



# **TRIPURA UNIVERSITY**

**(A Central University)  
Suryamaninagar-799022**

**Syllabus**

**OF**

**Human Physiology**

**Major – Semester – VI & III  
(Rectified)**

**2014**

## 6<sup>th</sup> Semester Syllabus for B.Sc.

### Human Physiology

#### Honours course (TDPH)

##### Unit 15: Sensory Physiology [25]

1. Olfaction and gustation: Structure of taste buds, mechanism of taste sensation, neural pathways for taste and smell sensation with centres involved. Taste and smell adaptation, Olfactometer, electroolfactogram.
2. Audition: Structure and function of auditory apparatus, organ of corti- Histology, function, propagation of sound waves, through different parts of ear and their role in hearing, auditory pathway, perception of sound frequency and loudness, Deafness, audiometry, hearing tests.
3. Vision: Anatomy and structure of eyeball, histology of retina, photochemical changes of retina on exposure to light, visual pathway, reflexes of the eye, accommodation, refractive errors and their remedies, visual field-scotopic and photopic vision, visual acuity, perception of depth, positive and negative after image, light and dark adaptation, theories of colour vision, colour blindness, basic idea about glaucoma.

##### Reference Books:

1. Medical physiology – Guyton
2. Basic Physiology- C.C. Chatterjee
3. Ganong

##### Unit 16: Microbiology, Biotechnology & Immunology [25]

##### Microbiology

1. Bacteria, virus and fungus – their structure and characteristics, bacterial classification
2. Bacterial growth cycle and factors (pH, temperature, nutritional requirement) controlling bacterial growth.
3. Bacterial genetics – transformation, conjugation, transduction
4. Bacteriostatic and bactericidal agents and their effects.
5. Brief idea of antibiotics with examples.
6. Some common diseases caused by bacteria, fungus and virus – cholera, eczema and influenza – their symptoms and preventive measures.

### Biotechnology

7. Recombinant DNA technology, DNA cloning, cloning vector, restriction endonuclease, cloning of DNA into cloning vectors .
8. DNA gel electrophoresis
9. Southern blot and western blot
10. Colony hybridization
11. Basic concepts of PCR

### Immunology

12. Immune system, Innate and acquired immunity – their components
13. Primary and secondary lymphoid organs, T cell, B cell, Macrophage, neutrophil, dendritic cells their functions.
14. Antigen, Immunogen, Epitope, Hapten, Paratope, MHC molecules, CD-4 and CD-8 markers – general idea.
15. Humoral immunity – general structure of IgG antibodies, Primary and secondary immune responses, clonal selection theory of antibody production
16. Cell mediated immunity – role of CTL and  $T_H$  in Cell mediated immunity.
17. Complement components of classical and alternative pathways, their activation, and physiological function of complement system.

### Reference Books:

1. Kuby Immunology
2. Basic immunology- Roit
3. Microbiology – Pelczar, Chan, Crieg
4. Biochemistry - Strier

### Unit 17: Molecular Biology & Genetics [25]

1. DNA – the genetic material, transformation in pneumococcus (Avery, MacLeod and Mc Carty), Griffith and Hershey – Chase experiments.
2. Semiconservative model of DNA replication
3. DNA polymerase I and III, DNA ligase, function of different subunits, Okazaki fragments.
4. DNA transcription: Concept of gene, difference between prokaryotic and eukaryotic gene. Mechanism of genetranscription, template and non-template strand. Promoter sites, RNA polymerase – functions of different components of RNA polymerase. Post transcriptional processing of eukaryotic mRNA.
5. Protein synthesis: genetic code, codons, reading frame, Nirenberg's experiment, initiation codon, termination codon, degeneracy of genetic code, Wobble hypothesis.

Mechanism of translation: Activation of amino acid, formation of initiation complex, Shine-Dalgarno Sequence, role of A site and P site. Elongation: role of elongation factors, translocation. Termination: role of terminators and release factors, post-transcriptional modification

6. Mutation: Spontaneous and induced mutation, mutagens- chemical, physical; transition and transversion of mutation – mechanism, chemicals inducing transition and transversion.
7. Chromosomal mutation: Structural, inversion, translocation, deletion, duplication, chromosomal number: Euploidy, aneuploidy, polyploidy. Repair of mutation: mismatch repair, excision repair,
8. Regulation of gene expression, operon concept, lac operon, cistron.
9. Different stages of meiosis and behaviour of chromosomes during meiosis
10. Mendelian genetics – Mendel's experiments, monohybrid crosses, principles of dominance, dihybrid crosses, incomplete dominance, co-dominance.
11. Human genetics – importance, pedigree analysis, karyotyping, human genetic disorders, gene incompatibility (ABO blood group), autosomal (phenylketonuria), albinism, sex-linked (haemophilia, red green colour blindness) diseases.

