

CBSE | DEPARTMENT OF SKILL EDUCATION CURRICULUM FOR SESSION 2021-2022 MEDICAL DIAGNOSTICS (SUBJECT CODE - 828)

**JOB ROLE : MEDICAL LABORATORY TECHNICIAN
Class – XI & XII**

COURSE OVERVIEW:

The course is designed to facilitate learning the essentials of Medical Diagnostics. Design of the course shall aid in developing skills required in planning and executing Laboratory process. Laboratory techniques along with fundamentals of laboratory management shall direct the learning process and will ensure efficient and effective understanding and performance in all spheres of laboratory works.

OBJECTIVES OF THE COURSE:

In this course, the students will be introduced to the fundamental concepts of medical technology and the career opportunities available in this field. This course provides an insight to the students regarding various issues associated with laboratory works like Investigation of Bio-fluids, Analysis of blood smear, and Works in blood bank etc. and building up goodwill and reputation of Laboratory or Hospitals with the essential concepts of Medical diagnostics. Class participation would be fundamental for the development of transferrable skills.

Followings are the main objectives of this course.

- To familiarize the students regarding various dimensions of Medical lab technology and career opportunities available in these fields.
- To develop practical understanding among the students associated with Medical lab through classroom discussion/ participation and projects.
- To develop transferrable skills among the students for managing Laboratory works efficiently so that they could be ready to join the Laboratory functions in any organization.
- To provide knowledge to students in concise and understandable format so that students could learn and apply these concepts in their career for the growth.
- To provide brief insight about personal grooming and its stages, meaning and importance of knowledge of Laboratory base works and other key dimensions of laboratory management in Hospitals.

SALIENT FEATURES:

- Medical diagnostics is originally an important part of promotion in Lab technology.
- Medical diagnostics has existed for ages and is time format of Lab works.
- Medical diagnostics provides an opportunity to the technicians to become well equipped in their area.
- It involves departmental interaction with the patients and attendants to ensure a quality service.
- It ensures identification of diseases facilitates treatment procedures and ensures recovery by maintaining good relations between Health care professionals and patients.
- Medical diagnostics bridges the knowledge gap between the Health care professionals and Patients and makes information available to the Patients and enhances their understanding about the disease and treatment procedures.

LIST OF EQUIPMENT AND MATERIALS:

The list given below is suggestive and an exhaustive list should be prepared by the skill teacher. Only basic tools, equipment and accessories should be procured by the Institution so that the routine tasks can be performed by the students regularly for practice and acquiring adequate practical experience.

Material Required for MEDICAL DIAGNOSTICS

Laboratory should contain the following: -

- Leishman's Stain
- Slide and coverslip
- Rubbing alcohol
- Lancet
- Cotton wool
- Piece of cotton clothe
- Staining rack
- Blood Grouping Reagents
- Centrifuge
- Artificial urine prepared by teacher (with the help of chemical salts according to composition of urine)
- Glacial acetic acid
- Sodium nitroprusside
- Liquor ammonia
- Benedict's reagent
- Sulphur powder

- Benzidine powder
- Hematoxylin and Eosin stain
- Pipette
- Burning mixture
- Lamp
- Test tubes
- Test tube holders
- Apron for students
- Histopathological slides

CAREER OPPORTUNITIES:

Medical diagnostics as a functional domain offers immense career opportunities to all age group of people irrespective of qualification, gender, race and religion. Following career opportunities are available in this field. Students can make their career in any field based on their interest and suitability in

- Forensic Science
- Medical lab technology
- Pathology
- Biotechnology
- Cytology
- Pharmacy

VERTICAL MOBILITY:

At Bachelor level, students may start their career as an assistant lab technician and they can reach at managerial level over the period of time. For the career progression, following career options are available in Medical diagnostics field.

- Assistant Medical lab technicians
- Blood Collectors for Lab purpose
- Lab receptionist
- Medical representative
- Medical transcriptionist

CURRICULUM:

This course is a planned sequence of instructions consisting of Units meant for developing employability and Skills competencies of students of Class XI and XII opting for Skills subject along with other subjects.

