SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
Osudu, Agaram Village, Koodapakkam post, Puducherry - 605502

Date: 06.08.2020

From
Dr.G.Somasundaram
Professor and Head,
Department of Pharmacology
Sri Lakshmi Narayana Institute of Medical sciences
Pondicherry

To
The Dean,
Sri Lakshmi Narayana Institute of Medical sciences
Pondicherry

Sub: Permission to conduct value-added course: Computing of Medicine

Dear Sir,

With reference to the subject mentioned above, the department proposes to conduct a value-added course titled: **Computing of medicine** on **September 2020– January 2021**. We solicit your kind permission for the same.

Kind Regards

Dr.Somasekar.HS

FOR THE USE OF DEANS OFFICE

Names of Committee members for evaluating the course:
Dean:Dr.Jayakumar HOD:Dr. Somasekar.HS Expert:Dr.Jaikumar, Dr.Balram
The committee has discussed about the course and is approved.

Dr. P. JAYAKUMAR, M.S., M.CH.,
DIRECTOR / DEAN
Sri Lakshmi Narayana Institute of Medical Sciences
Osudu, Agaram Post, Puducherry-605502

PROFESSOR & HOD
DEPARTMENT OF PHARMACOLOGY
Sri Lakshmi Narayana Institute of Medical Sciences,
PONDICHERRY - 605 502.

Dean Subject Expert HOD

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]
[Affiliated to Bharath University, Chennai - TN]

Circular (13.08.2020)

Sub: Organising Value-added Course: Computing of Medicine

With reference to the above mentioned subject, it is to bring to your notice that a Sri Lakshmi Narayana Institute of Medical science is organizing **"Computing of medicine" September 2020– January 2021.** 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 August 2020.
Applications received after the mentioned date shall not be entertained under any circumstances.

Dean

Dr. P. JAYAKUMAR, M.S., M.CH.,
DIRECTOR / DEAN
Sri Lakshmi Narayana Institute of Medical Sciences
Osudu, Agaram Post, Puducherry-605502

Encl: Copy of Course content.

Course Proposal

Course Title: COMPUTING OF MEDICINE

Course Objective:

1. Install different programming languages
2. Describe and discuss the difference between major families of computer programming languages
3. Install and use an Integrated Development Environment (IDE)
4. Describe how to structure a problem to allow the application of computational techniques
5. Find and use online resources on programming
6. Choose appropriate data types for simple computations
7. Describe and discuss difference in different control structures
8. Implement and test different control structures
9. Computing in forensic medicine
10. What are the stages of a forensic computing examination?
11. Regulatory compliances

Course Outcome: Opportunity to achieve computer literacy including language,syntax and fundamental computational ideas and acquire or strengthen algorithm and logical thinking for approaching problems.

Course Audience: 2nd Year MBBS Students

Course Coordinator: Dr.Somasekar.HS

Course Faculties with Qualification and Designation:

1. Dr.Jaikumar Assistant Prof Dept of Pharmacology
2. Dr.Balram Assistant Prof Dept of Pharmacology

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

SlNo	Date	Topic	Time	Hours	Name of the Faculty
1	08.09.2020	Game and Introduction	9 -12am	3	Dr.Balram
2	09.09.2020	Install different programming languages	9-12 am	3	
3	08.10.2020	Describe and discuss the difference between major families of computer programming languages	9-12 am	3	
4	09.10.2020	Install and use an Integrated Development Environment (IDE)	9-12 am	3	
5	09.11.2020	Describe how to structure a problem to allow the application of computational techniques	9-12 am	3	Dr.Jaikumar
6	10.11.2020	Find and use online resources on programming	9-12 am	3	
7	08.12.2020	Choose appropriate data types for simple computations	9-12 am	3	
8	09.12.2020	Describe and discuss difference in different control structures	9-12 am	3	Dr.Balram
9	1.01.2021	Implement and test different control structures	9-12 am	3	
10	12.01.2021	Computing in forensic medicine	9-12 am	3	
			Total Hours	30	

Reference books

1.Applied Computing in Medicine and Health

Authors: **Dhiya Al-Jumeily Abir Hussain Conor Mallucci Carol Oliver**

2. Visual Computing for Medicine
Authors: Bernhard Preim Charl Botha

VALUE ADDED COURSE

1. Name of the programme & Code

Computing of Medicine

2. Duration & Period

30 hrs & September 2020– January 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:

Short answers *Enclosed as Annexure- III*

6. Certificate model

Enclosed as Annexure- IV

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

September 2020– January 2021

8. Summary report of each program year-wise

Value Added Course- September 2020 - August 2020					
Sl. No	**Course Code**	**Course Name**	**Resource Persons**	**Target Students**	**Strength & Year**
1	PH01	**Computing of Medicine**	Dr.Jaikumar Dr.Balram	2nd MBBS	20 (Sep 20 – Jan 21)

9. Course Feed Back

Enclosed as Annexure- V

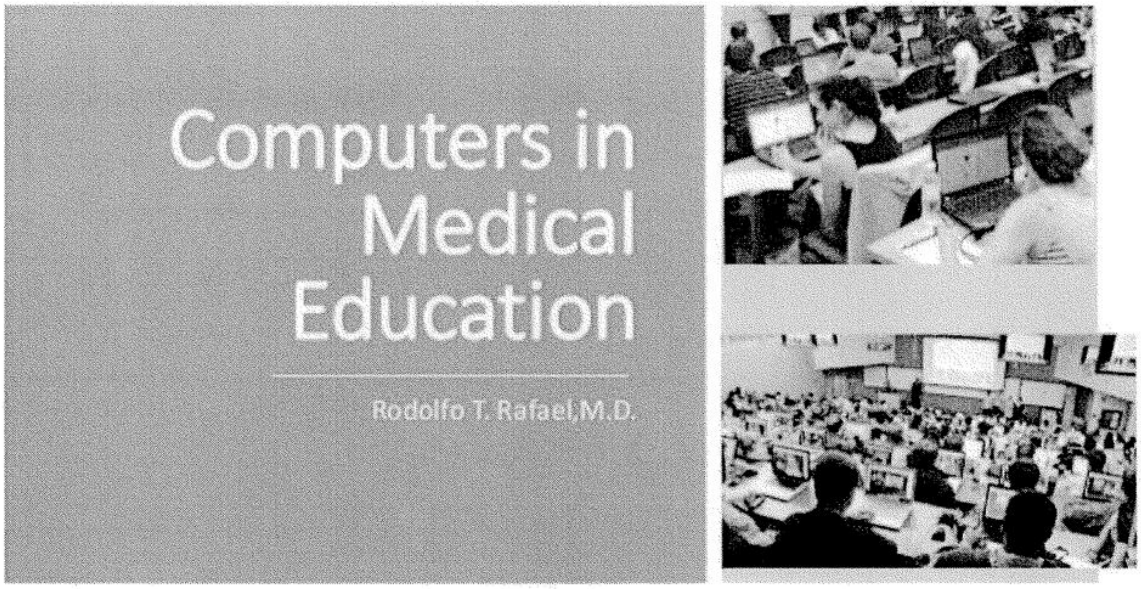
RESOURCE PERSON **COORDINATOR**

Computing of medicine

Particulars	Description
Course Title	Computing of medicine
Course Code	PH01
Objective	1. Install different programming languages 2. Describe and discuss the difference between major families of computer programming languages 3. Install and use an Integrated Development Environment (IDE) 4. Describe how to structure a problem to allow the application of computational techniques 5. Find and use online resources on programming 6. Choose appropriate data types for simple computations 7. Describe and discuss difference in different control structures 8. Implement and test different control structures 9. Control simple input and output from a program 10. Implement and test different control structures 11. Computing in forensic medicine 12. What are the stages of a forensic computing examination? 13. Regulatory compliances
Further learning opportunities	Opportunity to achieve computer literacy including language,syntax and fundamental computational ideas and acquire or strengthen algorithm and logical

	thinking for approaching problems
Key Competencies	On successful completion of the course the students will have skill in Handling the computer and able to apply the knowledge in forensic aspects
Target Student	II MBBS Students
Duration	30hrs Every Sep 2020 to Jan 2021
Theory Session	10hrs
Practical Session	20hrs
Assessment Procedure	Short notes

PARTICIPANT HAND BOOK



Introduction

Computers are becoming increasingly popular every passing day amongst a wide section of people. With the advent of microcomputers in late seventies and their subsequent performance enhancement in eighties, computers have reached our homes. Computers have undoubtedly revolutionized our whole life style. Computer techniques have tremendous applications in medical field, where it has the largest amount of social impact. Computers are playing an important role in the running of large hospitals.

Computer facilities are now regarded as integral to much diagnostic equipment. Major uses of computers in medicine include hospital information system, data analysis in medicine, medical imaging laboratory computing, computer assisted medical decision making, care of critically ill patients, computer assisted therapy and so on.

