Course Objectives

- *Operate and take care of various laboratory equipments.*
- *Perform Pathological, Biochemical and Microbiological diagnostic procedures/ techniques.*
- *Give awareness to the public about various health hazards.*
- *Act as a distributor of diagnostic kits and reagents.*
- *Establish a Clinical Laboratory with the recognition of Government and support of qualified Pathologists, Microbiologists, Biochemists and Laboratory Technicians.*

COURSE FACILITATORS

Mr. Renji Varghese
(Assistant Professor, Department of Biotechnology , CMS College Kottayam)

Mrs. Deepthi S Nair M.Sc. MLT
(Laboratory Technician, Govt. of Kerala)

CERTIFICATE IN ROUTINE CLINICAL LABORATORY TECHNIQUES

DEPARTMENT OF BIOTECHNOLOGY

CAREER ORIENTED ADD-ON COURSE

Dept. of Biotechnology, CMS College Kottayam (Autonomous)

CERTIFICATE IN ROUTINE CLINICAL LABORATORY TECHNIQUES

Credits – 2, Theory – 18 hours (Module 1 to 4), Practical – 18 hours (Module 5)

OBJECTIVES

- Operate and take care of various laboratory equipments.
- Perform Pathological, Biochemical and Microbiological diagnostic procedures/techniques.
- Give awareness to the public about various health hazards.
- Act as a [illegible]butor of diagnostic kits and reagents.
- Establish a Clinical Laboratory with the recognition of Government and support of qualified Pathologists, Microbiologists, Biochemists and Laboratory Technicians.

SYLLABUS

CO No.	*Expected Course Outcomes* *Upon completion of this course, the students will be able to:*	Cognitive Level
1	List the routine clinical laboratory techniques	R
2	Understand the significance of a clinical laboratory in a society	U
3	Utilize the common laboratory equipments	Ap
4	Analyze the routine clinical laboratory techniques	An
5	Evaluate the results of routine clinical laboratory tests	E
6	Propose the prophylactic measures of various infections and diseases	C

CO: Course Outcome

Cognitive level; R [illegible]ember; U-Understanding; Ap-Apply; An-Analyze; E-Evaluate; C-Create.

Module	Cour[illegible] Description	Hrs	CO. No.
1.0	**Introd[illegible]uction to Clinical Laboratory**	2	
1.1	Significance of Clinical Laboratory Technology, Sections of a Clinical Laboratory.	1	2
1.2	Common Laboratory Glass wares & Lab Equipments - Microscope, Centrifuge, Colorimeter, Spectrophotometer, Chemical Balance, Hot air oven, Autoclave, Water bath, Micropipette etc.	1	3
2.0	**Pathology**	9	
2.1	Blood – Sample Collection - Composition and functions of blood - Plasma & Formed elements, Anticoagulants - Definition, common anticoagulants, colour coding.	1	1,2,3, 4,5

