MOLECULAR DIAGNOSTICS II

Semester	Subject Code	Category	Lecture		Theory		P	C
IV	21SBT4A	Skill Based Subject - II	2hrs per week	30	2hrs per week	30	0	2

- **COURSE OBJECTIVES:**

Knowledge of up to date methods in Molecular Biology and Molecular Genetics, including their theoretical bases

COURSE OUTCOMES:

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL (K1-K4)
CO1	Able to understand the metabolism and disorders of nutrients	K2
CO2	Apply suitable methods to detect and identify pathogens and drug resistance testing	K3
CO3	Analyze the molecular oncology and mitochondrial disorders	K4
CO4	Introduces biomarkers in disease diagnostics	K1
CO5	Knowledge of chromosomal aberrations and its consequences	K1

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

MAPPING WITH PROGRAMME OUTCOMES:

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

S-strong; M- medium; L-low

UNIT I: BIOCHEMISTRY AND MOLECULAR BIOLOGY IN DIAGNOSTICS 6 Hours

Metabolism and disorders: Carbohydrates –regulation and disorders (sickle cell anemia)Protein and amino acids –deficiencies and disorders (tyrosinemia). Lipids – metabolism and disorders (Gaucher disease). Vitamins -Deficiencies and diagnosis. Minerals: Calcium, Sodium, Iron, deficiency manifestations and diagnosis.

UNIT II: IMMUNODIAGNOSTICS 6 Hours

Microbial pathogenesis, diagnostic pathology, immune pathology, and immunohistopathology. Drug susceptibility testing, drug resistance testing.

UNIT III: IMOLECULAR ONCOLOGY MITOCHONDRIAL DISORDERS: 6 Hours

Cancer – Benign and Malignant neoplasms, multifactorial disposition, Cancer pathogenesis, Proto-oncogenes, Oncogenes Mitochondrial inheritance, Mitochondrial myopathy, identity testing.

UNIT IV: BIOMARKERS IN DISEASE DIAGNOSTICS 6 Hours

FDA definition of disease markers, Role of markers in Disease diagnosis. Approaches and methods in the identification of disease markers, tumour& cancer markers, markers in inflammation and diagnosis of cytoskeletal disorders.

UNIT V: CHROMOSOMES AND CYTOGENETIC ANALYSIS 6 Hours

Structural and Numerical aberrations and its consequences. X-chromosome dosage compensation and inactivation mechanism. Uniparentaldisomy, Genomic Imprinting and disorders. FISH, CGH, Flowcytometry technique.

Distribution of Marks: Theory 80% and Problems 20%

TEACHING METHODOLOGY

- Class room teaching
- Assignments
- Discussions
- Home work
- PPT presentations
- Seminars
- Models/Charts

TEXTBOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	DrJayantiTokas	Immunology and Molecular Diagnostics	Laxmi Publications	2015

2	K. K Jain	Hand book of biomarkers	Humana press	2017
3	Nader Rifai, A. Rita Horvath, Carl T. Wittwer, Jason Park	Principles and Applications of Molecular Diagnostics	TNQ technologies	2018
4	Geroge P. Patrinos	Molecular Diagnostics	Wilhelm Ansorge Academic Press	2009
5	Edward Highsmith	Molecular Diagnostics	Springer Science & Business Media	2015

REFERENCES:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Nader Rifai; Andrea R Horvath; C Wittwer.	Tietz Textbook of Clinical Chemistry and Molecular Diagnostics	Academic Press	2016
2	Peter Hu, MadhuriHegde, Patrick Alan Lennon	Modern Clinical Molecular Techniques	Springer Science & Business Media,	2012
3	William B. Coleman	Molecular Diagnostics	Human Press	2007
4	George P. PatrinosWilhelm AnsorgePhillip B. Danielson	Molecular Diagnostics	Academic Press	2016
5	E. Dequeker	Molecular Diagnostics	Academic Press	2014

WEB SOURCES:

1. https://dx.advamed.org/sites/dx.advamed.org/files/resource/advameddx_dxinsights_pdf.pdf
2. https://www.researchgate.net/publication/6541473_Molecular_Diagnostics_of_Medically_Important_Infections/link/0fcfd50d1d052d5dc2000000
3. https://researchguides.austincc.edu/medlab
4. https://www.sciencedirect.com/book/9780128029718
5. https://www.elsevier.com/books/molecular-diagnostics/patrinos/978-0-12...

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