The word computer comes from the word "compute", which means to calculate. Computer can be defined as an electronic device that is designed to automatically accept data, store and process then producing output results. Computers are used to store and process large amount of data and provide information to the user and to perform large number of calculations rapidly and accurately. Charles Babbage is considered to be father of modern computer 1.

Components of computers : Hardware, Software

Hardware is the term given to the physical components of the computer system. Hardware is basically divided into three units :

Input devices : Input devices convert the data to be processed into a format acceptable to the computer. The data is then passed on to the central

processing unit of the computer. The input devices include punch cards, magnetic tapes, key board and so on.

The central processing unit (CPU) : The CPU is the brain of the computer. All major calculations and comparisons are made here. It has three constituents, the memory units, the control unit and the arithmetical logic unit.

The output devices : The output devices accept the result produced by CPU and supply the results to users. Printers and visual display units are the popular output devices of computers.

Software are the set of programs that control the activity of processing by the computer. There are two types of software, system software and application software. System software are collection of programs which allow the user to interact with the computer hardware, e.g. operating system like DOS, UNIX and compilers like C, FORTRAN, COBOL and BASIC. Application software consists of programs which perform special functions for the user such as word processing, data processing and spreadsheet programs.

Computer Techniques in Medicine

The application of computer techniques in various fields of medicine is briefly discussed below :

Hospital information system

Medical informatics is a rapidly growing discipline. It seeks to organize and manage information in support of patient care, biomedical research and education through the aid of computer and information networks . A computerized hospital information system can establish consistent standards in the transmission and storage of data and continuously monitor all transactions. It provides easy access to valuable patient care information. The physicians can have direct access to all the information of his/her patient through the use of computer. A hospital information system generally covers areas like registration, admission/transfer/discharge, billing, medical record, index, wards, operation theater scheduling, stores/inventory, pharmacy, diet, CSSD, bio-medical maintenance, payroll, accounts, etc.

To date, several software vendors have developed hospital systems relating to managing hospitals . Generally hospital administrators prefer to buy readymade package and customize the same to suit their needs.

Data Analysis in Medicine

In medical research large number of data is collected. This data is to be compiled, analyzed and interpreted. For this purpose, certain statistical methods are to be applied, these include calculation of standard deviation, standard error, application of tests of statistical significance like Z Test, unpaired and paired t test and chi-square test. Statistical methods are time consuming. With the help of computer, large number of statistical calculations can be performed in a very short time.

Several good quality statistical packages are available, which allow the use of many more methods than is practical using traditional paper calculations [4]. These statistical packages include the following :

1. The biomedical computer package (BMD) : This was the first package developed and provides a standard set of advanced statistical programs.

2. Statistical package for the social sciences (SPSS): It is used for wide range of medical problems. Many statistical options are available in SPSS varying from simple statistics to multivariant analysis.

3. Genstat: This is a powerful package with special emphasis on analysis of variance.

4. Epi-Info : This package is developed by WHO for epidemiological studies. This package has word processing, data analysis and graphical abilities. Questionnaire can be made directly by text editor. Data analysis is very simple and serves the need of most of investigators. The program is made available by WHO and CDC (Centre for Disease Control) and are not copyrighted. Making copies for others is permitted and encouraged.

