

**Maharashtra University of Health Sciences,
Vani Road, Mhasrul, Nashik - 422 004**

**University Department of Interpathy Research & Technology
(UDIRT)**

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INFORMATION BROCHURE

**ONE YEAR CERTIFICATE COURSE IN
PHARMACEUTICAL MEDICINE**

IMPORTANT INFORMATION AT A GLANCE

One Year Certificate Course In Pharmaceutical Medicine

Note :- (1) Day, Date & Time of Entrance Examination. (2) Entrance Examination Centre. (3) Declaration of Result / Merit list. (4) Date of Selection Process (Counselling & Admissions). (5) Venue of Selection Process (Counselling & Admissions etc will be informed separately

**ONE YEAR CERTIFICATE COURSE IN
PHARMACEUTICAL MEDICINE
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महाराष्ट्र आरोग्य विज्ञान विद्यापीठ

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES

UNIVERSITY DEPARTMENT OF INTERPATHY RESEARCH & TECHNOLOGY

1) Introduction:-

Maharashtra University of Health Sciences, Nashik has started one year certificate course in pharmaceutical medicine in collaboration with physicians of pharmaceutical industries. This course is a professional course, approved by the University Grants Commission, New Delhi.

This will be a comprehensive training course in pharmaceutical medicine wherein, education will be provided by leading experienced teachers from University, pharmaceutical industries, regulatory authorities, academic researchers and research organizers. This would help students to expand, understand and able to participate in development of drug with efficacy & safety profile to marketing. Further, provide education in health care sector, regulatory national and international affair, legal, ethical and scientific aspects of clinical trial. This course is designed in to various following modules.

Core Curriculum for certificate course in Pharmaceutical Medicine: Based on International Federation of Association of Pharmaceutical Physicians (IFAPP), this programme consists of 7 modules the nucleus of an appropriate postgraduate course in Pharmaceutical Medicine.

2. Aims & Objectives:-

1. To strengthen a health science discipline concerned with the discovery, development, evaluation, registration, monitoring, medical aspects and marketing of Medicines for benefit of the individual patients and public health.
2. To familiarize students with Research Methodology (in animal and human) & develop research aptitude by encouraging them to undertake research projects (**basic**: laboratory based, **clinical**: often human research, **Epidemiological**: population based – survey and case control studies, **social or behavioral**: component of epidemiological research and **interventional studies**: to evaluate the impact of specific intervention on prevention / management of disease.
3. To provide a complete understanding of drug development from pre clinical to clinical.
4. To provide broad background knowledge in regulatory, legal & ethical issues.
5. To train in biostatistics, data management, monitoring and health economics.
6. To sharpen practical skills by training and by demonstrating, biochemical, and analytical experiments using modern instruments.
7. To develop ability to work independently or work in industry, research oriented institute or in office of regulatory authorities.
8. To create awareness about promotion of product & marketing of drugs in National / International market.
9. To develop scientific temper and interest by exposure through Internet, Computers, Various databases and Pharmaceutical Visits.

3. Eligibility:-

This course shall be open to students as follows:

- a) Graduates of the following systems of Health Sciences:-
MBBS, BDS, BAMS, BUMS, BHMS or any Health Science Graduate
- b) Pharmacy Graduates or higher (B. Pharm or Higher Degree)

4. Duration:-

One Year (Two Terms each of six months)

Course shall be conducted by University Dept. of Interpathy Research & Technology, MUHS Students will have to make their own residential arrangements.

5. Language of Course: - English

6. Total number of Seats: - 60 (Reservations as per State Govt. rules)

7. Nature of Course: - Interdisciplinary, full time course.

8. Fee structure:-

Sr. No.	Particulars	Fee for one year
1.	Eligibility Fee	5,000.00
2.	Tuition Fee	45,000.00
3.	Library Fee / Year	500.00
4.	Library Deposit	2,000.00
5.	Digital Library Fee / year	1,000.00
6.	Workshop Fee / Seminar Fee	1,000.00
7.	Identity Card Cost	100.00

8.	Exam Fee	3,000.00
9.	Caution Money	1,500.00
10.	Laboratory Fee	1,000.00
	Total Rs.	60,100/-

❖ Students will have to pay examination fees and any other fees applicable as per the latest changes made by MUHS.

