SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
Osudu, Agaram Village, Kudapakkam Post, Pondicherry – 605 502.

DEPARTMENT OF PHYSIOLOGY

Date:06.11.2021

From
Dr.V.Senthil kumar
Professor and Head,
Physiology
Sri Lakshmi Narayana Institute of Medical sciences
Puducherry

To
The Dean,
Sri Lakshmi Narayana institute of Medical sciences
Puducherry

Sub: Permission to conduct value-added course: Certificate course in Basics of ECG & Code: PHY C02

Dear Sir,

With reference to the subject mentioned above, the department proposes to conduct a value-added course titled: Certificate course in Basics of ECG & Code: PHY C02 from January 2022-April 2022. We solicit your kind permission for the same.

Kind Regards

Dr.V.Senthil kumar

FOR THE USE OF DEANS OFFICE

Names of Committee members for evaluating the course:

The Dean:Dr.G.Jayalakshmi

The HOD: Dr.V.Senthil kumar

The Expert:Dr.V.Anebaracy

The committee has discussed about the course and is approved.

Dean
(Sign &Seal)

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

Subject Expert
(Sign &Seal)

HOD
(Sign &Seal)

PROFESSOR & HOD
DEPARTMENT OF PHYSIOLOGY
Sri Lakshmi Narayana Institute Of Medical Sciences
PONDICHERRY - 605 502.

OFFICE OF THE DEAN

Sri Lakshmi Narayana Institute of Medical Sciences

OSUDU, AGARAM VILLAGE, VILLIANUR COMMUNE, KUDAPAKKAM POST,
PUDUCHERRY - 605 502.
[Recognised by Medical Council of India, Ministry of Health letter No. U/12012/249/2005-ME (P -II) dt. 11/07/2011]
[Affliated to Bharath University, Chennai - TN]

No. SLIMS/Dean Off/VAC / 292 **Circular** **Date: 18.11.2021**

Sub: Organising Value-added Course: Certificate course in Basics of ECG & Code: PHY C02 ,Reg

With reference to the above mentioned subject, it is to bring to your notice that Sri Lakshmi Narayana Institute of Medical sciences, is organizing "Certificate course in Basics of ECG".The course content is 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 December 2021. Applications received after the mentioned date shall not be entertained under any circumstances.

Dean

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

Encl: Copy of Course content.

Course Proposal

Course Title: Certificate course in Basics of ECG & Code: PHY C02

Course Objective: At the end of the course, the participants should know about the

1. Definition of ECG
2. List the uses of ECG
3. ECG leads
4. Identify the ECG waves, segments and intervals
5. Normal values and significance of various ECG waves, segments and intervals.
6. ECG tracings of normal 12 leads
7. Interpret various aspects of ECG.
8. Determine mean QRS axis and list the common causes of right and left axis deviation.
9. Understand the physiological basis of common ECG abnormalities such as arrhythmias, heart blocks, Myocardial infarction.

Course Outcome: On successful completion of the course the students will have the knowledge in Basics of normal ECG and interpretation of abnormal ECG

Course Audience: Ist year M.B.B.S students (2021-2022 batch)

Course Coordinator: DR.R.Vijayakumar

Course Faculties with Qualification and Designation:

1. Dr.V.Anebaracy,M.B.B.S,M.D,Assistant Professor,Physiology
2. DR.V.Senthilkumar, M.B.B.S,M.D ,Professor & HOD,Physiology

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

SlNo	Date	Topic	Time	Faculty	Hours
1	3/1/2022	Definition of ECG, List the uses of ECG	1.30 pm to 6.30 pm	Dr.V.Anebaracy	2

2	6/1/2022	. ECG leads, Identify the ECG waves, segments and intervals	2 pm to 6 pm	Dr.V.Senthilkumar	5
3	4/2/2022	Normal values and significance of various ECG waves, segments and intervals.	2 pm to 5 pm	Dr.V.Anebaracy	4
4	23/2/2022	ECG tracings of normal 12 leads	2 pm to 5 pm	Dr.V.Anebaracy	3
5	4/3/2022	Interpret various aspects of ECG.	1.30 pm to 6.30 pm	Dr.V.Senthilkumar	5
6	18/3/2022	Determine mean QRS axis and list the common causes of right and left axis deviation.	2 pm to 6 pm	Dr.V.Anebaracy	4
7	8/4/2022	Understand the physiological basis of common ECG abnormalities such as arrhythmias, heart blocks, Myocardial infarction.	1.30 pm to 6.30 pm	Dr.V.Senthilkumar	5
			Total Hours		30

REFERENCE BOOKS:

1. Leoschamroth: An Introduction to Electro Cardiography
by Calambur Narasimhan (Author), Johnson Francis (Author), Leoschamroth (Author)

2. The ECG Made Easy, International Edition by Hampton (Author)

VALUE ADDED COURSE

1. Name of the programme & Code

Certificate course in Basics of ECG & Code: PHY C02

2. Duration & Period

30 hrs & January 2022-April 2022

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:

Multiple choice questions- *Enclosed as Annexure- III*

6. Certificate model

Enclosed as Annexure- IV

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

One time from January 2022-April 2022

8. Year of discontinuation: 2022

9. Summary report of each program year-wise

Value Added Course- January 2022-April 2022					
Sl. No	**Course Code**	**Course Name**	**Resource Persons**	**Target Students**	**Strength & Year**
1	PHYC02	Certificate course in Basics of ECG	Dr.V.Anebaracy Dr.V.Senthilkumar	1st MBBS	20 (January 2022 -April 2022)

10. Course Feed Back

Enclosed as Annexure- V

R. Vijayakumar

COORDINATOR:

Dr.R.Vijayakumar

RESOURCE PERSON:

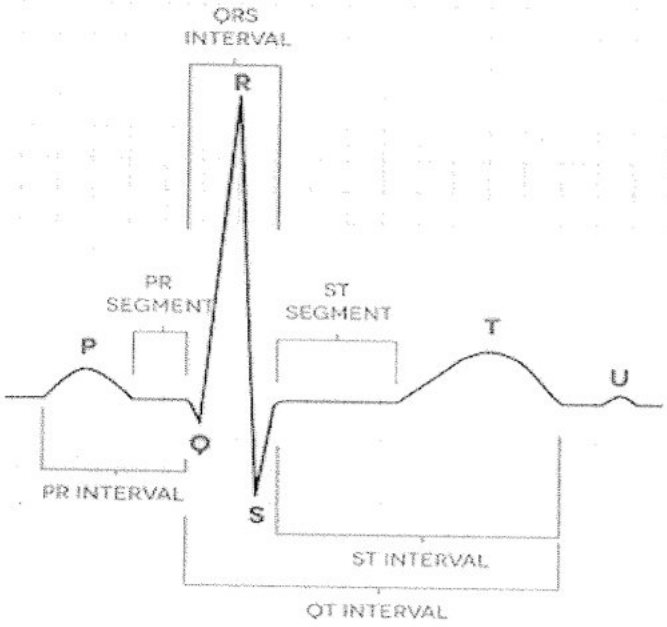
Dr.V.Anebaracy

RESOURCE PERSON:

Dr.V.Senthilkumar VSK

CERTIFICATE COURSE IN BASICS OF ECG (PHY C02)

Normal ECG



PARTICIPANT HAND BOOK

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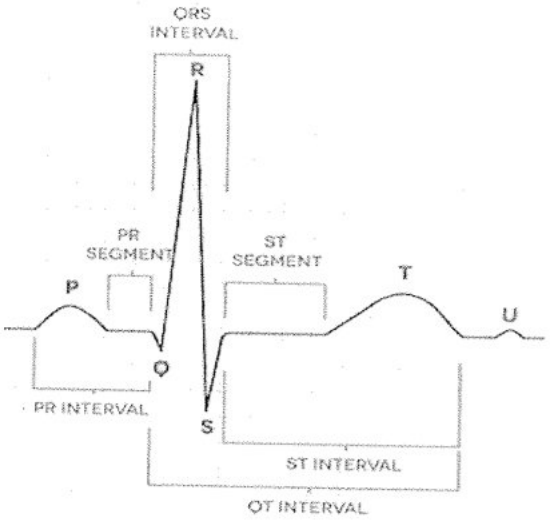
COURSE DETAILS

Particulars	Description
Course Title	Certificate course in Basics of ECG
Course Code	Code: PHY C02
Objective	1. Definition of ECG 2. List the uses of ECG 3. ECG leads 4. Identify the ECG waves, segments and intervals 5. Normal values and significance of various ECG waves, segments and intervals. 6. ECG tracings of normal 12 leads 7. Interpret various aspects of ECG. 8. Determine mean QRS axis and list the common causes of right and left axis deviation. 9. Understand the physiological basis of common ECG abnormalities such as arrhythmias, heart blocks, Myocardial infarction.
Further learning opportunities	Advance course in ECG interpretation.
Key Competencies	On successful completion of the course the students will have the knowledge in Basics of normal ECG and interpretation of abnormal ECG
Target Student	1st MBBS Students
Duration	30 hrs & January 2022-April 2022
Theory Session	20hrs
Practical Session	10hrs
Assessment Procedure	Long answer question and short answer question

ECG (Electrocardiogram) is defined as the graphical recording of the electrical activities of the heart

Normal ECG



ECG tracing shows different waves, intervals and segments.

Waves	Intervals	Segments
P wave	PR interval	PR segment
QRS complex	QRS interval	ST segment
	T wave	ST interval
	U wave	QT Interval

J point

- The point where the QRS Complex ends and ST segment begins is called as J point.
- There is no electrical activity at J point.

- Elevation of J point even for 1mm suggests myocardial ischemia or infarction.

- PR segment: It is an isoelectric line.

During PR segment, the wave of depolarisation passes slowly thro' AV node and Bundle of His

The magnitude produced by these structures is too small to produce any deflection (waves) in ECG recording.

- ST segment: It is an isoelectric line.

This is the phase between the end of ventricular depolarisation and the beginning of ventricular repolarisation and hence no deflection (waves) is produced during this phase.

In **Acute Myocardial infarction**, **ST segment elevation occurs.**

PR interval: It is the interval between the beginning of P wave to the beginning of QRS complex

Duration: 0.12 to 0.20 seconds

Significance: It represents atrial depolarisation and conduction thro' AV node

QRS interval (duration): It is the interval between the beginning of Q wave to the J point.

Duration: 0. 08 - 0.10 seconds

Significance: It represents ventricular depolarisation.

ST interval: It is the interval between the J point and the end of the T wave.

Duration: 0.32 seconds

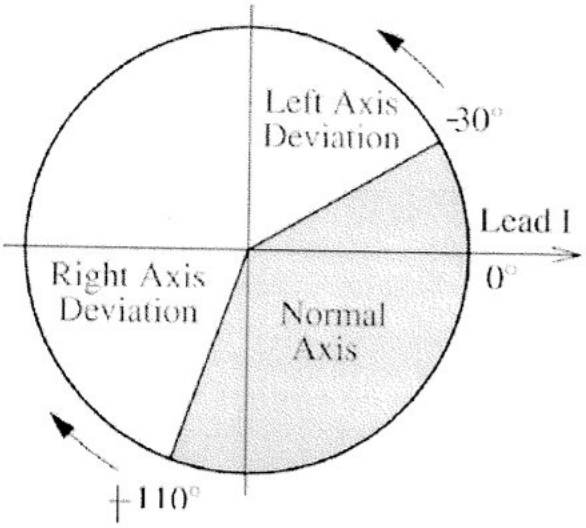
Significance: It represents ventricular repolarisation.

QT interval: It is the interval between beginning of QRS complex to the end of T wave.

Duration: 0.40 – 0.43 seconds

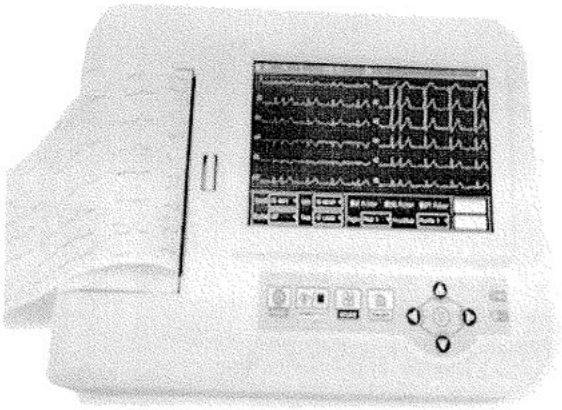
Significance: It represents ventricular depolarisation and ventricular repolarisation.