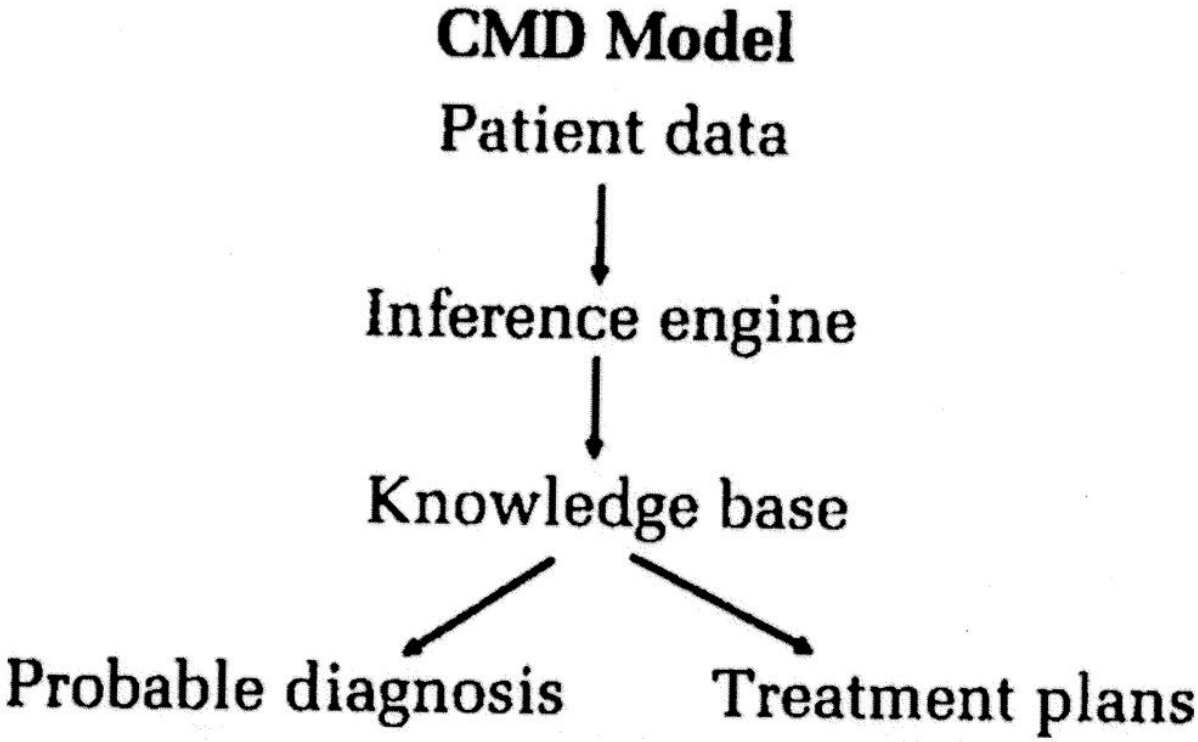
Laboratory Computing

The primary objective of a clinical laboratory is to provide accurate results in short time. Laboratory analysis includes blood chemistry, photometry, microbiology, etc. Results must match with patient identification details and should be valid. Quick access to laboratory system can contribute to efficient patient care system.

Computer Assisted Decision making (CMD)

It is an interactive computer system that directly assists doctors with clinical decision making task. The system is intended to support doctors, complementing their natural abilities to make judgment with computer's vast memory, reliability

and processing capabilities. A general model of computer assisted medical decision making has been developed [5].



Care of critically ill patients

Critically ill patients require large number of therapeutic interventions to optimize their chances of survival. For this, the variables must be collected frequently and the data derived therefrom made available to the clinicians and nursing staff. This results in a large quantity of information, which may loose its significance unless the data recorded is presented in a clear manner. In the intensive care unit it is now possible to computerise the total management of data recorded on the patients.

Data management includes the entry, integration and reporting of all vital signs, medications, intake and output volumes and laboratory values.

Closed loop system for the direct computer control of the infusions of vasodilator has been developed . An intraarterial canula connected to a suitable cardiovascular monitor provides the input signal to the computer. A pump which infuses the vasodilator drug to the patient is controlled by computer to maintain the arterial pressure within predetermined units.

Computer assisted therapy

Methods for planning, monitoring and adjusting dosages regimens of powerful and potentially toxic drugs, e.g. digitalis and antibiotics like gentamicin have been developed. The physician can plan dosage regimens by selecting a target peak total body concentration of a drug.

Medical imaging

During last decade computers were commonly used for high resolution image generation. Dedicated hardware and software is required to generate such images in CT scan, MRI, ultrasound, and gamma cameras. It is possible to integrate these workstations to the main hospital information system. Three dimensional images of

living human anatomy, regional physiology and biochemistry in health and diseases are in use.

Other applications of computer

In addition computers are being used in primary health care, psychiatry, physiological measurements, medical education, literature search, and as an aid to the handicapped.

Computers play a key role in almost every sphere of life. They facilitate storage of huge amounts of data, they enable speedy processing of information and they possess an inbuilt intelligence. Owing to these unique capabilities, computers function on levels close to that of a human brain. Computers can hence be employed in a wide variety of fields like engineering, data processing and storage, planning and scheduling, networking, education as well as health and medicine. You might want to take a look at the various uses of computers.

Computers are the excellent means for storage of patient related data. Big hospitals employ computer systems to maintain patient records. It is often necessary to maintain detailed records of the medical history of patients. Doctors often require the information about a patient's family history, physical ailments, already diagnosed diseases and prescribed medicines. This information can be effectively stored in a computer database. Computers can keep track of

prescriptions and billing information. They can be used to store the information about the medicines prescribed to a patient as well as those, which cannot be prescribed to him/her.

Computers enable an efficient storage of huge amounts of medical data. Medicine comprises vast base of knowledge. Computer storage can serve as the best means of housing this information. Medical journals, research and diagnosis papers, important medical documents and reference books can best be stored in an electronic format. Many of the modern-day medical equipment have small, programmed computers. Many of the medical appliances of today work on pre-programmed instructions. The circuitry and logic in most of the medical equipment is basically a computer.