2.2	**Blood cell types - RBC, WBC, Platelets. Identifying Characters & Normal range.**	1	1,2,3, 4,5
2.3	**Hemoglobin estimation and its clinical significance. Preparation and Examination of Blood Smear: Differential Leukocyte Count.**	1	1,2,3, 4,5
2.4	**Cell Count - Improved Neubauer Counting chamber, RBC count and WBC count.**	1	1,2,3, 4,5
2.5	Packed cell volume - Wintrobe's method - procedure, normal value, and clinical significance. Erythrocyte Sedimentation Rate (ESR) - Westergren's method - procedure, Normal value, clinical significance.	1	1,2,3, 4,5
2.6	Blood group system ABO & Rh Systems, Bombay blood group. Blood Grouping techniques - Cell grouping & Serum grouping - Slide & Tube method. Cross matching	1	1,2,3, 4,5
2.7	Urine – Sample Collection – Normal and Abnormal constituents of urine. Types of urine samples. Methods of collection, preservatives.	1	1,2,3, 4,5
2.8	Physical, Chemical and Microscopic examinations of urine hCG test in Urine	1	1,2,3, 4,5
2.9	Physical, Chemical and Microscopic examinations of stool, sputum and semen	1	1,2,3, 4,5,6
3.0	**Biochemistry**	**4**	
3.1	Types of chemicals and preparation of solutions. Cleaning of glass wares for biochemical analysis. Types of specimens in clinical Biochemistry, Collection and processing of specimens for biochemical analysis, Types of assays- Endpoint and Kinetic (definition and example only).	1	1,2,3, 4,5
3.2	Blood Glucose Estimation - FBS, PPBS,RBS, Normal value and Clinical Significance - Hyper and hypoglycemia, Mention Glucometer Technique, GTT and GCT procedures	1	1,2,3, 4,5,6
3.3	Renal Function Tests – Blood Urea and Serum Creatinine. Lipid Profile - Relevance, tests included in the Profile, Estimation of Cholesterol, Normal value and Clinical Significance of Total Cholesterol, TG and Lipoproteins.	1	1,2,3, 4,5,6
3.4	Liver Function Tests - Bilirubin-Formation of Bilirubin, Types of Bilirubin-conjugated and unconjugated, Estimation of Bilirubin, Normal value and Clinical Significance, Estimation of Total protein, Estimation of Albumin, Normal value and clinical significance of Bilirubin Total protein, Albumin, ALP, ALT and AST.	1	1,2,3, 4,5,6

4.0	**Microbiology**	**3**	
4.1	**Classification of Microbes, pathogen, commensals, type of Infections, communicable diseases.**	**1**	1,2,3, 4,5,6
4.2	**Importance of sterilization and Disinfection** **Methods of sterilization.** **Physical methods - Dry heat, Moist Heat** Chemical methods - alcohols, halogens, gases	1	1,2,3, 4,5,6
4.3	Routine culture media, culture methods, staining techniques, biochemical tests used for the identification of bacteria and antibiotic sensitivity test (brief study only)	1	1,2,3, 4,5,6
5.0	**Practical**	**18**	
5.1	Blood Collection – Demonstration, Estimation of Haemoglobin – Sahli's method and Cyanmethaemoglobin method	2	1,2,3, 4,5,6
5.2	Preparation and Examination of Blood Smear: Leishman Staining and Differential Leukocyte Count.	1	1,2,3, 4,5,6
5.3	RBC count and WBC count.	1	1,2,3, 4,5,6
5.4	ESR and PCV	1	1,2,3, 4,5,6
5.5	Blood grouping – Forward and Reverse, Major cross matching	1	1,2,3, 4,5,6
5.6	Blood Glucose Estimation – Glucose Oxidase/Peroxidase method, Glucometer, Total Cholesterol estimation – CHOD/PAP method	1	1,2,3, 4,5,6
5.7	RFT – Estimation of blood Urea and serum Creatinine	1	1,2,3, 4,5,6
5.8	LFT – Estimation of bilirubin, total protein, albumin, ALT and ALP	1	1,2,3, 4,5,6
5.9	Preparation of routine culture media; Streak culture, Stroke culture, Stab culture and Lawn culture; Gram staining; Bacterial Motility by Hanging drop method, Indole test, Citrate test, TSI test, Urease test, Mannitol and Motility test, Oxidase test; Antibiotic sensitivity test.	6	1,2,3, 4,5
5.10	Clinical Laboratory Visit	3	1,2,3, 4,5,6

Reference Books

Text book of Medical Laboratory Technology – Ramnik Sood

Manual of Laboratory safety – Roshid Najat

The short text book of **Medical Laboratory for Technicians- Satish Gupte**

Laboratory procedures in Haematology - Mehdi SR

Medical Laboratory Technology, Procedure manual for Routine diagnostics - Vol I, II & III
Kanai Mukherjee.

Textbook of Microbiology - Ananthanarayan and Jayaram Paniker

Fundamentals of clinical chemistry – Tietz

Practical Haematology- Dacie and Lewis

Teaching Methodology

Lecture, Demonstration, Discussion and Project methods, ICT enabled teaching, Case study, E-content and Multimedia delivery, Clinical Laboratory Visit etc.

