Sri Lakshmi Narayana Institute of Medical Sciences

Date: 21.6.2021

From

Dr.Kamatchi
Professor and Head,
Department of Microbiology,
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

To

The Dean,
Sri Lakshmi Narayana Institute of Medical College
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Permission to conduct value-added course: Certificate course Communication skills & Quality Assurance in Clinical Microbiology

Dear Sir,

With reference to the subject mentioned above, the department proposes to conduct a value-added course titled: Certificate course Communication skills for Feb 2022 to March 2022& Quality Assurance in Clinical Microbiology for July 2021 to August 2021. We solicit your kind permission for the same.

Kind Regards

Dr.Kamatchi

FOR THE USE OF DEANS OFFICE

Names of Committee members for evaluating the course:

The Dean: **Dr. Jayakumar**

The HOD: **Dr. Kamatchi**

The Expert: **Dr.Abarna.V**

The committee has discussed about the course and is approved.

Dean (Sign & Seal)

Subject Expert (Sign & Seal)

HOD (Sign & Seal)

DEAN
SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
OSUDU, AGARAM VILLAGE,
KOODAPAKKAM POST,
PUDUCHERRY - 605 502

DEPT OF MICROBIOLOGY
SRI LAKSHMI NARAYANA INSTITUTE OF
SCIENCES-PONDICHERRY 605 502

PROFESSOR & HOD
DEPARTMENT OF MICROBIOLOGY
Sri Lakshmi Narayana Institute Of Medical Sciences
PONDICHERRY

Sri Lakshmi Narayana Institute of Medical Sciences

Circular

1.07.2021

Sub: Organising Value-added Course: Quality Assurance in Clinical Microbiology -reg

With reference to the above-mentioned subject, it is to bring to your notice that Sri Lakshmi Narayana Institute of Medical Sciences, **Bharath Institute of Higher Education and Research**, is organizing "Certificate course in **Quality Assurance in Clinical Microbiology"** from July 2021. The course content enclosed below."

The application must reach the institution along with all the necessary documents as mentioned. The hard copy of the application should be sent to the institution by registered/ speed post only so as to reach on or before July 30th2021. Applications received after the mentioned date shall not be entertained under any circumstances.

Dean

Encl: Copy of Course content.

Course Proposal

Course Title: Certificate course in Quality Assurance in Clinical Microbiology

Course Objective:

1. Definition for Quality Assurance in Clinical Microbiology
2. Factors influencing Quality
3. Post Analytical stage
4. Total quality management(TQM)
5. Quality Criteria In Microbiology
6. Types of Quality Assurance
7. Quality Control(QC)
8. Sterilization control

Course Outcome: On successful completion of the course the students will be able to give Quality report

Course Audience: Medical undergraduates

Course Coordinator: Dr. kamatchi

Course Faculties with Qualification and Designation:

1. **Dr.Abarna.V, MD Assistant professor**
2. **Mrs.Sandhyarani Msc, Tutor**

Course Curriculum/Topics with schedule (Min of 30 hours)

Date	Time	Topic -	Hour	Lecture taken by
6.07.2021	4-7pm	Pre-test & Introduction	3hrs	Dr.Abarna.V
13.07.2021	4-7pm	Factors influencing Quality	3hrs	Dr.Kamatchi
20.07.2021	4-7pm	Analytical stage	3hrs	Dr.Abarna.V
27.07.2021	4-7pm	Total quality management(TQM)	3hrs	Dr.Kamatchi
3.08.2021	4-7pm	Quality Criteria In Microbiology	3hrs	Mrs.Sandhyarani
10.08.2021	4-7pm	Practical aspect of Quality Criteria In Microbiology	3hrs	Mrs.Sandhyarani