The functioning of hospital-bed beeping systems, emergency alarm systems, X-ray machines and several such medical appliances is based on computer logic. Computer software is used for diagnosis of diseases. It can be used for the examination of internal organs of the body. Advanced computer-based systems are used to examine delicate organs of the body. Some of the complex surgeries can be performed with the aid of computers. The different types of monitoring equipment in hospitals are often based on computer programming. Medical imaging is a vast field that deals with the techniques to create images of the human body for medical purposes. Many of the modern methods of scanning and imaging are largely based

on the computer technology. We have been able to implement many of the advanced medical imaging techniques, thanks to the developments in computer science. Magnetic resonance imaging employs computer software. Computed tomography makes use of digital geometry processing techniques to obtain 3-D images. Sophisticated computers and infrared cameras are used for obtaining high-resolution images.

Computers are widely used for the generation of 3-D images in medicine. Computer networking enables quicker communication. Computers and Internet have proved to be a boon in all the spheres of life. In the field of medicine, computers allow for faster communication between a patient and a doctor. Doctors can collaborate better over the Internet. Today, it is possible to obtain experts' opinions within seconds by means of the Internet. Medical professionals sitting on opposite sides of the globe can communicate within minutes by means of the Internet. It is due to computer networking technology that network communication has become easy. Medical practitioners can discuss medical issues in medical forums.

They can exchange images and messages in seconds and derive conclusions speedily. They can seek advice and share knowledge in a convenient manner over the Internet. The importance of computers cannot be stressed enough as computer technology has revolutionized the field of medicine.

In many countries, forensic pharmacologists have been a valuable resource in different criminal and civil cases. They apply their knowledge of pharmacology to civil/legal issues such as resolving litigations, drug regulatory process, and the criminal justice system.

It has been proven through different research studies and case studies that comprehensive investigation plays an unflinching role in the determination of the cause of death in crime scenes with positive drug screens. Even the general public is aware of the role of forensic sciences in the legal system of justice. With increased exposure to the work of the forensic scientists, there has been an increased enrollment in criminal justice system and forensic science courses in schools and colleges in countries like United States of America and Australia. Forensic sciences encompasses the broader application of different branches of science to legal matters. The domain of Forensic Pharmacology focuses on the knowledge of action and interaction of different chemicals in the living beings and its application to legal matters.

Role of Forensic Pharmacologist

Forensic Pharmacology answers the questions of association of chemicals with an individual's behavior, illness, injury, or death. It can be described as the

interpretation of the effects of drugs and their duration of action with the purpose of facilitating a medico-legal process.

The pharmacologist conducts an analysis of the body fluids and tissues and interprets the chemical data to help the attorneys in assessing the role of a drug or specific chemical in the behavior, illness, injury, or death of an individual. The forensic pharmacologist can be of great help in both criminal and civil cases. The exact role of a pharmacologist in forensic sciences is to analyze, assess, review, and support the attorney's position. He may be asked to provide a written report if his review positively supports the attorney's case. In the case of a trial, the forensic pharmacologist may be needed to testify and clearly explain the findings in the court. The role of a forensic pharmacologist also involves helping the attorney in preparing a cross-examination of the expert on the opposite side.

Forensic Pharmacologist and Toxicologist

Many a time, a forensic pharmacologist and forensic toxicologist are considered to be the same. The forensic toxicologist is also involved in drug testing and in testifying for the attorney in criminal cases, but a forensic pharmacologist is engaged in forensics in a much broader way.His area of expertise includes a much broader range of cases such as adverse drug reactions to medicines, overdose of medicines, drug interactions, and personal injury resulting from an exposure to

medicines, effects from drug abuse or industrial chemicals, and induction of cancer by chemicals.

Forensic Pharmacology: Need of the Hour

Forensic Pharmacology is not a new subspecialty. The only thing new about it is probably the use of the terminology "Forensic Pharmacology" to define a subspecialty of pharmacology that focuses on the legal application of the knowledge that a pharmacologist already possesses. And thus, such subspecialty needs recognition among the Indian pharmacologists.