10. Application Form & Information Brochure:-

1. Information Brochure along with blank Application form is available on the University website (www.muhsnashik.com). The candidates are requested to download the application form and send it along with a D.D. of Rs. 500/- in favor of "Registrar, MUHS, Nashik". D.D. should be drawn on any Branch of Nationalized bank payable at Nashik. The envelop should be superscripted with "Certificate Course One Year Certificate Course in Pharmaceutical Medicine"
2. The application form must be filled by the candidate in his / her own handwriting using black ball point pen and submit it on or before last date of submission of the application forms on the following address:

"The Registrar, Maharashtra University of Health Sciences, Vani Road, Mhasrul, Nashik - 422 004".

Note : An incomplete application form will be rejected.

- 1 Following attested photocopies are required to be submitted along with the application form:
 1. Nationality Certificate OR Valid Passport
 2. SSC Board Certificate (Certificate of age)
 3. HSC Mark sheet
 4. Equivalence Certificate from A.I.U. for NRI (if applicable)
 5. Physical fitness Certificate

6. Bonafide Certificate from Dean / Principal of the college (if applicable) OR Gap affidavit on stamp paper of Rs. 20/-
7. College leaving Certificate (Transfer Certificate)
8. Internship Completion Certificate (if applicable)
9. First to Final Year Degree Mark sheet & P.G. Degree Mark sheet (Mandatory) in case of candidates having P.G. Degree
10. Degree Certificate / Passing Certificate.
11. Registration Certificate from council (MMC, State Council, MCI, DCI, CCIM, CCH)
12. Certificate of additional Qualifications.
13. Affidavit for change of Name (Marriage Certificate/ Copy of Govt. Gazette.....if applicable)
14. Caste Certificate
15. Caste Validity Certificate
16. Creamy layer certificate
17. Migration certificate issued by respective Board / University (if applicable)

11. SCHEME OF ENTRANCE EXAMINATION (screening test):-

Syllabus & Rules for Entrance Examination

Multiple choice questions shall be based on **the General knowledge related to health sciences.**

- Students have to appear for objective type Entrance Examination.
- The examination will be conducted at Nashik.
- Date of Examination, Time & Venue shall be informed on University web site.
- Language of entrance examination shall be English.

- The examination shall consist of common objective type question paper of 100 marks containing 50 questions, and duration of examination shall be one hour.
- The candidate will be required to mark the correct answer by black / blue ball point pen in the given objective question booklet.
- Each correct answer will be given two marks. There shall be no negative marking.
- Scratching, overwriting, multiple answers and hand written answer will be considered as wrong answer and no marks will be allotted to them.

12. Declaration of Result / Merit list:-

Merit list shall be prepared of only those candidates securing 50% or more marks in open category and 45% or more marks in reserved category. The merit list will be displayed on the university website

Tie-Breaker :-

In case of equal marks in Common Entrance Test the following procedure shall be adopted for deciding the merit.

First level :-

The candidate with more aggregate marks (converted into percentage upto 2 decimal points) at HSC.

Second Level :-

The candidate with more aggregate marks (converted into percentage upto 2 decimal points) at Final year examination of the respective course.

Third Level :-

If the tie still persists then an older candidate will be preferred over the young candidate.

13. Selection Process:-

- The candidate will be called for interview as per category wise merit list.
- Date of interview will be informed on the web site.
- The allotment of seats shall be made to the successful candidate as per merit list. Merit list will be prepared in accordance with the State Govt. rules / norms.
- The candidate who will not appear for the interview on the notified date in person his selection shall be considered as cancelled and such candidate shall lose his seat.
- Eligibility of candidate will be finalized after verification of all original documents.
- The candidate is required to take admission within one week of issuing a letter of selection; he has to pay the fees as mentioned in point no.8.
- Seats that have been fallen vacant shall be filled in subsequent rounds and displayed on the Notice board of UDIRT and the official website.
- Decision of selection committee shall be final.