Evaluation

Theory – 50 marks (50 Objective questions) (1 hour duration)
Practical – 50 marks (4 hours duration)

A separate minimum of 40% marks in theory and practical is required for the successful completion of this course.

Second DC - Add-on Course - Theory

~~Attendance~~ - 18/11/19

1. Jiksa James.
2. Deepika Mohanan
3. Subana Abdul Salam
4. Pavithra Prasad.
5. Shilpa Sunil.
6. Devika Santhosh
7. Dishwarya Lakshmi
8. Klayan K Varghese.
9. Adithya Sankar c L
10. Angha S Nair
11. Elezabeth Alestha David.
12. Deepthi shajan
13. Fathima Subahana K.A
14. Angela sesab ben
15. Jainu Ismail
16. Bhagya Sree R
17. Richard Shibu
18. Syam prasad
19. Shaun shaji
20. Rahul Rajesh
21. Nandini
22. Vijina
23. Sreelakshmi
24. Sona.S.
25. Sandra

26) - Athira Rajeev

27) Avani devi

28) Annmariya John

29) Silviya Kalam

For Renji Varghese

Second DC - Add-on-Course - Theory
Attendance - 19/11/19

1. Subana Abdul Salam
2. Tijina Rachel Thomas
3. Syam prasad
4. Sandra Saji
5. Shaun Shaji
6. Shilpa Sunil
7. Fathima Subana
8. Nandini
9. Deepika
10. Angela
11. Adhithyan
12. Anagha
13. Aishwarya Lakshmi
14. Bhaggasen
15. Sainu Ismail
16. Rahul Rajesh
17. Richard Shibu Kuriakose
18. Pavithra Prasad
19. Sreelakshmi
20. Sona. S.
21. Siksa
22. ~~Sreelakshmi~~
23. Devika Santhosh
24. Deepthi Shajan
25. Elezabeth Aleesha David
26. Klayan

26. Ann Maria John

27. Athira Saji

28. Avani Dev

29. Silviya Kalam

For Renji Varghese

Sewing DC - Add-On- Course - Theory

Attendance - 20/11/19

1. Subana Abdul Salam
2. Tijina Rachel Thomas
3. Sreelakshmi Venugopal
4. Saina Ismail
5. Bhagyasree R
6. Rahul Rajesh
7. Sona S
8. Sandra Aji
9. Deepika Mohanan
10. Pavithra Prasad
11. Tiksa James
12. Elizabeth Aleshya David
13. Deepthi shajan
14. Fathima Subana
15. Richard
16. ~~Rahul~~
16. Sharon
17. Silviya
18. Ann Maria
19. ~~A~~ Aarthira
20. Avani
21. Syama prasad
22. ~~Tiksa James~~

22 Klayan K Varghese
23. Devika Santhosh
24 Shilpa Sunil
25 Nandini Pradeep
26. Adithya Sankar
27 Anagha S Nair
28. Aishwarya Lakshmi M
29. Angela Sarah Ben

for. Reiji Varghese

CMS COLLEGE KOTTAYAM (*Autonomous*)