MEDICAL DIAGNOSTICS (Subject Code - 828)

CLASS –XI

Total Marks: 100 (Theory-60 + Practical-40)

	TERM	UNITS	NO. OF HOURS for Theory and Practical	MAX. MARKS for Theory and Practical
Part A		Employability Skills		
	Term I	Unit 1 : Communication Skills-III	13	5
		Unit 2 : Self-Management Skills-III	07	
		Unit 3 : ICT Skills-III	13	
	Term II	Unit 4 : Entrepreneurial Skills-III	10	5
		Unit 5 : Green Skills-III	07	
		Total	50	10
Part B		Subject Specific Skills		
	Term I	Unit 1: Investigation- Urine and feces Analysis	40	15
		Unit 2: Body Fluids	20	10
	Term II	Unit 2: Body Fluids	20	5
		Unit 3: Histopathology (Lab Process)	40	20
		Total	120	50
Part C		Practical		
		Project	50	10
		Viva based on Project		05
		Practical File/ Report / Portfolio / Power Point presentation		15
		Demonstration of skill competency via Lab Activities		10
		Total		50
		GRAND TOTAL	220	100

NOTE: Detailed Curriculum/ Topics to be covered under Part A: Employability Skill can be downloaded from CBSE website.

PRACTICAL GUIDELINES FOR CLASS XI

Assessment of performance:

In class XI– Two examiners (internal examiner) assigned for the conduct and assessment of Practical Examinations each in Senior Secondary School Curriculum Question for the viva examinations should be conducted by the internal examiners. Question to be more of General nature, project work or the curriculum. Investigatory Project especially those that show considerable amount of effort and originality, on the part of the student, should get suitable high marks, while project of a routine or stereotyped nature should only receive MEDIOCRE marks.

Procedure for Assessment of practical project work: (Total 40 marks)

For students of Class XI projects has been emerging as a very interesting but sometimes challenging. It enhances understandability, creativity and innovativeness. It also improves presentation and communication skills. Keeping this in mind following guidelines have been framed to bring about uniformity and reward creative skills among students. Students can prepare a Project Report on activities performed in Medical room of school on the basis of their understandability and class room knowledge. They may get the guidance from their respective teacher in order to boost their skill and knowledge. The Project should be the sole work of student.

Viva based on Project -05 marks

The teacher conducting the final practical examination should ask verbal questions related to the project. If no project has been assigned /made by the students, viva must be based on subject as per the Curriculum only.

Project & Project Report– 20 marks:

List of Projects:-

1. The students will find out the presence of Glucose in urine by Benedict Reagent's test in the Laboratory.
2. Students will find out the presence of Protein in given urine sample by Heat test.
3. The students will find out the presence of Ketone Bodies in Laboratory by Legal test.
4. The students will find out the presence of Ketone Bodies in Laboratory by Rothera's test.
5. The students will find out the presence of Bile salt in given urine sample with the help of sulphur powder test
6. The students will find out the presence of blood in given urine sample by Benzidine test.
7. The students will prepare charts and present the functions of body fluids.
8. The students will draw the diagram of circulation of CSF in human body.
9. The students will draw the diagram of normal and abnormal sperms.
10. The students will decorate the board about prevention of Male infertility to create awareness.
11. The students will arrange seminar about prevention of infectious diseases to create awareness among students.

12. The students will present their concepts about lung diseases that can be diagnosed by sputum analysis.
13. Students will prepare charts about Manual methods of Histopathological techniques in groups.
14. Students will identify following microscopic slides:
 - a. Cerebellum
 - b. Tongue
 - c. Esophagus
 - d. Stomach
 - e. Duodenum
 - f. Jejunum
 - g. Ileum
 - h. Large intestine
 - i. Lungs
 - j. Muscles (Skeletal, Cardiac and Smooth)
 - k. Kidneys
 - l. Ureters
 - m. Skin
 - n. Testis
 - o. Ovary
 - p. Uterus
15. The students will draw the structure of Microscope in file and they will describe the functions of different parts of Microscope.
16. The students will draw the diagrams of all histopathological tissues in their file with their characteristic features.
17. The students will stain any given histopathological tissue slide by using hematoxylin and eosin stain.
18. The students will present their views about their career scopes and interests by presentation.