Mean QRS AXIS OF HEART

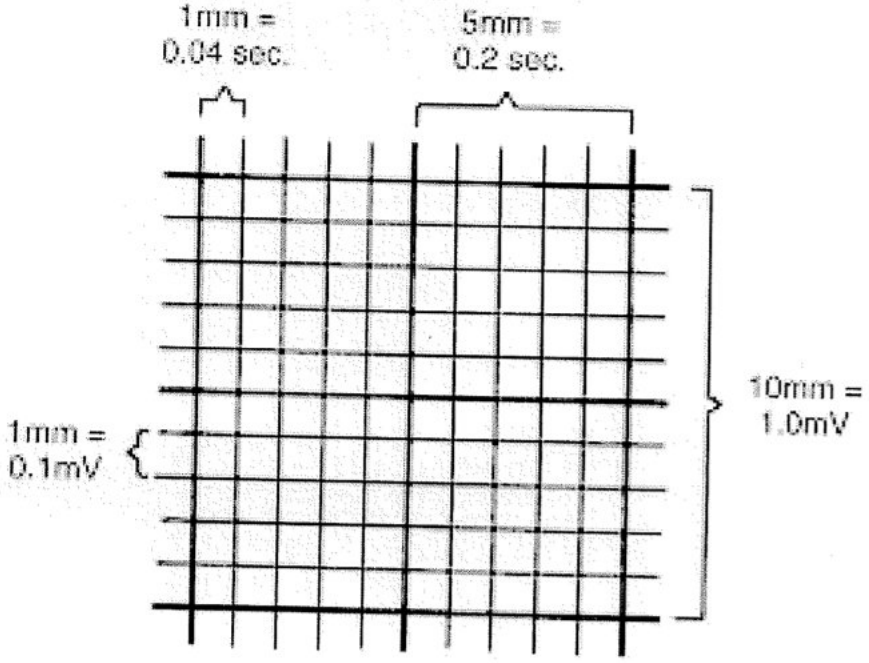


ECG recording: ECG is recorded by ECG machine with the help of leads.ECG lead is a pair of electrodes used to detect the potential difference of the heart.

ECG machine



Standard ECG Paper Grid



ECG leads:

Classification of leads:

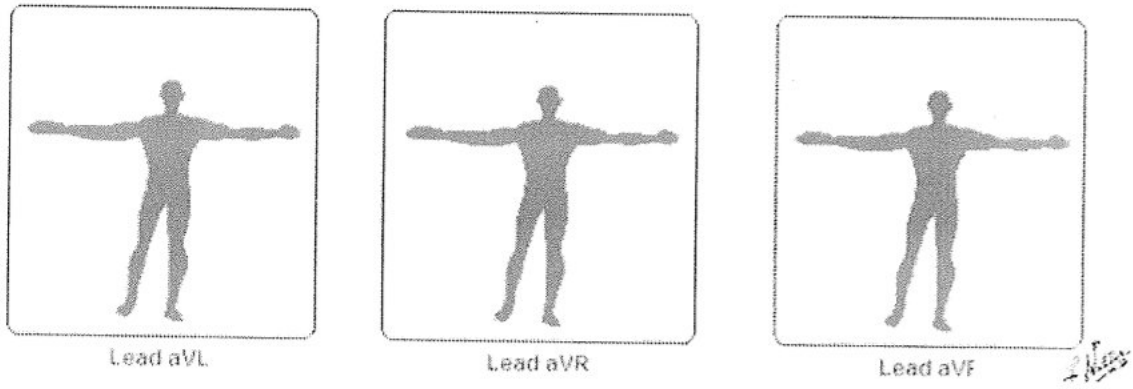
Direct leads

Indirect leads

a. Limb leads: Unipolar augmented limb leads & bipolar limb lead

b. Chest leads (Precordial leads)

c. Esophageal leads (E15-25), (E25-35), E(40-50)



Augmented Unipolar Limb Leads

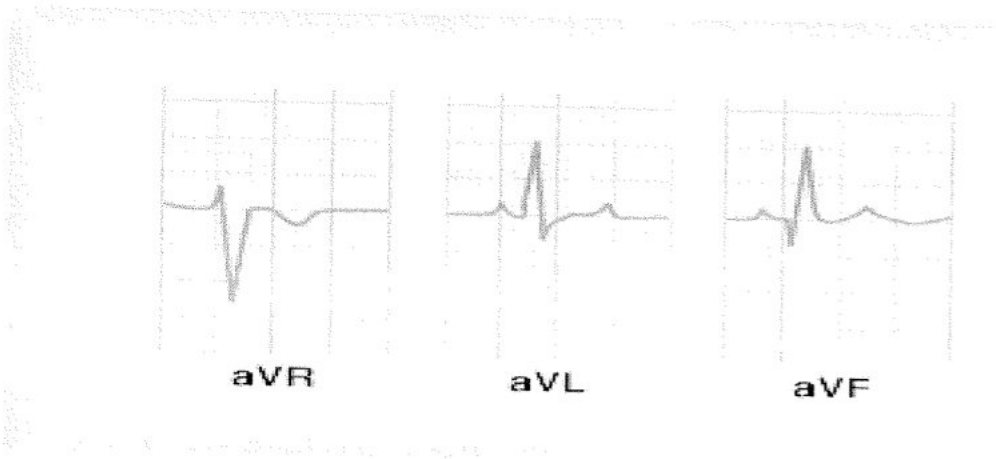
AUGMENTED UNIPOLAR LIMB LEADS

One electrode is active (recording) electrode & the other one is the indifferent electrode.