Add-on Course Theory Examination March 2020

ATTENDANCE SHEET

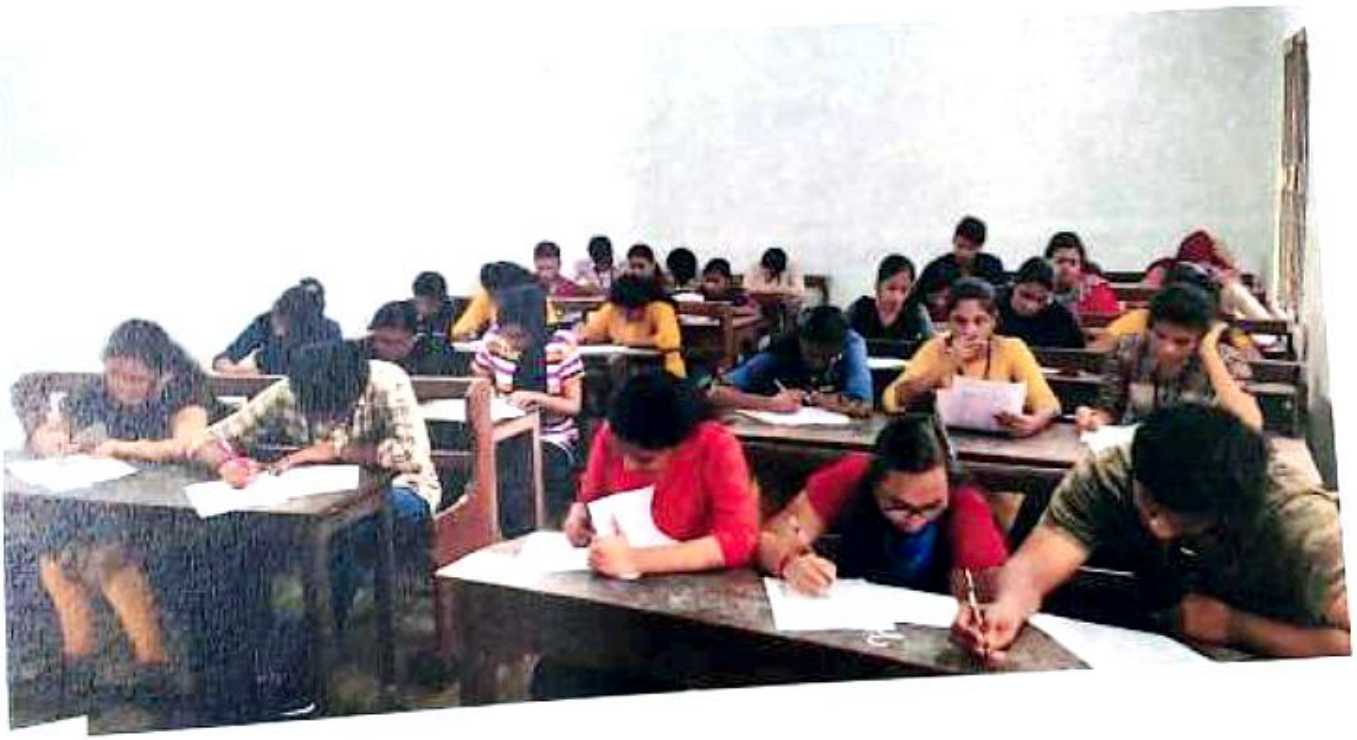
B.Sc. Botany and Biotechnology (Double Main) (2018 – 2021)

Date: 05/03/2020 **Time: 10 am to 11 am (1 hour)**

Sl. No.	UPRN	Name	QP Code	Signature
1	182112301	ADITHYA SANKAR C L	1	
2	182112302	AISHWARYA LAKSHMI M	2	
3	182112303	ANAGHA S NAIR	3	
4	182112305	ANGELA SARAH BEN	4	
5	182112306	ANN MARIA JOHN	5	
6	182112307	ATHIRA SAJI	6	
7	182112308	AVANI DEV	7	
8	182112309	BHAGYASREE R	8	
9	182112311	DEEPIKA MOHANAN	9	
10	182112312	DEEPTHI SHAJAN	10	
11	182112313	DEVIKA SANTHOSH	11	
12	182112315	ELEZABETH ALEESHA DAVID	12	
13	182112316	FATHIMA SUBHANA K A	13	
14	182112317	JIKSA JAMES	14	
15	182112319	KLAYAN K VARGHESE	15	
16	182112320	NANDINI PRADEEP	16	
17	182112322	PAVITHRA PRASAD	17	
18	182112323	RAHUL RAJESH	18	
19	182112324	RICHARD SHIBU KURIAKOSE	19	
20	182112325	SAINU ISMAIL	20	
21	182112326	SANDRA AJI	21	
22	182112327	SHARON SHAJI	22	
23	182112328	SHILPA SUNIL	23	

For Ranji Varghese.

