

MOLECULAR DIAGNOSTICS I

Semester	Subject Code	Category	Lecture		Theory		P	C
III	21SBT3A	Skill Based Subject- I	2hrs per week	30	2hrs per week	30	0	2

COURSE OBJECTIVE:

- ✓ This course provides an introduction to the theory and use of molecular techniques in the diagnostics lab, with an emphasis on nucleic acids isolation, handling, and storage.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL (K1-K4)
CO1	Introduces about the molecular diagnostics	K1
CO2	Able to assess the different methods of sample collection	K5
CO3	Apply the biochemical estimation for vitals.	K3
CO4	Able to get the knowledge about different diagnostic instruments.	K2
CO5	Interpreting the methods of diagnosis in molecular level.	K2

Knowledge level: K1- Remember; K2- Understand; K3- Apply; K4- analyze

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	M	M	M	M
CO2	M	S	S	S	M	M
CO3	S	M	S	S	S	M
CO4	S	M	S	S	M	M
CO5	M	S	S	S	M	M

S-strong; M- medium; L-low

UNIT I:INTRODUCTION TO MOLECULAR DIAGNOSTICS**6 Hours**

Introduction and History of diagnostics, Diseases- infectious, physiological and metabolic errors, genetic basis of diseases, inherited diseases. Infection – mode of transmission in infections, factors predisposing to microbial pathogenicity. ·

UNIT II: SAMPLE COLLECTION**6 Hours**

Types of specimens, Collection of blood, Anticoagulants and preservatives for blood, Preparation of serum, Urine collection – timed urine specimen, urine preservatives, Separation and Storage of Specimens, Care of handling the specimen.

. UNIT III: BIOCHEMICAL ESTIMATION:**6 Hours**

Basic Principle of Colorimetric, UV-Spectrophotometry. Estimation & clinical significance of the Followings: Blood sugar (F/PP/R), Glucose Tolerance Test, Total Plasma protein, Albumin, Globulin, Cholesterol, Triglyceride, Lipoproteins- LDL, VLDL, HDL, Blood Urea.

UNIT IV: DIAGNOSTIC EQUIPMENTS:**6 Hours**

Sphygmomanometer, Stethoscope, Semi automated BP Instrument, Automated BP Instrument, ECG machine, Spirometer and Blood cell Counter,

UNIT V: MOLECULAR DIAGNOSIS:**6 Hours**

Nucleic acid amplification methods and types: Real-time PCR, Inverse PCR. Qualitative and quantitative techniques of Proteins and Amino acids: Protein stability, amino acid sequence analysis, FISH, DNA microarray.

Distribution of Marks: Theory 80% and Problems 20%

TEACHING METHODOLOGY

- Chalk and board
- Group discussion
- Assignments
- PPT presentations
- Seminars
- Models/Charts

TEXTBOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	William Coleman Gregory Tsongalis\	Diagnostic Molecular Pathology	Academic Press	2016
2.	Kamal. V	Textbook Of Pathology	Cbs; First Edition	2017

3.	Shirish M Kawthalkar	Essentials of Clinical Pathology	Jaypee Brothers Medical Publishers (P) Ltd	2016
4.	George P Patrinos	Molecular Diagnostics	Wilhelm Ansorge Academic Press	2005
5.	MousumiDebnath , Godavarthi B.K.S Prasad	Molecular Diagnostics:Promises and Possibilities	Springer Science and Business Media	2010

REFERENCES:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	K.L. Mukherjee	Medical Laboratory Technology Vol-2	Tata McGraw-Hill., India	2010
2.	PranabeswarChakraborty	Practical Pathology	New Central Book Agency	2010
3.	William B. Coleman PhD, Gregory J. Tsongalis	Essential Concepts in Molecular Pathology	Academic press	2009
4.	Davis F.A	Molecular Diagnostics	Lela Buckingham	2019
5.	William B. Coleman, Gregory J. Tsongalis	Molecular Diagnostics	Springer Science & Business Media	2006

WEB SOURCES:

1. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1214554/>
2. <https://www.bioline.com/us/research/molecular-diagnostics>
3. <http://dmbj.org.rs>
4. https://www.austincc.edu/mlt/mdfund/mdfund_links.html
5. <https://www.britannica.com/science/DNA-fingerprinting>
6. https://en.wikipedia.org/wiki/DNA_footprinting

Syllabus Designer:

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