1. aVR- RIGHT ARM ACTIVE ELECTRODE (+) and left arm & left leg (-)

2. aVL- LEFT ARM ACTIVE ELECTRODE (+) and right arm and left leg (-)

3. aVF- LEFT FOOT ACTIVE ELECTRODE (+) and right arm and left arm (-)

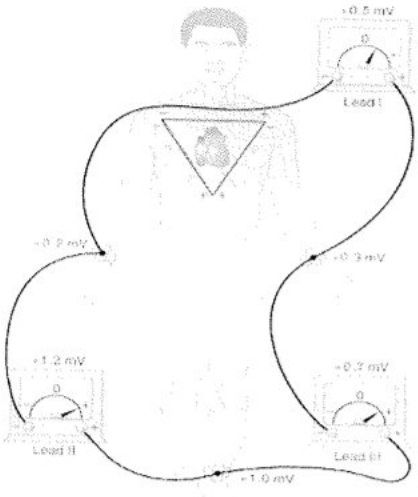


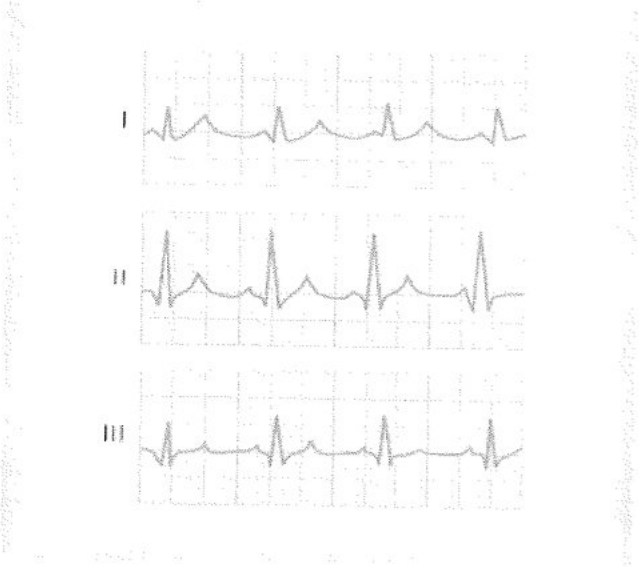
P wave is always negative in aVR

BIPOLAR LIMB LEADS

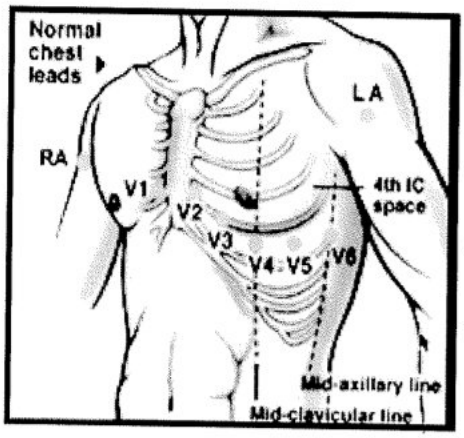
- Lead I – Between the right arm (-) & the left arm (+)
- Lead II - Between the right arm (-) & the left leg (+)
- Lead III - Between the left arm (-) & the left leg (+)
    - Right leg acts as ground wire to prevent external disturbance.

BIPOLAR LIMB LEADS



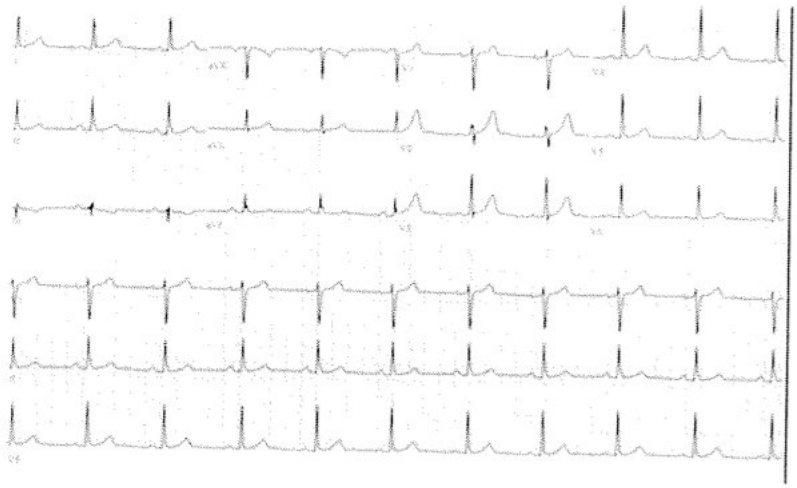


Precordial or Chest Leads



V_1 4th intercostal (right)
V_2 4th intercostal (left)
V_3 Between V_2 & V_4
V_4 Midclavicular **(5^{th} Lt ICS)** (mid-collarbone)
V_5 5th intercostal space **(Lt)** (anterior axillary line)
V_6 5th intercostal **(Left)** (midaxillary line)

Normal 12 lead ECG



ECG is useful for assessing

1. Anatomical orientation of the heart
2. Size of the chambers
3. Disturbance of rhythm and conduction
4. Ischemia of myocardium
5. Location,extent,progress of Myocardial infarction
6. Effects of altered electrolyte concentration
7. Influence of drugs like digitalis
8. Efficiency of pacemaker

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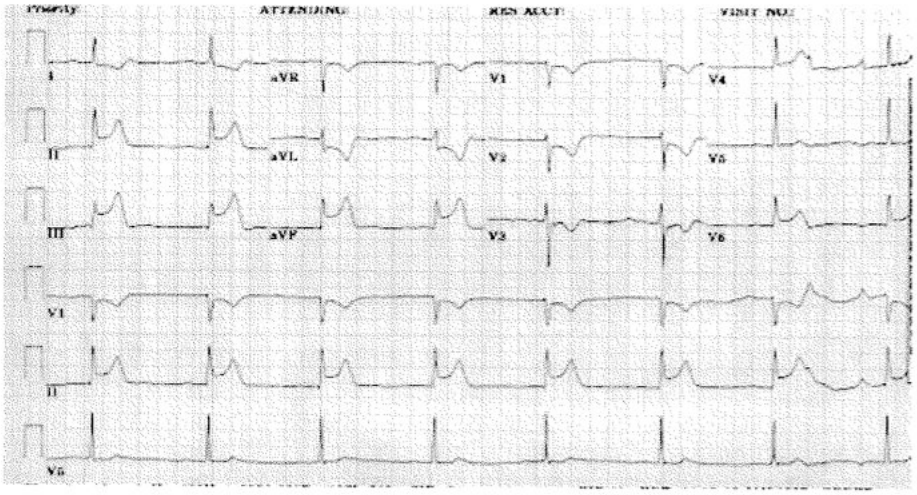
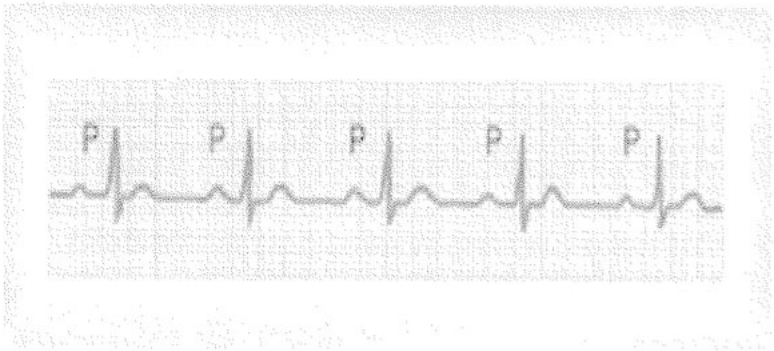
ACUTE MYOCARDIAL INFARCTION