Toxicology is concerned with the deleterious effects of the drugs and chemical agents on all living systems. Toxicology is included as a part of forensic medicine for medical curriculum in India. It is defined as the science that involves detection of drugs and poisons in biological specimens and its application for medico-legal purposes. However, it is much different from the interpretation of effects, use or abuse of drugs, and its duration of action for the medico-legal process which is referred to as Forensic Pharmacology. A fine line differentiates "Forensic Pharmacology" from "toxicology." Some textbooks use term such as "pharmacological toxicology" for assessing the toxicity of therapeutic agents (drugs). Forensic Pharmacology is included as a part of forensic medicine, which

discusses toxicities from the drugs in common therapeutic use, commonly abused drugs, drugs having no medicinal value and "street" or "designer drugs."

An important and extensively studied branch of pharmacy curriculum in India is "Forensic Pharmacy" or "Pharmaceutical Jurisprudence," which deals with various laws pertaining to drugs and pharmaceuticals and profession of pharmacy. It includes the knowledge of various acts, rules, and schedules which directly or indirectly influence various operations pertaining to procurement, manufacture, and distribution of drugs. The knowledge of Forensic Pharmacy is essential to understand the legal aspects pertaining to practice of pharmacy. The forensic pharmacist is required to profess and should also be engaged in manufacturing, sale, and distribution of drugs. Similarly, Forensic Pharmacology guides us to investigate whether a drug or a chemical was related to an individual's behavior, illness, injury, or death.

With continued new drug developments, there are multiple new drugs hitting the markets every year. Few of them are new molecules in the market and claim to contain "nonillegal" compounds although they may exhibit important psychoactive effects. Such drugs are called as "smart drugs." Also, in addition to new drugs or chemicals, new ways to abuse existing drugs are found, for example, scopolamine has become a drug of abuse for recreational and predatory purposes. Thus, the forensic pharmacologists need to keep themselves updated with the knowledge of

new legal and illegal drugs, their pharmacological or toxicological effects and also guide the community and regulatory authorities regarding the possible abuse of such drugs or chemicals to commit the crimes.

Application of the biotechnological advances to pharmacology and toxicology has widely extended our understanding and overall scope of these subjects. Similarly, advances in analytical techniques have made detection of drugs and chemicals much easier which can help resolving medico-legal cases with the guidance from experts such as a forensic pharmacologist. Some drugs can even alter the neurotransmitters and hence lead to a poor impulse control and subsequent aggression in behavior. The role of a forensic pharmacologist becomes significant in this case because he/she is needed to testify the truth of these claims. He/she has to observe, assess, and analyze the violent behavior and use of the drug and determine the likelihood of the relation of impulsive behavior to the drug use.

Pharmacology is evolving as a subject, and Indian pharmacologists need to look at different aspects of pharmacology beyond therapeutics. Forensic Pharmacology offers a unique opportunity to expand the existing knowledge of the drugs, their mechanisms, actions, and its medico-legal impacts. It adds additional dimension to forensic medicine and provides a scope for further research.

The Science of "Drugs and Forensics"

Forensics as a science and profession is considered to be important for the investigation of illness, injury, or deaths. It is defined as the application of the sciences of drugs to the application of legal code of conduct.The pharmacologist as an expert in the science of drugs and is involved in the clinical, distributive, and administrative aspect of pharmacy.

Scope of Forensic Pharmacology

There are many criminal and civil cases involving the use of drugs and other chemicals which come under the forensic law. The forensic pharmacologist needs a specific recognition in his profession because of the highly specific nature of his expertise, skill, and work. Various scenarios where the expertise of a forensic pharmacologist can be useful include:

Drug abuse

A national survey conducted by the Indian Ministry of Social Justice and Empowerment in 2004 has brought forth the fact that drug abuse was quite commonly seen among Indian males aged 12–60 years. The most common abuse was in the use of tobacco (55.8%), alcohol (21.4%), cannabis (3.0%), opiate (0.7%), and sedatives (0.1%).

In criminal courts, crimes which are committed by the individuals under the influence of a drug or medication are one of the most frequently reported ones. These crimes could be the results of the effect of medicine resulting in a change in the behavior or thought process of the person. Forensic Pharmacology deals with the study of "drugs of abuse", examples of which are cannabinoids, central nervous system (CNS) stimulants such as cocaine, heroin, marijuana, tobacco, and amphetamine-related drugs, CNS depressants such as alcohol, benzodiazepines, and opioids, hallucinogens such as lysergic acid diethylamide, mescaline, and phencyclidine, dissociative anesthetics such as ketamine, inhalants such as chloroform and anabolic steroids.Such drugs are often involved in criminal and civil matters concerning personal injury, motor vehicle accidents, drug overdose, and murder. Also, their actions and addiction liability has profound medico-legal implications.