17.08.2021	4-7pm	Quality Control(QC)	3hrs	Dr.Abarna.V
24.08.2021	4-7pm	Practical aspect of Quality Control(QC)	3hrs	Dr.Abarna.V
27.08.2021	4-7pm	Sterilization control	3hrs	Dr.Kamatchi
31.08.2021	4-7pm	Post test	3hrs	Mrs.Sandhyarani
		Total hours	30hrs	

References:

1. Principles and practices of quality assurance – Ann Gravells
2. Fundamentals in quality assurance – Liliana lanchu

VALUE ADDED COURSE

1. Name of the programme & Code

Certificate course in Quality Assurance in Clinical Microbiology and MIC04

2. Duration & Period

30 hrs & July 2021 –August 2021

3. Information Brochure and Course Content of Value Added Courses

Enclosed as Annexure- I

4. List of students enrolled

Enclosed as Annexure- II

5. Assessment procedures:

Questionnaire - *Enclosed as Annexure- III*

6. Course Feed Back

Enclosed as Annexure- IV

7. No. of times offered during the same year:

July 2021 –August 2021

8. Year of discontinuation: 2021

9. Summary report of each program year-wise

Value Added Course- July 2021 –August 2021					
Sl. No	**Course Code**	**Course Name**	**Resource Persons**	**Target Students**	**Strength & Year**
1	MIC04	Certificate course in Quality Assurance in Clinical Microbiology	Dr. Abarna.V Mrs.Sandhyarani	2nd yr MBBS	22July 2021 –August 2021

10. Certificate model

Enclosed as Annexure- V

RESOURCE PERSON **COORDINATOR**

AnnexureI

COURSE DETAILS

Particulars	Description
Course Title	Quality Assurance in Clinical Microbiology
Course Code	MIC04
Objective	1. Introduction 2. Factors influencing Quality 3. Post Analytical stage 4. Total quality management(TQM) 5. Quality Criteria In Microbiology 6. Types of Quality Assurance 7. Quality Control(QC) *8.* Sterilization control
Further learning opportunities	Quality Assurance in Clinical Microbiology
Key Competencies	On successful completion of the course the students will be able to give Quality report
Target Student	2nd yr MBBS Students
Duration	30hrs Every July 2021 –August 2021
Theory Session	10hrs
Practical Session	20hrs
Assessment Procedure	Questionnaire

Date	Time	Topic -	Resource person
6.07.2021	4-7pm	Pre-test & Introduction	Dr.Abarna.V
13.07.2021	4-7pm	Factors influencing Quality	Dr.Kamatchi
20.07.2021	4-7pm	Analytical stage	Dr.Abarna.V
27.07.2021	4-7pm	Total quality management(TQM)	Dr.Kamatchi
3.08.2021	4-7pm	Quality Criteria In Microbiology	Mrs.Sandhyarani
10.08.2021	4-7pm	Practical aspect of Quality Criteria In Microbiology	Mrs.Sandhyarani
17.08.2021	4-7pm	Quality Control(QC)	Dr.Abarna.V
24.08.2021	4-7pm	Practical aspect of Quality Control(QC)	Dr.Abarna.V
27.08.2021	4-7pm	Sterilization control	Dr.Kamatchi
31.08.2021	4-7pm	Post test	Mrs.Sandhyarani

Quality Assurance in Clinical Microbiology

Introduction

IMPORTANCE Microbiological investigations are important in the

• diagnosis, • treatment, and • surveillance of infectious diseases and • policies regarding the selection and use of antimicrobial drugs. It is, therefore, essential that test reports are relevant, reliable, timely, and interpreted correctly.

