

B.Sc. Life Sciences (NEP-UGCF) VIII Semester

DISCIPLINE SPECIFIC ELECTIVE COURSE -18 Semester VIII-DSE-Medical Diagnostics and Healthcare Zoo-DSE-25

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lectures	Tutorial	Practical/ Practice		
Semester VIII-DSE-Medical Diagnostics and Healthcare Zoo-DSE-25	04	02	Nil	02	Should have appeared in Semester VI	-

Learning Objectives

The learning objectives of this course are as follows:

- To provide an understanding of basic principles and applications of medical diagnostics in healthcare.
- To acquaint students with common diagnostic tools, techniques, and their significance in disease detection.
- To introduce preventive healthcare practices and their importance in lifestyle disease management.
- To provide hands-on exposure to selected diagnostic techniques in laboratory settings.

Learning Outcomes

By studying this course, students will be able to

- To explain the principles and working mechanisms of advanced diagnostics.
- To demonstrate proficiency in operating instruments like PCR machines, ELISA.
- To analyze data Medical Diagnostics and Healthcare.
- To solve problems in diagnostics, genomics, proteomics, and drug discovery.

Syllabus:

Semester VIII-DSE-25 Medical Diagnostics and Healthcare

Unit I: Introduction to Medical Diagnostics

Concept and scope of medical diagnostics and healthcare, Types of diagnostic methods: Invasive vs. Non-invasive, Ethical issues and safety in medical diagnostics, Role of diagnostics in preventive and curative medicine.

Unit II: Clinical Laboratory Diagnostics

Blood analysis: CBC, blood sugar, lipid profile, liver and kidney function tests. Urine analysis: physical, chemical, microscopic. Serological tests: ELISA, Widal test, VDRL, Molecular diagnostics: PCR, RT-PCR, DNA-based detection of pathogens.

Unit III: Imaging and Instrumental Diagnostics

X-ray, CT scan, MRI: principle and applications. Ultrasound and echocardiography. Endoscopy and colonoscopy, ECG and EEG: principle and interpretation basics.

Unit IV: Healthcare and Preventive Medicine

Vaccines and immunization programs. Screening programs: cancer, tuberculosis, diabetes, hypertension. Lifestyle diseases: causes, diagnosis, and preventive strategies (diabetes, cardiovascular disease, obesity, etc.). Recent advances in personalized medicine and telemedicine.

Practical Exercises (Any 4–5)

1. Urine Analysis (Chemical tests protein, glucose, ketones).
2. Estimation of Blood Glucose and cholesterol using kits.
3. Demonstration of ELISA using kits.
4. Study of normal ECG and identification of basic abnormalities (provided sample traces).

Suggested Readings

1. Cheesbrough, M. (2012), District Laboratory Practice in Tropical Countries, Cambridge University Press.
2. Godkar, P. B., & Godkar, D. P. (2014), Textbook of Medical Laboratory Technology. Bhalani Publishing.
3. Kumar, P. J., & Clark, M. (2020), Kumar and Clark's Clinical Medicine. Elsevier.
4. McPherson, R. A., & Pincus, M. R. (2021), Henry's Clinical Diagnosis and Management by Laboratory Methods, Elsevier.