fig.45.10 = 45.9\* |
| **966** |  | **1036** | Endocrine tissues of the pancreas fig.45.11 = 45.10\* 906 |
| **969** |  | **1037** | The adrenal medulla and Fig.45.15 = 45.14\* |
| **949** |  | **1037** | Nervous system and hormonal fig. 44.21 a,b = 44.24\* |
| 972 |  | 1038 | Gonadal steroids regulate fig. 46.14 |