Quality

According to ISO quality is defined as totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs

A diagnostic test in Clinical Microbiology to be of good quality , must be clinically relevant i.e. it must help in the prevention or treatment of disease

To state a quality, should answer;

- Is the result correct? = Reliability

- Is the same result obtained when test is repeated?= Reproducibility

- Is the test rapid enough to be of use to the doctor in prescribing treatment ? =Speed

Factors influencing Quality

Quality is not only achieved through improving and controlling the analytical process alone without parallel improvement and control of pre-analytical and post analytical stage

Pre - Analytical stage - Patient preparation - Proper sample selection - Proper collection and transportation - Details of the patient and specimen identification - Knowledge of the normal range of the results and abnormalities - selection of right test method

Analytical stage - actual laboratory testing a) Detailed procedure for examining different specimens. b) Staining techniques and QC of stains. c) Aseptic techniques and safe handling of infectious material. d) Preparation and QC of culture media and preservation of stock strains. e) Inoculation of liquid and solid media. f) Reading and interpretation of cultures. g)

Techniques used to identify pathogens. h) Antimicrobial sensitivity testing and QC of procedures and antibiotic discs. i) Cleaning and QC of equipment used in microbiology laboratory. j) Immunologic techniques and QC of antigen and antibody reagents. k) Safe working practices. l) Disposal of specimens and cultures. m) Cleaning of glassware, plasticware, etc. n) Sterilization procedures and their control.

Post Analytical stage

Final report writing

Interpretation of report by clinician

Instruction of appropriate therapy

Others- -Accuracy -Bias -Error The difference between an observed or measured value and the best obtainable estimates of its true value

□ Laboratory professionals now realize that QC is only a small part of the issue of quality. Even when the laboratory has effectively controlled media, reagents, and instruments, the quality of the test result is poor if the specimen had degraded before arriving in the laboratory but was still tested. Suppose a specimen contained the wrong patient name; again, the media can be top quality, the incubator temperature accurate, and the technologist very competent, but if the results are recorded on the wrong patient chart, quality patient care management does not exist for the intended patient. □ It is now important to realize that preanalytic, analytic, and postanalytic activities all affect quality. An outcome can be interrupted or destroyed at any point in the process.

TOTAL QUALITY MANAGEMENT(TQM)

TQM means all those activities in the laboratory which controls the every variable that could possibly affect the quality of the test results. eg. In Gram stain θ Ideal situation of TQM may not be possible but a level of quality assurance that can control most of the factors which are likely to affect the test results can be attained

Good Laboratory Practices(GLP) Performance of all the activities of the laboratory in the best possible way so that the results obtained are of the highest possible accuracy •Proper collection of samples • Appropriate identification of specimens with special labels on hazardous specimens • Prompt transportation to laboratory at appropriate temperature •

Collection and storage under conditions which prevent deterioration of the sample before the performance of Test (e.g for anaerobic culture) • Accurate performance of test • Release of reports • Delivery of reports to the correct destination in the shortest possible time

Standard operating procedures (SOPs) Each laboratory must have SOPs, sometimes referred to as the local laboratory bench manual. It is required:- a) to improve and maintain the quality of laboratory service to patients and identify problems associated with poor work performance. b) to provide laboratory staff with written instructions on how to perform tests consistently to an acceptable standard in the laboratory. c) to help avoid short-cuts being taken when performing tests. d) to provide written standardized techniques for use in the training of laboratory personnel. e) to facilitate the preparation of a list and inventory of essential reagents, chemicals and equipment. f) to promote safe laboratory practice.

Quality Criteria In Microbiology

Clinical relevance - contribution of test to the prevention or cure of infectious diseases • If Streptococcus pyogens is isolated, a full antibiograms has no clinical relevance since benzyl penicillin is the drug of choice, and this is always active in vitro. • If Escherichia coli is isolated from a sporadic case of non-bloody diarrhoea, identification of the serotype is of no clinical relevance, since there is no clearly established correlation between serotype and pathogenicity Good quality test is one that is accurate and gives useful results for the prevention and cure of infection

Reliability: correct result □ For tests that give quantitative results, reliability is measured by how close the results are to the true value — measurement of minimal inhibitory concentration (MIC) values of antibiotics in vitro; □ For tests that give qualitative results, reliability is measured by whether the result is correct. Some examples of tests of this kind are: — identification of pathogens;

Reproducibility: or precisiom - same result with repetition of the test i.e. precision - Reduced by lack of homogeneity(mixture organism) and lack of stability (multiplication or die).