Sports medicine and doping

The identification of androgens as ergogenic or performance enhancing agents dates back to the 1930's. Commonly used ergogenic drugs include anabolic steroids, narcotic analgesics, diuretics, beta blockers, growth hormone, oral peptide hormones, amphetamines, caffeine, cocaine, sympathomimetic agents, and erythropoietin. Several sportsperson have been found guilty of using such

ergogenic agents to enhance their performance in sports. World Anti-Doping Agency has stringent guidelines on the use of ergogenic drugs. National Anti-Doping Agency is the national organization responsible for promoting, coordinating, and monitoring the doping control program in sports with a vision of "dope free" sport in India. A forensic pharmacologist can help in achieving this vision with the better use of analytical methods to detect the doping and can also help in avoiding accidental use of ergogenic drugs by athletes. Additionally, they can also advise on the drug interactions and use of drugs for therapeutic purposes in athletes.

Blood levels

The forensic pharmacologist can assess and analyze the blood samples of a person to determine high and borderline doses, signs of toxicity, lack of therapeutic effect, or a suspected case of poor adherence. A pharmacologist is well-versed to detect alterations in postmortem and ante-mortem blood levels. The pharmacologist can also closely monitor the narrow therapeutic range of different drugs such as digoxin, lithium, or theophylline.

Drugs, alcohol, and driving

Forensic pharmacologist is armed with the knowledge of pharmacokinetics, pharmacodynamics, drug interactions, and adverse reactions. He is the most well-

suited to analyze the data collected and make an informed decision in favor of or against his attorney's case. The forensic pharmacologist can interpret the concentration of alcohol in blood and its typical effects. Pharmacokinetics is employed to measure the blood level of alcohol at the time of the alleged crime. Drug interactions, synergistic or antagonistic effect of different drugs on alcohol absorption or metabolism, and the disease state present in the individual can be easily assessed by the forensic pharmacologist and provide a great help to the medico-legal and judicial system.

Criminal cases

Forensic pharmacologists play an important role in a wide range of criminal cases. There are many cases where a forensic pharmacologist can provide a testimonial such as use of drug or poison as a weapon, mental impairment caused due to the effect of a medication, or the use of a specific drug as the reason for criminal aggression. Drug use and their effect on the victim form a major reason for a large number of criminal events. Drugs are frequently used in suicide attempts and as a tool of homicide or sexual assault. The most commonly used date drugs are flunitrazepam, alcohol, gamma-hydroxybutyrate, and ketamine.

Forensic pharmacovigilance

Commonly encountered problems with the use of medication in clinical practice are adverse drug reactions, drug interactions, systematic medical errors in use, unexpected failures of effectiveness, or quality problems by users. Considering the patient safety, such problems should be reported and scrutinized in detail.

Pharmacovigilance is the well-known science related to the adverse effects or any other drug-related problems. It helps in improving patient safety in therapeutics by detection, warning, management, and advice which can reduce the harm and benefit in practice. Pharmacovigilance can also be used as an important medical discipline in forensic cases in a variety of ways, e.g., establishing the effects of the drugs leading to crime, e.g., could this drug (or chemical) have caused this harmful effect in the person and did it really cause the effect either (criminal case)? Any injury or death in the form of adverse drug reactions that are caused by counterfeit, contamination, adulteration, or other substandard medicinal products which is identified by application of standard pharmacovigilance procedure is termed as "forensic pharmacovigilance" and it forms an integral part of Forensic Pharmacology.

In context of civil cases, Forensic Pharmacovigilance can play an important role when some previously unsuspected class effect emerges when the drug is available in public domain after licensing, as compared to the use in restricted group who took part in its clinical trials. The teratogenicity with Thalidomide is the classic

example. Recently, there were concerns of bladder cancer with use of anti-diabetic medication Pioglitazone, and it was banned in India for a brief period. It differs from Pharmacovigilance as it considers the medico-legal implications as well.

Limitations

Although computers can store and retrieve large amount of data and perform complicated analysis in very short period, their major limitation is that they lack decision making power and are not sensitive like human brain. Data entry is major hindrance for using computers by medical professional.

Computer virus is a generic term used to describe any of a group of willfully destructive computer programs. Viruses can multiply with repeated use of a program and can be transmitted with executable programs. They can destroy program files, data files or erase all data from hard disk. Commonly found viruses in our country are Joshi, Michael Angelo, DirII, India etc. There are antivirus programs available to remove a virus from a file. Due to newer introduction of viruses it is difficult to completely eradicate viruses. Some of antivirus programs are Scan, CPAV (Central Point Anti Virus), and Norton anti virus.