PROLONGED PR INTERVAL-FIRST DEGREE AV BLOCK



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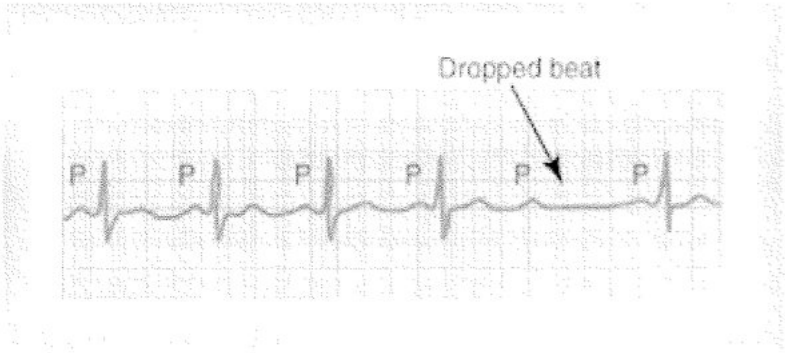
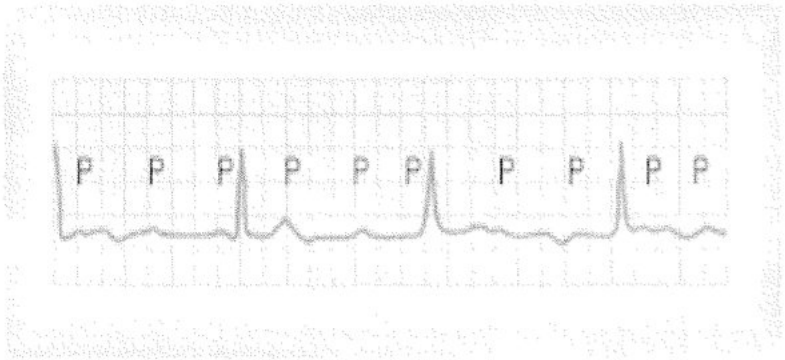
SECOND DEGREE AV BLOCK



COMPLETE AV BLOCK-THIRD DEGREE BLOCK



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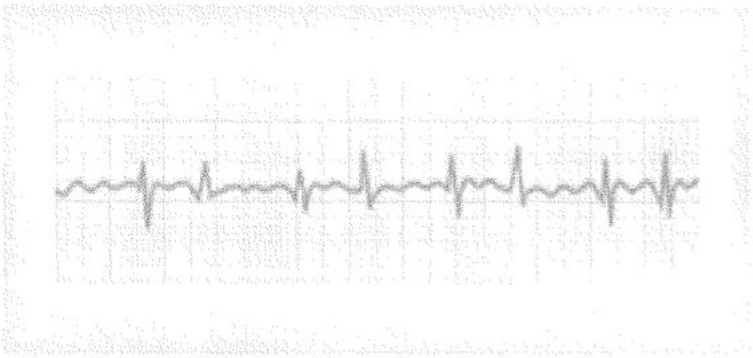
Cardiac arrhythmias

Disorder in rhythmicity of heart is called arrhythmia.

1. Atrial flutter: Saw toothed P waves are present
2. Atrial fibrillation: Presence of Fibrillatory P waves & irregularly irregular pulse
3. Ventricular fibrillation: Rapid, wide irregular ventricular complexes present.

ATRIAL FLUTTER

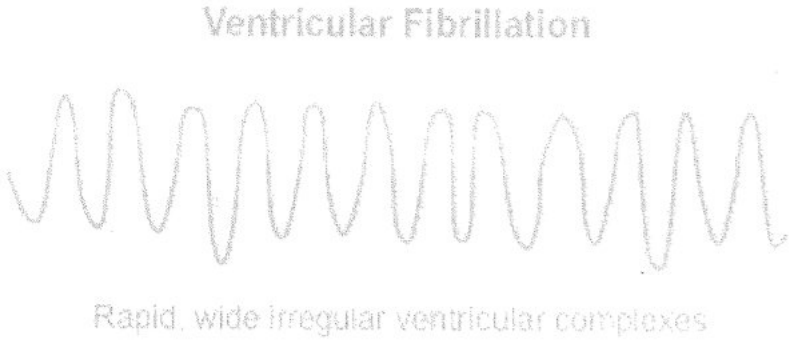
- SAW TOOTH P WAVES



ATRIAL FIBRILLATION

- FIBRILLATORY P WAVES & IRREGULARLY IRREGULAR PULSE

VENTRICULAR FIBRILLATION



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VALUE ADDED COURSE

Certificate course in Basics of ECG & Code: PHY C02

List of Students Enrolled: January 2022-April 2022

1st Year MBBS Student			
Sl. No	**Name of the Student**	**Registration Number**	**Signature**
1	KAVITHA .M	U16MB311	
2	KAVIYA .K	U16MB312	
3	KEERTHANA .K	U16MB313	
4	KEERTHI K DAS	U16MB314	
5	KUNCHAL BALA VENKATA RAMANA RED	U16MB315	
6	LAKSHMIPURAM VEDA SREEVIDYA	U16MB316	
7	LOGESH BABU J.S	U16MB317	
8	LOKESHWARAN .M	U16MB318	
9	MADHUMITHA .R	U16MB319	
10	MADHUMITHA .S	U16MB320	
11	MANIMAARANE .R	U16MB321	
12	MATHIVAANANE .R	U16MB322	
13	MATHIVANAN .J	U16MB323	
14	MD ALTAF KHAN	U16MB324	
15	MEKALA CHARAN CHOWDARY	U16MB325	
16	MERLIN.S	U16MB326	
17	MERLINE SHEEBA .B	U16MB327	
18	MOHAN .B	U16MB328	
19	MOHIT BHARDWAJ	U16MB329	
20	MONISH PALEI PATRA	U16MB330	