24	182112329	SILVIYA KALAM	24	
25	182112330	SONA S	25	
26	182112331	SREELAKSHMI VENUGOPAL	26	
27	182112332	SUBANA ABDUL SALAM	27	
28	182112333	SYAM PRASAD	28	
29	182112334	TIJINA RACHEL THOMAS	29	
		Total Allotted		29
		Total Present		29
		Total Absent		NIL
		Name and Signature of Invigilator(s)		Renji Varghese



CMS College Kottayam

(Add-on-Course)

Dept. of Biotechnology

Add-Course Name : Certificate in Routine Clinical Laboratory Techniques

Course Coordinator: Renji Varghese

Expenditure Statement

1) Remuneration to Course Co-ordinator - 5,000/-

2) Remuneration to External faculty - 4,000/-

3) Petrol Charge (Vehicle Running expense of own vehicle KL-28-B-4315) - 800/-

TOTAL - 9,800/-

(Nine Thousand Eight Hundred only)

Amount Received from College - 15,000/-

Balance Refunded to College - 5,200/-

(Five Thousand Two Hundred only)

8/7/20

Renji Varghese

CMS COLLEGE KOTTAYAM

CASH PAYMENT VOUCHER

Vr. No.

Date 20/11/19

A/c

Pay to RENJI VARGHESE

Rs. 5,000/- (Rupees Five Thousand only)

being Remuneration to the Course Coordinator or in-house faculty of Add-on Course

AUTHORISED BY

PAID BY

RECEIVED BY

CMS COLLEGE KOTTAYAM

CASH PAYMENT VOUCHER

Vr. No.

Date 20/11/2019

A/c

Pay to Mrs. DEEPTHI S NAIR

Rs. 4000/- (Rupees Four Thousand only

Honorarium for value added courses)

being 9 Hours Theory class - 400 x 9 = 3600/-

TA for 2 days - 200 x 2 = 400/-

AUTHORISED BY

PAID BY

RECEIVED BY

20/11/19

Transport (Petrol charge)

for Add-on-Course

Own vehicle (KL-28-B-4315) - 800/-

Rs. Eight Hundred only

Ranji Vaghee

CMS COLLEGE KOTTAYAM (AUTONOMOUS)

Value Added Course (2019-2020)

DEPARTMENT OF BIOTECHNOLOGY

Second Year B.Sc. Botany & Biotechnology (Double Main)

Certificate in Routine Clinical Laboratory Techniques

Report

The value-added course ***Certificate in Routine Clinical Laboratory Techniques*** was designed with the objective to provide theoretical knowledge and hands on exposure to the students for equipping them to operate and take care of various laboratory equipments and to perform Pathological, Biochemical and Microbiological diagnostic procedures.

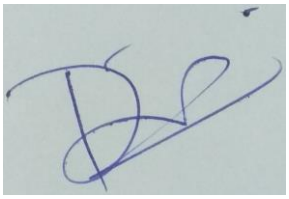
The course was started with expected outcomes of understanding the basic concepts of Clinical Laboratory Techniques. This course is expected to help students in gaining experience in laboratory practices and skills in designing a clinical laboratory and to create an awareness about the prophylactic measures of various infections and diseases.

The theory part comprising of 18 hours was conducted on 2019 November 18, 19 and 20 (6 hours per day) and classes were taken by Mr. Renji Varghese, Assistant Professor, Department of Biotechnology, CMS College Kottayam and Mrs. Deepthi S Nair M.Sc. MLT, Laboratory Technician, Department of Health, Government of Kerala. Mr. Renji Varghese took the Microbiology and Biochemistry portions and Mrs. Deepthi S Nair dealt the Pathology and Introduction part of the course.

The 18 hours of practical sessions were conducted during 2019 December 2, 3, and 4 by Mr. Renji Varghese.

Evaluation of the course consists of Internal assessment of 60 marks and External assessment of 40 marks. Attendance, Seminar, Assignment and Test paper were the components of Internal assessment. Final External assessment was done on 05 March 2020.

29 Students appeared the final assessment and 29 students passed the course. Marks and Grades secured by the students were attached separately. Based on the feedback by the students, it was found that the students are satisfied with the theoretical, practical and evaluation pattern of the value-added course. Students observed the importance of value-added courses for getting more exposure to the laboratory tools and techniques of their core programme.



Mr. Renji Varghese
(Course Co-ordinator)