

[MBTDS0061T]: Disease and Stress Biology

Theory: CIA: 20 Marks; End-Sem: 80 Marks

No. of Credits	6
Theory/Composite	Theory
No. of periods assigned	6 Theory

Course description/objective:

The course aims to:

1. impart a basic understanding of integrative physiology of physiological diseases, with specific examples as supporting case studies.
2. to impart a fundamental understanding of metabolism, a basic understanding of integrative metabolism and homeostasis aspects of metabolic diseases, with specific examples as supporting case studies.
3. emphasize on the basic principles of medical diagnostics and disease diagnostics, with special emphasis on histopathology, haematological tests and postmortem analyses.
4. impart a basic understanding of neurodegenerative diseases
5. impart knowledge on antibiotic resistance, multidrug resistance and relevant issues.

Syllabus:

Module A: 40 marks

(3 Classes/week)

Unit I: Cellular stress response: heat shock response or the unfolded protein response, autophagic cell death

Unit II: Molecular mechanisms of major neurodegenerative diseases: Alzheimer's disease and tauopathies (the role of specific molecules and cellular pathways that are responsible in neuronal death of these diseases (e.g. amyloid precursor protein or APP, and APP processing in neurons are responsible in the development of Alzheimer's disease); Parkinson's disease; Huntington's disease; amyotrophic lateral sclerosis; prion diseases

Module B: 25 marks

(2 classes/week)

UNIT III: Metabolism and metabolic disorders: (i) Metabolic division of labour and homeostatic control of metabolism (ii) Overview of metabolic disorders (Clinical studies and examples).

UNIT IV: Integrative physiology and associated disorders: (i) Concept of Integrative physiology and homeostasis (ii) Pathophysiology of body systems (Clinical studies and examples).

UNIT V: Medical diagnosis and disease diagnostics: (i) Concept of Medical diagnosis and disease diagnostics, (ii) Histopathological examination, Haematological tests, (iii) Postmortem examination and forensics, (iv) Pharmacogenomics.

Module C: 15 Marks

(1 class/week)

Unit V: Bacterial Mechanisms of Antibiotic Resistance: A structural perspective

Unit VI: Multidrug resistance and ABC transporters

Unit VII: The Roles of Eukaryotic and Prokaryotic ABC Transporter Families; Failure of Chemotherapy.

Texts & Reading/Reference Lists:

- 1) Textbook of Medical Physiology. A.C. Guyton, J.E. Hall (11th ed.).
- 2) Berne and Levy Physiology. B.M. Koeppen, B.A. Stanton (6th ed.).
- 3) Atlas of Human Anatomy - Frank H. Netter (6th Ed).
- 4) Neurobiology. G.G. Matthews (2nd ed.).
- 5) Lehninger Principles of Biochemistry. M.M. Cox, D.L. Nelson (5th ed.).
- 6) Harper's Illustrated Biochemistry. R.K. Murray, D.K. Granner, V.W. Rodwell, (29th ed.).
- 7) Biochemistry-Mathwes, Van Holde (3rd ed.)
- 8) Review and articles wherever appropriate

Q.Paper Structure for End Sem Theory

Module A (40):

- 1 compulsory short question of 10 marks with choice
- 3 questions of 10 marks from 5 questions (with appropriate sub parts)

Module B (25):

- 1 question of 10 marks (Any 1 out of 2)
- 3 questions of 5 marks each (Any 3 out of 5)

Module C (15):

- 1 compulsory short question of 5 marks with choice
- 1 question of 10 marks from 2 questions (with appropriate sub parts)