SRI LAKSHMI NARAYANA INSTITUE OF HIGHER EDUCATON AND RESEARCH

Certificate course in Basics of ECG & Code: PY C02

ANSWER ALL THE QUESTIONS (Total marks=50 marks)

1. Long answer question 1x20=20 marks

1. Explain in detail about waves, intervals, segments of normal ECG with diagram:

2. Short answer questions: (6x5=30 marks)

a. ECG leads

b. List the uses of ECG

c. Determine mean QRS axis and list the common causes of right and left axis deviation.

d. ECG changes in acute myocardial infarction.

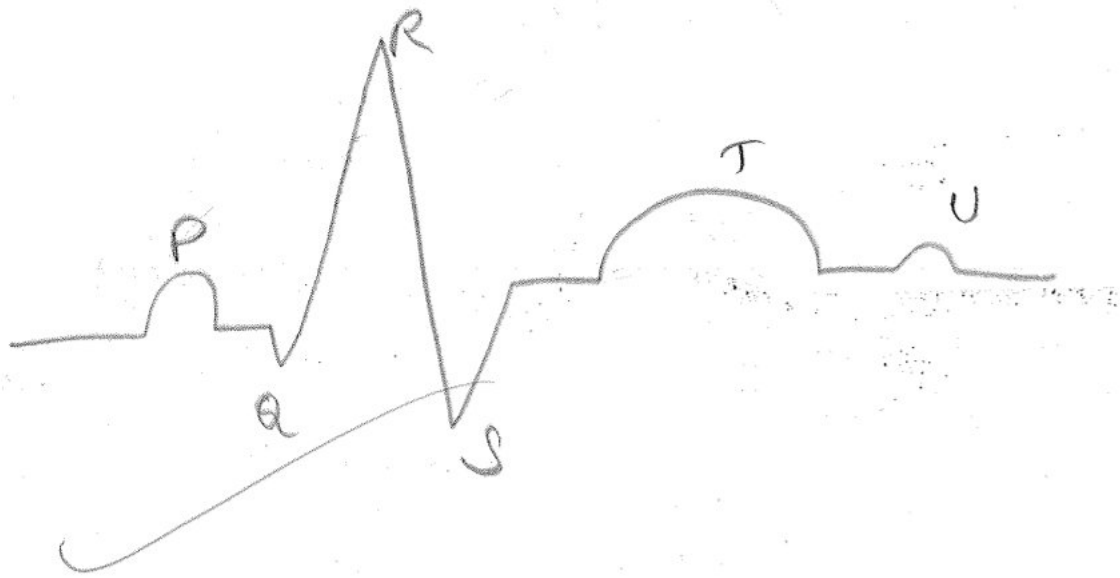
e. ECG changes in arrhythmias

f. ECG changes in heart blocks,

Keerthi K Das
U16MB314

Value Added Course on Basics of EGG

① Explain in detail about waves, intervals, segments of Normal ECG with diagram:



ECG tracing shows different waves, interval and segments.

Waves	Intervals	Segments
P wave	PR interval	PR Segment
QRS complex	QRS interval	ST Segment
T wave	ST interval	
U wave	QT interval	

J Point:

⇒ The point where the QRS complex ends and ST segment begins is called as J Point.

Significance: It represents Ventricular depolarisation

ST Interval:

It is the interval between the J point and the end of the T wave.

Duration: 0.40 – 0.43 Seconds

Significance: It represents Ventricular depolarisation and Ventricular repolarisation.