Efficiency: • Its Ability to give the correct diagnosis of the pathogen or pathological condition • Measured by two criteria For example, the sensitivity of MacConkey agar is poor for the isolation of Salmonella Typhi from stool. This important enteric pathogen is often missed because of overgrowth by nonpathogenic intestinal bacteria.

For example: • Ziehl–Neelsen staining of sputum is highly specific for diagnosing tuberculosis, because it gives only a few false-positive results -

Quality Assurance

QUALITY ASSURANCE is the sum of all those activities in which the laboratory is engaged to ensure that test results are of good quality

World Health Organization(WHO) defined quality assurance as "total process whereby the quality of laboratory reports can be guaranteed"

Summarized as- right result, at the right time, on the right specimen, from the right patient, with result interpretation based on right reference data, and at the right price

Help to detect how to ensure the quality of investigations result

Features of Quality Assurance

Comprehensive – to cover every step from collection of specimen to report dispatch

Rational - to concentrate in the most critical step in the cycle

Regular - to provide regular monitoring of test procedures

Frequent - to detect and errors as they occur GOOD-QUALITY LABORATORY SERVICES MEAN GOOD- QUALITY MEDICINE

Types of Quality Assurance

INTERNAL QUALITY ASSURANCE - Quality Control

EXTERNAL QUALITYASSURANCE - Quality Assessment

Internal quality assurance:-Each laboratory has programme to check the quality of its own test

Ideally , involves- □ Continuous monitoring of test quality □ Comprehensive checking of all steps from collection of specimen to report dispatch INTERNAL **QUALITY ASSURANCE IS ABSOLUTELY ESSENTIAL FOR GOOD OPERATING PROCEDURE**

Quality Control(QC)

Ensures that information generated by a laboratory is accurate, reliable and reproducible

Accomplished by ¬ assessing the quality of specimens; ¬ monitoring the performances of test procedures, reagents, media, instruments, and personnel; ¬ reviewing the test results; and ¬ documenting the validity of test methods

INTERNAL QUALITY CONTROL contd…. - Set of procedures undertaken to ensure quality from the collection of specimens, the performance of the test upto analytical results, and the procedure being planned, ordered and followed up

Aspects of Internal Quality Control

Cleaning of the working space,

Personal hygiene,

Safety precautions,

Designated eating and smoking areas located outside the laboratory,

Handling and disposal of infected material,

Appropriate vaccinations for workers, e.g. hepatitis B,

Care of equipment,

Collection of specimens,

Registration of specimens,

Elimination of unsuitable specimens,

Processing of specimens,

Recording of results,

Reporting of results

Quality Control of Equipment

Good quality tests cannot be performed if the equipment is either of poor quality or poorly maintained

Inoculating loop Remove deposits by dipping in sand or clean by wetting with alcohol and igniting Calibrate each new loop / or after 1 week

Sterilization control

Hot air oven Autoclave □ Physical: Temperature chart recorder and thermocouple □ Chemical: Browne's tube (green spot, color changes from red to green) □ Biological: spores of Bacillus subtilis or non-toxigenic strain of Clostridium tetani on paper strips □ Physical - thermocouple and temperature chart recorder. □ Chemical -Browne's tube and succinic acid (whose melting point is 121oC) and Bowie Dick tape. Bowie Dick tape is applied to articles being autoclaved. If the process has been satisfactory, dark brown stripes will appear across the tape. □ Biological-paper strip containing spores of Bacillus stearothermophilus.