Reference Books:

#### **Unit 18: Research methodology & Epidemiology [25]**

1. Meaning of research, Objectives and significance of research, research ethics, types of research.
2. Scientific methods in research, selecting the research problem, need for research design, sample design and its different steps, Need for basis of selecting a sampling procedure, characteristics of a good sample design, types of data.
3. Utility of statistics in research, measures of central tendencies (Mean, median, mode), standard deviation (SD), standard error of mean(SEM), Student's T test, graphical representation of data frequency, polygon, histogram, normogram, bar diagram, pie diagram. Testing of hypothesis, null hypothesis, tests of significance, degree of freedom.
4. Definition of epidemiology, recent developments in epidemiology, definition, scope and uses of epidemiology, concepts of disease occurrence, chain of infection, epidemic disease occurrence, measuring disease frequency, population at risk.

Reference Books:

1. Research Methodology – C. R. Kothari
2. Basic Epidemiology – R. Bonita, R. Beaglehole, T Kjellstrom
- 3.



**TRIPURA UNIVERSITY**

(A Central University)  
Suryamaninagar-799022

**Syllabus**

**OF**

**Human Physiology**

**Major – Semester – VI**

**H-8 Practical (Paper –V B)**  
**(Rectified)**

**2014**

## H8: Practical (Paper VB)

Marks: (80 + 20 internal)

### Practical :

A. Microbiology & Immunology [20 marks]

- a) Gram staining of bacteria
- b) Ouchterlony double diffusion test (pattern of antigen antibody interaction)
- c) Single colony isolation by agar streak method.

B. Sensory Physiology [20 marks]

- a) Models of eye, ear, nose, tongue, skin: structure and functions
- b) Tests for detecting defects of colour vision
- c) Rinne's / Weber's test for deafness
- d) Visual acuity – Snellen's chart
- e) Audiometry

C. Molecular Biology & Genetics [20]

- a) DNA isolation
- b) DNA /Protein separation by paper electrophoresis & gel electrophoresis

D. Research Methodology [20 marks]

- a) Mean, median, mode, standard deviation, standard error of mean calculation.
- b) Tests of significance (t-test) calculation.

Viva voce [10 marks]

Laboratory Note Book [10 marks]

## TDPH Honours 3<sup>rd</sup> semester

### Unit VIII : Digestive system & Nutrition

1. Anatomy & histology of alimentary tract and digestive glands
2. Composition, function, formation, mechanism of secretion, regulation of secretion of digestive juices, enterohepatic circulation of bile salts and bile pigments – their significance, role of bil in fat digestion and absorption.
3. Formation of HCl, cholelithiasis, concept of hyperacidity, achlorohydria.
4. Digestion and absorption of carbohydrates, fats, proteins, vitamins B<sub>12</sub>, iron Calcium and iodine.
5. Enteric nervous system, movements of alimentary canals, swallowing phenomenon-mechanism, defecation mechanism
6. Disorders of digestive system, peptic ulcer, vomiting, constipation.
7. Vitamins- water and fat soluble vitamins- sources, daily requirements and function.
8. Chemical nature and structure of vitamins; biosynthesis of vitamin C, A and D
9. Co-enzymatic role of vitamins in metabolism.
10. Vitamin deficiency symptoms and disorders; hyper-vitaminosis
11. Bulk and trace elements and physiological roles of Na<sup>+</sup>, K<sup>+</sup>, Ca<sup>++</sup>, Mg<sup>++</sup>, Fe<sup>++</sup>, Zn<sup>++</sup>, Se<sup>++</sup>, Cu<sup>++</sup>, Iodine.
12. Calorific value of foods and determination by Bomb calorimeter, SDA of foods, RQ, their definition and physiological importance
13. BMR, factor affecting BMR, determination by Benedict's Roth apparatus.
14. Nutritional importance and dietary requirements of carbohydrate, proteins and fats. RDA-carbohydrates, protein fats and other nutrients. Complete and incomplete proteins, biological value of proteins, essential amino acids and fatty acids.
15. Food groups, formulation of balanced diet for growing child, adult man and woman, pregnant and lactating mother, elderly people.
16. Malnutrition, protein calorie malnutrition (Kwarshiorkor) and undernutrition (Marasmus), their preventive and curative measures, obesity.