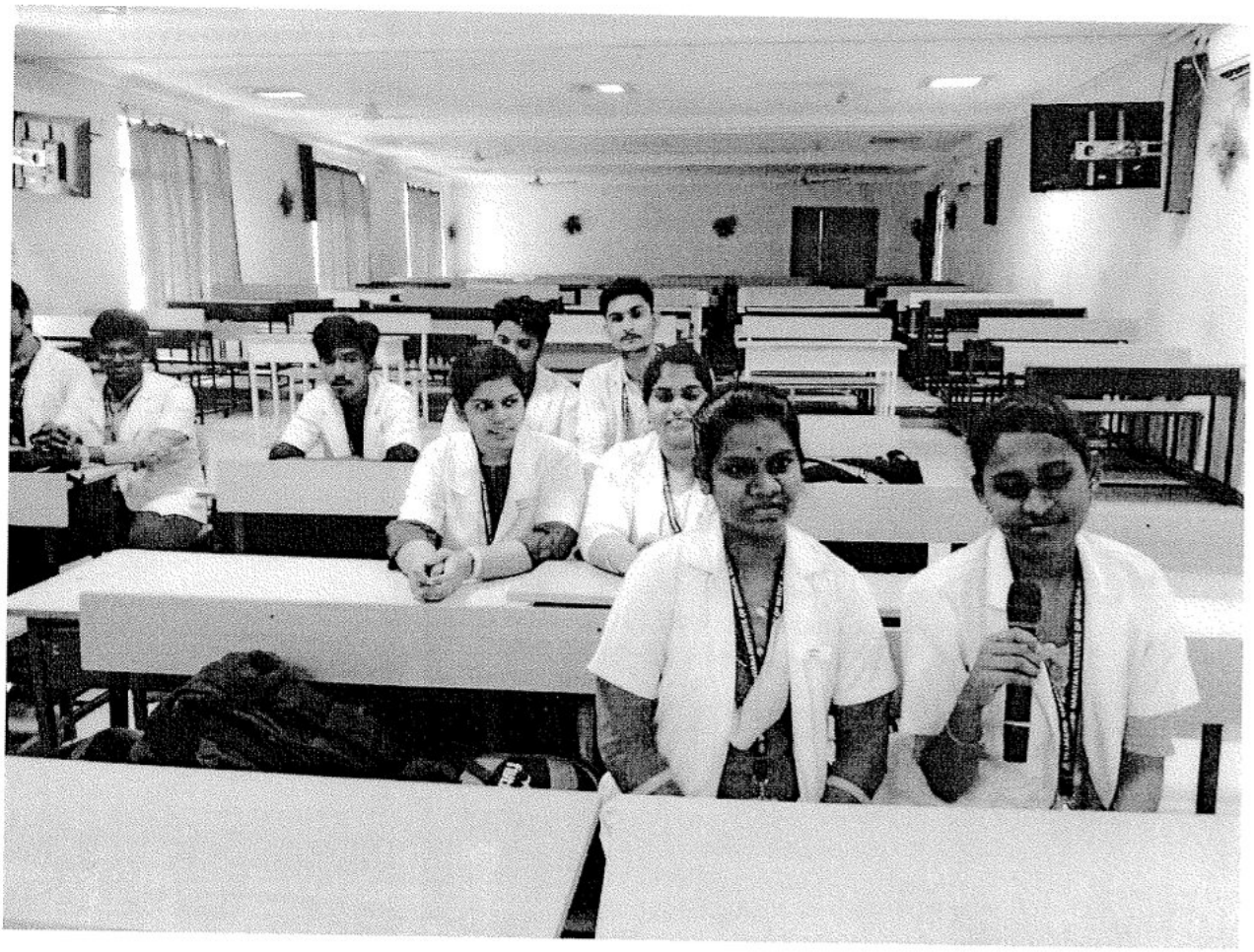
(2) B: List the uses of ECG

ECG is useful for assessing

(i) Anatomical orientation of the heart.
(ii) Size of the Chambers
(iii) Disturbance of rhythm and conduction
(iv) Ischemia of myocardium
(v) location, extent, progress of Myocardial infarction.
(vi) Effects of altered electrolyte concentration.
(vii) Influence of drugs like digitalis
(viii) Efficiency of Pacemaker.

D:- ECG changes in acute myocardial infarction.

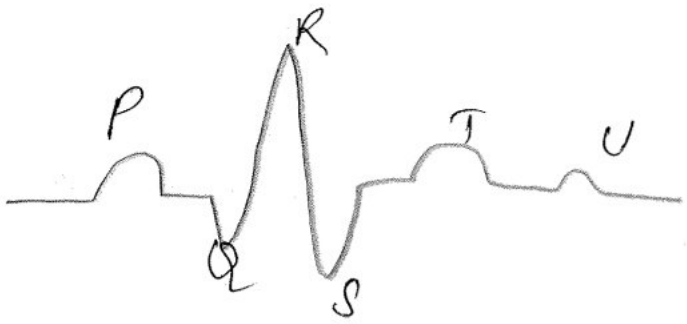
In acute Myocardial infarction, ST Segment elevation occurs.



Certificate course in Basics of ECG

B. MOHAN
U16MB328

(1) Long answer Question:-



ECG tracing shows different waves, intervals, segments

Waves are P, QRS, T, U waves.

Intervals are QRS interval, PR interval

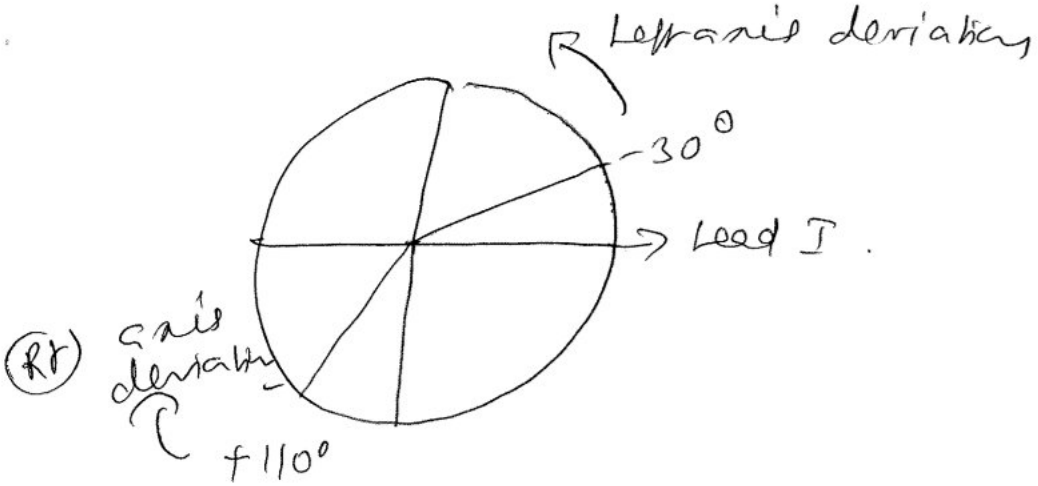
segments are PR segment, ST segment
ST Interval, QT interval.

PR segment :- It is due to depolarisation of AV node & Bundle of His

ST segment :- It is between the end of ventricular depolarisation & beginning of ventricular repolarisation

PR interval :- It is the interval between the beginning of Pwave.

(2) (c)



Normal electrical axis of heart is -30° to $+110^{\circ}$.

(RT) axis deviation occurs in (RT) ventricular hypertrophy, pulmonary Hypertension

Left axis deviation occurs in (LT) ventricular hypertrophy, Systemic hypertension

(2) (d) ECG changes in acute Myocardial Infarction:

ST segment elevation occurs.