PARAMETERS	MARKS
I) Relevance and Efficiency	35
II) Effectiveness	
III) Impact	
IV) Sustainability	
V) Team Work	
VI) Regularity	
VII) Demonstration of skill competency via LabActivities	
Viva (Based on Curriculum)	05
TOTAL	40

MEDICAL DIAGNOSTICS (Subject Code - 828)

CLASS – XII

Total Marks: 100 (Theory-60 + Practical-40)

	TERM	UNITS	NO. OF HOURS for Theory and Practical	MAX. MARKS for Theory and Practical
Part A		Employability Skills		
	Term I	Unit 1 : Communication Skills-IV	13	5
		Unit 2 : Self-Management Skills- IV	07	
		Unit 3 : ICT Skills- IV	13	
	Term II	Unit 4 : Entrepreneurial Skills- IV	10	5
		Unit 5 : Green Skills- IV	07	
		Total	50	10
Part B		Subject Specific Skills		
	Term I	Unit 1: Hematology	40	20
		Unit 2: Blood bank	10	5
	Term II	Unit 2: Blood bank	30	15
		Unit 3: Cytology	40	10
			Total	120
Part C		Practical		
		Project	50	10
		Viva based on Project		05
		Practical File/ Report / Portfolio / PowerPoint presentation		10
		Demonstration of skill competency via LabActivities		15
		Total		50
		GRAND TOTAL	220	100

NOTE: Detailed Curriculum/ Topics to be covered under Part A: Employability Skill can be downloaded from CBSE website.

PRACTICAL GUIDELINES FOR CLASS XII

Assessment of performance:

In class XII – Two examiners (**internal examiner and external examiner**) assigned for the conduct and assessment of Practical Examinations each in Senior Secondary School Curriculum Question for the viva examinations should be conducted by both the internal and external examiner. Question to be more of General nature, project work or the curriculum. Investigatory Project especially those that show considerable amount of effort and originality, on the part of the student, should get suitable high marks, while project of a routine or stereotyped nature should only receive MEDIOCRE marks.

Procedure for Assessment of practical project work: (Total 40 marks)

- Creative skills among students. Students can prepare a Project Report on activities performed in Medical room of School.
- They may get the guidance from their respective teacher in order to boost their skill and knowledge. The Project should be the sole work of student.
- The mark for the project report will be assessed by the subject teachers and external examiner, through, a well- planned rubric, keeping in view the core content, quality of the project and Organization of data.
- To improve students' presentation skills, it is suggested that the students should be trained to present the final project. The concerned teacher and the students should visit to some hospitals in order to understand knowhow of the health care sector. Visiting to hospital or health care sectors will enhance their knowledge and improve their skills & understanding.

Viva based on Project -05marks

The teacher conducting the final practical examination should ask verbal questions related to the project. If no project has been assigned /made by the students, viva must be based on subject as per the Curriculum only.

Project & Project Report–(20 marks)

List of Projects:-

1. The students will prepare Blood Smear by using slides.
2. The students will stain the Blood Smear by Leishman's Stain.
3. The students will identify different blood cells under microscope.
4. The students will draw the blood cells in their file and describe about them.
5. The students will estimate the haemoglobin concentration of given blood by Sahli'shemoglobinometer.
6. Students will present the functions of blood by presentation.

7. The students will identify the Blood groups in given sample.
8. Students will prepare chart for concepts of Rh blood group system.
9. Students will arrange the board about different blood group systems and their features to create awareness about blood grouping systems.
10. The students will use centrifuge to separate serum.
11. The students will prepare buccal smear in Laboratory.
12. The students will stain the buccal smear.
13. The students will draw the diagram of Neubauer's chamber in their file and they will describe about cell counting.
14. The students will arrange a seminar about Prevention of anemia in young generation to create awareness among students.
15. The students will describe about PAP staining in their file.
16. The students will prepare presentation about Blood Cancer and its types in groups.
17. The students will draw the diagram of bone marrow collection in stages in their file.
18. The students will present about their career goals as Medical Lab technician in future.

PARAMETERS	MARKS
I) Relevance and Efficiency II) Effectiveness III) Impact IV) Sustainability V) Team Work VI) Regularity VII) Demonstration of skill competency via LabActivities	35
Viva (Based on Curriculum)	05
TOTAL	40