Faculty of Computers, Military College of Telecommunications, Mhow is running regular courses for all ranks on applications of computers in different fields. In many garrisons, computer courses are being organized at station level. Although computers have tremendous scope in different field of medicine, the contrast between the apparent need for clinical computing systems and their slow establishment is well recognised. The ability of such systems to solve some of the problems associated with the traditional medical records is also well recognized. Yet after almost 30 years of endeavor and the development of many different systems the number in daily use is relatively small . There is urgent need to create computer awareness among medical professionals. They need to familiarize themselves with application of computer in medicine and make best use of it.

VALUE ADDED COURSE
COMPUTING OF MEDICINE

List of Students Enrolled Sep 2020 – feb2021

Sl. No	Name of the Student	Register No	Signature
1	MONISHA . S	U16MB331	
2	MONISHA .M	U16MB332	
3	MONISHDEVI .N	U16MB333	
4	MOUNIKA .A	U16MB334	
5	MOUNIKA.B	U16MB335	
6	MUHAMMAD SHEBIN	U16MB336	
7	MUSKAAN SHAMIM	U16MB337	
8	MUSULURI SHYAM SINDHU	U16MB338	
9	NAMITA YADAV	U16MB339	
10	NAMRATA GHORAI	U16MB340	
11	NANDU ARAVIND	U16MB341	
12	NEELU.S.P	U16MB343	
13	NEITOUNUO MARY PIENYII	U16MB342	
14	NIKITA VERMA	U16MB344	
15	NISHA AGRAWAL	U16MB345	
16	NOUNETSHUNUO KELIO	U16MB346	
17	PALAYULLA VALAPPIL VARUN	U16MB347	
18	PARTHASARATHY .S	U16MB348	
19	PATIL NAMRATA YASHANAND	U16MB349	
20	RAJAGOPAL R	U16MB350	

RESOURCE PERSONS

CO-ORDINATOR

PROFESSOR & HOD
DEPARTMENT OF PHARMACY
Sri Lakshmi Narayana Institute Of
PONDICHERRY - 60

SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
Osudu, Agaram Village, Koodapakkam post, Puducherry - 605502

COMPUTING IN MEDICINE

SHORT ANSWERS

Course Code: PH 01

I. ANSWER THE QUESTIONS

1. Components of Computer
2. Role of computer in hospital information system
3. Role of computer in lab diagnosis
4. Computer Assisted Decision making (CMD)
5. Computer Assisted therapy

Annexure - IV

COMPUTING IN MEDICINE

SHORT ANSWERS

Course Code: PH.01

I. ANSWER THE QUESTIONS

1. Components of Computer

- Mother board
2. Central processing unit
3. Graphics processing unit
4. Random Access memory (RAM)

2. Role of computer in hospital information system

→ For maintaing patient records

→ For maintaing medical history of patients

→ Doctor often require the information about a patient family history, physical ailments.

3. Role of computer in lab diagnosis

computer programs are more successful in narrow constrained single areas of medicine with much underlying pathophysiologic understanding and where decisions are based largely on hard laboratory data

4. Computer Assisted Decision making (CMD)

1. clinical algorithms
2. statistical analysis of collection of patient data
3. mathematical models of physical power

5. Computer Assisted therapy

It is used to deliver some aspects of psychotherapy
& behavioral treatment directly to patients.

6. Role of computer in forensic medicine. Give five examples.

autopsy computer software to
incorporate third party modules.

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 MONISHA.S has actively participated in the Value Added Course on"COMPUTING OF MEDICINE"held during September 2020 to January 2021.Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

Dr. S.Jaikumar
Dr.Balram Sai prasanna
RESOURCE PERSONS

Dr.Somasekar.HS
COORDINATOR

Student Feedback Form

Course Name: Computing & Medicine

Subject Code: PH01

Name of Student: S. Monisha Roll No.: U16MB331

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:

Date: 12.01.2021

From
Dr.G.Somasundaram
Professor and Head,
Department of Pharmacology
Sri Lakshmi Narayana Institute of Medical sciences
Pondicherry

To
The Dean,
Sri Lakshmi Narayana Institute of Medical sciences
Pondicherry.

Sub: Completion of value-added course: Computing of medicine

Dear Sir,

With reference to the subject mentioned above, the department has conducted the value-added course titled: **Computing of Medicine** on **September 2020– January 2021**. We solicit your kind action to send certificates for the participants which is attached with this letter. Also, I am attaching the photographs captured during the conduct of the course.

Kind Regards

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

Dr.Somasekar.HS

Encl: **Certificates**
Photographs