Browne tube- glass tube containing heat sensitive dye

Quality Control Of Culture Media

Prepared form basic ingredients or from commercially available dehydrated powders or purchased ready ORDERING AND STORAGE OF DEHYDRATED MEDIA

Order quantities that will be used up within 6 months or at most 1 year and working media should be used up within one month

Record date and amount on receiving the container

Store in dark, cool ,well ventilated place and protect against sunlight

Discard all dehydrated media that are either caked or darkened

Keep written records of media in stock

□ Preparation of media:- strictly according to manufacturers guide

Storage of Prepared Media

Protect against light

Protect against heat

Media containing blood, other organic additives, or antibiotics should be stored in the refrigerator

Typical shelf-lives of media are: o Tubes with cotton-wool plugs,= 3 weeks; o Tubes with loose caps,= 2 weeks; o Containers with screw-caps, =3 months; o Petri dishes, if sealed in plastic bags, =4 weeks

Quality Control Of Prepared Media

pH testing: If the medium is prepared from basic ingredients, it should be allowed to cool before the pH is tested; If the pH differs by more than 0.2 units from the specification, adjust with acid or alkali or prepare a new batch

Sterility testing: Take 3–5% of each batch and incubate at 35 C for 2 days ,refrigerate rest. If more than two colonies per plate are seen, discard the whole batch

Performance testing: Laboratory should keep a set of stock strains for monitoring the performance of media Standard Strains for quality control Staphylococcus aureus (ATCC 25923) Escherichia coli (ATCC 25922) Pseudomonas aeruginosa (ATCC 27853) Enterococcus faecalis (ATCC 29212)

Medium Incubation Control Organism Expected Result Blood Agar 24h, CO2 S. aureus Growth and beta-haemolysis S.pneumoniae Growth and alpha-haemolysis Chocolate agar 24h, CO2 H.influenzae Growth MacConkey agar With crystal violet 24h E.coli Red colonies P.mirabilis Colourless colonies (no swarming) E.faecalis No growth Methyl red/Voges-Proskauer broth 48h E.coli Positive/negative K.pneumoniae Negative/positive Mueller-Hinton agar 24h E.coli ATCC 25922 Acceptable zone sizes P.aeruginosa ATCC 27853 Acceptable zone sizes Peptone water (indole) 24h E.coli Positive K.pneumoniae Negative Simmons citrate (incubate with loose screwcap) 48h E.coli No growth K.pneumoniae Growth, blue colour Thiosulfate citrate bile salt (TCBS) agar 24h Vibrio spp. (non agglutinable Yellow colonies Thayer Martin Agar 24h, CO2 N.meningitidis Growth N.gonorrhoeae Growth Staphylococci No growth E.coli No growth Performance tests on commonly-used media

Procedure/result

Test Control organism Expected reaction

Catalase S. aureus + Bubbling reaction Streptococcus spp. – No bubbling **Coagulase** S. aureus + Clot formation in 4 hours

Indole E. coli + Red ring at surface E. aerogenes – Yellow ring at surface **Methyl red** E. coli + Instant red colour E.. aerogenes – No colour change **Oxidase** P.aeruginosa + Purple colour in 20 seconds E. coli – No color in 20 seconds

Voges E. aerogenes + Red colour Proskauer E. coli – No colour change **Bacitracin disc** Streptococcus group A + Zone of inhibition E. faecalis – No Zone of inhibition

Optochin disc S. pneumoniae + Zone of inhibition S. viridans – No zone of inhibition

Control In Antibiotic Susceptibility Testing

Discs should be of correct diameter (6.35mm) and of correct potency

Stock supply should be stored frozen (-20 C)

Working supply should be kept no longer than 1 month in a refrigerator (2– 8 C)

Only Mueller–Hinton agar of performance-tested quality and pH (7.2–7.4) should be used

Inoculum should be standardized against the turbidity standard

Zone sizes should be measured and interpreted by referring to a table of critical diameters

Tests should be carried out with the three standard strains: - when a new batch of discs is put into use; - when a new batch of medium is put into use; -once a week, in parallel with the routine antibiograms