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 LOKESH BALA J.S has actively participated in the Value Added Course on Basics of ECG held during January 2022-April 2022 Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

Dr. V.Anebaracy
RESOURCE PERSON

Dr.R.Vijayakumar
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 MADHUMITHA . S has actively participated in the Value Added Course on Basics of ECG held during January 2022-April 2022 Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

Dr. V.Anebaracy
RESOURCE PERSON

Dr.R.Vijayakumar
COORDINATOR

Student Feedback Form

Course Name: Certificate course in Basics of ECG

Subject Code: PHY C02

Name of Student: MD Abdul Kadir Registration Number: U16 MB 324

We are constantly looking to improve our classes and deliver the best training to you. Your evaluations, comments and suggestions will help us to improve our performance

Sl. NO	Particulars	1	2	3	4	5
1	Objective of the course is clear			✓		
2	Course contents met with your expectations				✓	
3	Lecturer sequence was well planned			✓		
4	Lectures were clear and easy to understand				✓	
5	Teaching aids were effective			✓		
6	Instructors encourage interaction and were helpful				✓	
7	The level of the course			✓		
8	Overall rating of the course	1	2	3	(4)	5

** Rating: 5 – Outstanding; 4 - Excellent; 3 – Good; 2– Satisfactory; 1 - Not-Satisfactory*

Suggestions if any:

We want advance courses in ECG

Date: 8/4/2022

Signature

Student Feedback Form

Course Name: Certificate course in Basics of ECG

Subject Code: PHY C02

Name of Student: MERLIN.S Registration Number: U16MB326

We are constantly looking to improve our classes and deliver the best training to you. Your evaluations, comments and suggestions will help us to improve our performance

Sl. NO	Particulars	1	2	3	4	5
1	Objective of the course is clear			✓		
2	Course contents met with your expectations			✓		
3	Lecturer sequence was well planned				✓	
4	Lectures were clear and easy to understand			✓		
5	Teaching aids were effective				✓	
6	Instructors encourage interaction and were helpful			✓		
7	The level of the course				✓	
8	Overall rating of the course	1	2	3	(4)	5

** Rating: 5 – Outstanding; 4 - Excellent; 3 – Good; 2– Satisfactory; 1 - Not-Satisfactory*

Suggestions if any:

Excellent Sessions !!

Merlin
Signature

Date: 8/4/2022

Date: 12.04.2022

From
Dr.V.Senthil kumar
Professor and Head,
Physiology
Sri Lakshmi Narayana Institute of Medical sciences
Puducherry

To
The Dean,
Sri Lakshmi Narayana Institute of Medical sciences
Puducherry
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Through Proper Channel

Sub: Completion of value-added course: Certificate course in Basics of ECG & Code: PHY C02

Dear Sir,

With reference to the subject mentioned above, the department has conducted the value-added course titled: Certificate course in Basics of ECG & Code: PHY C02 from January 2022-April 2022. 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.

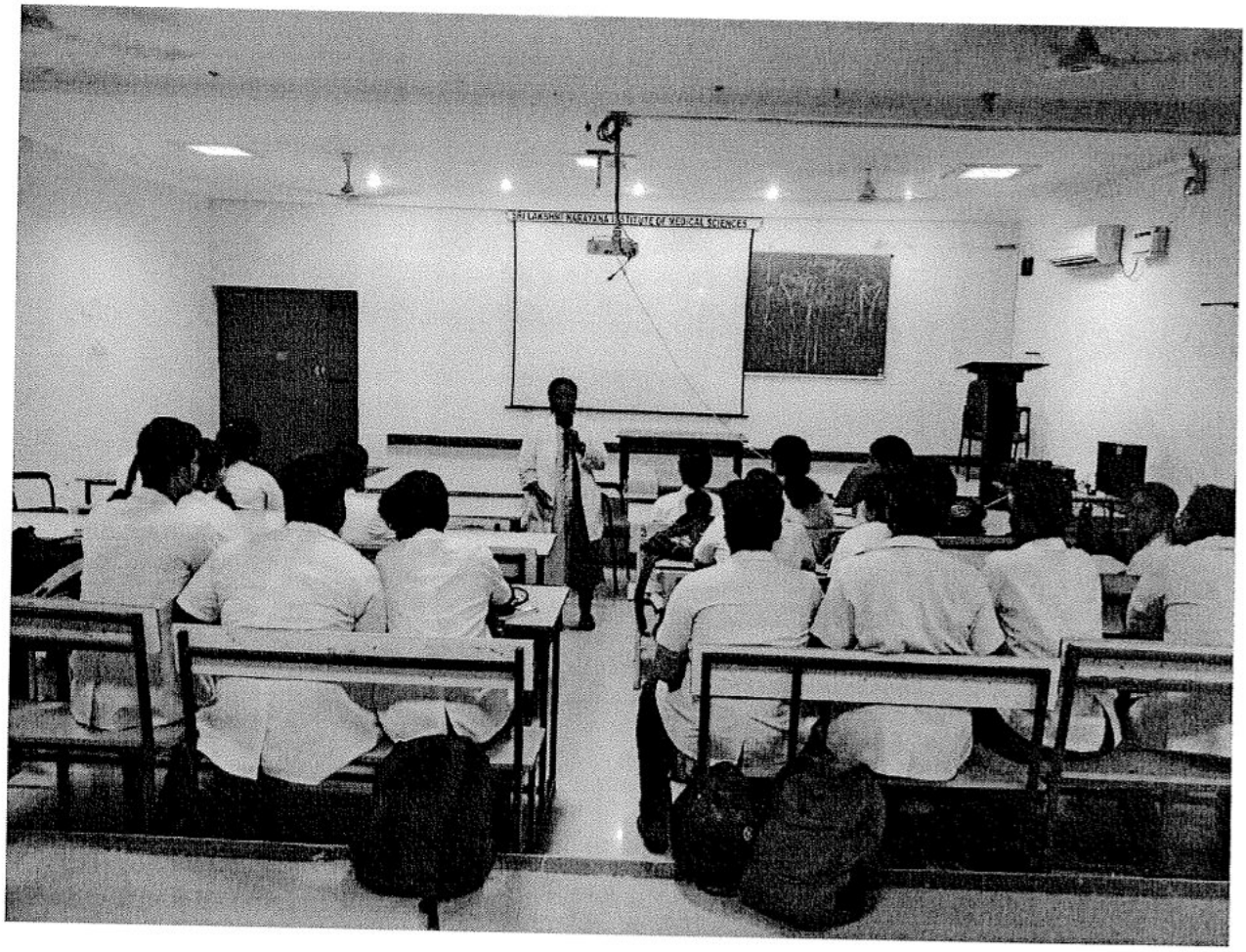
Kind Regards

VSK
Dr.V.Senthil kumar
HOD Physiology

PROFESSOR & HOD
DEPARTMENT OF PHYSIOLOGY
Sri Lakshmi Narayana Institute Of Medical Sciences
PONDICHERRY - 605 502.

Encl: Certificates

Photographs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