

Course Code	Course Title	L	T	P	C
BABIT308	Medical Diagnostics	3	1	0	4
Pre-requisite	BABIT205 - Immunology	Syllabus Version			
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Course Objectives					
1. Understand the disciplines, diagnostic tools in field of medical diagnostics 2. To understand haematology analyses, common infections diagnosis and histology analysis 3. To identify the smart and rapid tools for integrated and precision medicine					
Course Outcomes					
1. Explain the need for diagnostics lab and ethical regulations 2. Discuss the various procedures in hematological analysis. 3. Diagnose common infections and molecular diagnostics tools 4. Examine the tissue using histopathology and signal processing 5. Understand common imaging methods and integrated diagnostics					
Module:1	Introduction to Medical Diagnostics	8 hours			
Medical diagnostics importance and relevance, types and choice of diagnostics, patient examination and preparation, Biometric screening, interpretation of diagnostic test, problem of diagnostic error. Clinical laboratory management system: standardization and quality control in diagnostic technologies, Ethical consideration and core principles, Regulatory challenges in diagnostic industry.					
Module:2	Diagnosis in Hematology	9 hours			
Specimen collection, Storage, Transport. Smear test, Hemocytometer – cell count. Blood analysis – hemoglobin, hematocrit, ESR, bleeding time, coagulation time, blood indices, autoanalyzer and kits, Blood glucose tests, GTT, glucometer, HbA1c					
Module:3	Diagnostic microbiology	9 hours			
Common infections of blood, gastrointestinal tract, respiratory tract - specimen collection, detect, strain identification and isolate infectious agents, antibiotic susceptibility test. Indirect detection of pathogens. Rapid tests – TORCH, Mycodot. Molecular diagnostics: gene expression profile, RTPCR, RAPD					
Module:4	Histopathology BioSignal data	8 hours			
Specimen collection, Biopsy, FNAC, Fixation; Physical, chemical, freezing and microwave methods; Dyes. -Natural and Synthetic, Histopathology- processes and protocol for basic H&E staining, protocol for basic immunohistochemistry staining. Electric signal acquisition- ECG, Cardiac monitoring – stress test. EEG, EMG.					
Module:5	Diagnostic Imaging and integrated diagnostics	9 hours			

Energy sources and tissue properties in medical imaging, Projection X-ray imaging, Fundamentals of Computer tomography and Magnetic resonance Imaging. Ultrasonography – properties of sound, transducers, image formation. Smartphones in medical diagnostics: motion sensors, sound sensors, light sensors. Recent advances in Medical Diagnostics- personalized medicine and precision medicine. Application of ML in medicine such as diagnosis, prognosis, clinical decision. Ethics in ML in medicine. Application of AI for disease diagnosis. Integrated diagnostics approach: Example- cardiovascular diseases, stroke

Module:6	Contemporary Topics	2 hours
Total Lecture Hours:		45 hours
Tutorial Hours:		15 hours
Text Book(s)		
Haren Ram Chiary and H. S. Singh, "A Textbook on Medical Diagnostics", TechSar Pvt Ltd, 1 st Edition, 2020 Ian D. Penman, Stuart H. Ralston, Mark W. J. Strachan, Richard P. Hobson, "Davidson's Principles & Practice of Medicine: A text book for students and doctors", Elsevier, 24 th Edition, 2022		
Reference Books		
Richard A. McPherson, Matthew R. Pincus, Henry's , " Clinical Diagnosis and Management by Laboratory Methods ", Elsevier Health Sciences USA, 23 th Edition, 2017 Frances Talaska Fischbach, Marshall Barnett Dunning (III), " A Manual of Laboratory and Diagnostic Tests ", Wolters Kluwer Health USA, 10 th Edition, 2017 Ayman El-Baz, Jasjit S. Suri, " Machine Learning in Medicine ", Chapman Hall CRC Press, 1 st Edition, 2021		
Mode of Evaluation :Continuous Assessment Test, Digital Assignment, Quiz, Final Assessment Test, Seminar, Group Discussion, Presentaion		
Recommended by Board of Studies :		26-05-2025
Approved by Academic Council : No. 78		12-06-2025