Factor Influence Inoculum density Larger zones with light inoculum and vice versa Timing of disc application If after application of disc, the plate is kept for longer time at room temperature, small zones may form Temperature of incubation Larger zones are seen with temperatures < 35oC Incubation time Ideal 16-18 hours; less time does not give reliable results Size of the plate Smaller plates accommodate less number of discs Depth of the agar medium Thin media yield excessively large inhibition zones and vice versa Proper spacing of the discs Avoids overlapping of zones Potency of antibiotic discs Deterioration in contents leads to reduced size Composition of medium Affects rate of growth, diffusion of antibiotics and activity of antibiotics Factors influencing zone size in antibiotic susceptibility testing

Acidic pH of medium Tetracycline, novobiocin, methicillin zones are larger Alkaline pH of medium Aminoglycosides, erythromycin zones are larger Incubation in the presence of CO2

Increases zone size of tetracycline and methicillin Addition of thymidine to medium Decreases activity of trimethoprim Factors (contd.)

Maintenance And Use Of Stock Cultures Selection and origin- strains of maximum characters established Preservation 1. Long term preservation - Glycerol at -20C - Mineral oil at room temperature -Stab cultures at room temperature -Stab cultures in cystine trypticase agar (CTA)(for Neisseria and streptococci) -Cooked-meat medium for anaerobes 2. Short term preservation - Rapid growing organisms : in TSA slants in screw capped bottles - Streptococci: in Blood agar slats in screw capped bottles - Meningococci and

Diagnostic Antigens and Antisera

Store at the recommended temperature, avoid repeated freezing and thawing

Discard when the manufacturer's expiry date is reached

Always include a serum control of known reactivity in each batch of tests

Each batch of serological tests should include: -A negative serum (specificity control); -A weakly reactive serum (sensitivity control); -A strongly reactive serum (titration control)

EXTERNAL QUALITY ASSURANCE - Quality Assessment

Laboratory performance is controlled by external professional agency

In some countries, participation is mandatory(regulated by government) and required for licensure

Involves- • Periodic monitoring of test quality • Spot checking of identification tests, and sometimes of isolation techniques

External Quality Assessment

Assessment of Quality in a schematic way through an external agency using material of known but undisclosed results is called EQA

Powerful tool that challenges the internal Quality Control measures that are being adopted by the laboratory

Objectives of External Quality Assessment

Monitor laboratory performance and evaluation of quality control measures

Establish inter-laboratory comparability

Influence reliability of future testing

Promote high standards of good laboratory practices

Encourage use of standard reagents/ methodology and trained personnel

Identify common errors

Provide mechanisms to remedy identified deficiencies

Education through exercises, reports and meetings

what is sent □ Cultures(pure or mix) □ Serum (for syphilis, rubella,brucellosis,typhoid fever,etc)

INTERNATIONAL STANDARDS ORGANIZATION(ISO)

International Standards Organization (ISO) is one of the leading international bodies that has brought together international community in developing uniform standards for quality in manufacturing and service sectors

SUMMARY

QA = QC +IQA+ EQA θ QC must be practical, achievable and affordable

QA is important in the diagnosis, treatment, and surveillance of infectious diseases and policies regarding the selection and use of antimicrobial drugs

Trained technical staff and clinical microbiologists are important resource persons in providing the establishment of essential microbiology services

Regular use of Standard operating procedures (SOPs) is essential to maintain the quality of results in between lab

Annexure- II

VALUE ADDED COURSE

Certificate course in Quality Assurance in Clinical Microbiology and MIC04

List of Students Enrolled Feb –March 2021

2nd Year MBBS Student			
Sl. No	**Name of the Student**	**Roll No**	**Signature**
1	KISHORE.K	U15MB311	
2	LAKSHMI.N	U15MB313	
3	LINDA EVANS.M	U15MB315	
4	MADHAN SHRIRAMAN.N	U15MB316	
5	MAHALAKSHMI.M.N	U15MB317	
6	MAHESWARI.C	U15MB318	
7	MALAINESAN.EM	U15MB320	
8	NAFILA SHANEEN.P	U15MB326	
9	NAGALAKSHMI.P	U15MB327	
10	NARENDIRAN.N	U15MB330	
11	NAVEEN ANUSH.R	U15MB331	
12	NAYANA.G.CHANDRAN	U15MB332	
13	NIVEDITHA.A.N	U15MB333	
14	NIVETHA.S	U15MB334	
15	NIVETHITHA.R.N	U15MB335	
16	PADMA SUNDARI.P	U15MB336	
17	PIRAINILA.M	U15MB337	
18	PREETHIKA.R	U15MB342	
19	PRIYADHARSHINI.R	U15MB343	
20	RAGAVI.B.R	U15MB344	
21	RAKESH.R	U15MB346	
22	RAMKUMAR.S	U15MB347	

RESOURCE PERSON

COORDINATOR

SRI LAKSHMI NARAYANA INSTITUE OF HIGHER EDUCATON AND RESEARCH

Annexure - III

Certificate course in Quality Assurance in Clinical Microbiology

Questionnaire

Course Code: MIC04

I. ANSWER ALL THE QUESTIONS

1. **What are the Factors influencing Quality of results**

- Pre - Analytical stage
- Analytical Stage.
- Post - Analytical stage.

2. **Types of Quality Assurance**

- Clinical relevance
- Internal Quality
- External Quality

3. **Quality Control (QC)**

- Pre - testing
- Sterility testing

SRI LAKSHMI NARAYANA INSTITUE OF HIGHER EDUCATON AND RESEARCH

Annexure - III

Certificate course in Quality Assurance in Clinical Microbiology

Questionnaire

Course Code: MIC04

I. ANSWER ALL THE QUESTIONS

1. **What are the Factors influencing Quality of results**

- Improper collection.
- During Preanalytic Stage & Post analytic Stage.

2. **Types of Quality Assurance**

1) Internal Quality
2) External Quality
3) Inter laboratory

3. **Quality Control (QC)**

1) Physical.
2) Biological
3) Chemical.

Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research

(Deemed to be University under section 3 of the UGC Act 1956)

CERTIFICATE OF MERIT

This is to certify that Rakesh. R has actively participated in the Value Added Course on Certificate course in **Quality Assurance in Clinical Microbiology** held during July 2021 -August 2021 Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

DR.Abarna.V

RESOURCE PERSON

Dr.Kamatchi

COORDINATOR

Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research

(Deemed to be University under section 3 of the UGC Act 1956)

CERTIFICATE OF MERIT

This is to certify that Nivetha. S has actively participated in the Value Added Course on Certificate course in **Quality Assurance in Clinical Microbiology** held during July 2021 -August 2021 Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

DR.Abarna.V

RESOURCE PERSON

Dr.Kamatchi

COORDINATOR

Date : 2.09.2021

From
Dr.Kamatchi
Department of Microbiology,
Sri Lakshmi Narayana Institute of Medical Sciences, Pudhucherry
Bharath Institute of Higher Education and Research, Chennai.

Through Proper Channel

To
The Dean,
Sri Lakshmi Narayana Institute of Medical Sciences,Pudhucherry
Bharath Institute of Higher Education and Research,Chennai.

Sub: Completion of value-added course : Certificate course in **Quality Assurance in Clinical Microbiology**

Dear Sir,

With reference to the subject mentioned above, the department has conducted the value-added course titled Certificate course in **Quality Assurance in Clinical Microbiology** for 22students.We solicit your kind action to send certificates for the participants, that is attached with this letter. Also, I am attaching the photographs captured during the conduct of the course.

Kind Regards,

Dr. Kamatchi

Encl: Certificates& photographs