14. Disqualification for Admission:-

- A candidate who has already taken admission in to P.G. course in other subject or faculty will not be eligible for admission.
- Selected candidates who have cancelled their admission or do not take admission within stipulated period they shall not be eligible for admission in future.

15. Attendance:-

80% attendance is compulsory failing which students will not be allowed to appear for the examinations. Doctor's certificate is necessary if absence is due to illness.

16. Accommodation:-

Students have to make their own residential arrangements when they are posted in Nashik

17. Conduct of Course:-

- The Candidate admitted in this fulltime course shall have to remain in institute for full day.
- The candidate admitted in this course will not be allowed to work in any other institute or will not be allowed to work as a medical practitioner part / full time.
- The student while studying in this PG course, if found indulging in antinational activities, unlawful activities or ragging in any form, will be liable to be expelled from the department by the competent authority.
- It is responsibility of each student to have proper documents.

18. Certificate:-

After successful completion of the course, Certificate shall be awarded by the Maharashtra University of Health Sciences, MUHS (Nashik.)

19. Teaching Schedule, Modules and Evaluation:-

Annual Theory examination shall be conducted by the University Department of Interpathy Research & Technology at Nashik. In each form six month.

20. Academic Calendar of the Course

Module No.	Name of Modules	No. of lectures (In hrs)	Practical (In hrs)
1	Preclinical (Animal) Studies, Safety and Toxicity Testing	80	
2	General Pharmacology and Clinical Pharmacology	70	
3	Drug Safety	70	
4	Clinical Drug Development, Ethical and legal Requirement	70	

5	Biostatistics and Data Management	70	
6	Discoveries of new medicines & pharmaceutical medicine (pharma perspective)	70	
7	Drug Development From Herbal Sources	70	
	Total (700 hrs)	500	200

**No. of lecture Hours (500 hrs) + Hospital Visits & Projects (400 hrs)
+ Practicles 200 hrs) Total = 1100 hrs.**

21. Infrastructure

Facilities Available :

➤ Hospital Training

➤ Teaching Staff of UDIRT : **Medical** - Director-Professor

Professor

➤ **Medical** : Three Lectures

Paramedical : One Associate Professor

One Lecturer

➤ **Technical Staff** :

➤ One Senior Research Officer

➤ Two Junior Research Officer

➤ Two lab. Technician

➤ Laboratory Facility

➤ Library Facility (Conventional)

22. Core Curriculum and Syllabus

MODULE: 1 PRECLINICAL (ANIMAL) STUDIES, SAFETY AND TOXICITY TESTING

Core Curriculum

- The choice & predictive value of tests for acute, chronic, reproductive & genetic toxicity.
- Non-clinical drug safety evaluation.
- Common mechanism of damage to organs; their detection & elucidation.
- Toxicological Report writing.

Syllabus

- ❖ The fundamental differences and similarities between the pharmacology, and toxicology of compounds and their metabolites in animals and man and their qualitative and quantitative assessment.
- ❖ The purpose of descriptive and quantitative *in vitro* and *in vivo* testing.
- ❖ The choice of and the predictive value of these tests for acute, chronic, reproductive and genetic toxicity, carcinogenicity.
- ❖ Systemic toxicology, common mechanisms of damage to organs and their detection or elucidation.
- ❖ Preclinical Screening Methods
- ❖ The scheduling of toxicological tests linked to development plans, to regulatory needs, to human and animal pharmacology, and intended clinical use and route(s) of administration.
- ❖ The size, cost and administration of a toxicological programme, its data management and its quality assurance, and report writing.
- ❖ The regular review of toxicology, its inclusion into clinical trial protocols and brochures, and the appropriate planning of and correlation with the clinical evaluation of potential and observed toxicity in patients.
- ❖ Preclinical safety evaluation of biotechnology-derived pharmaceuticals
- ❖ Preclinical safety Pharmacology of the immune system.

MODULE: 2 GENERAL PHARMACOLOGY AND CLINICAL PHARMACOLOGY

Core Curriculum

- Drug Receptors, Pharmacokinetics and metabolism, Pharmacodynamic
- Pharmaceutical Development - formulations, manufacture and supply of materials, labelling and presentation, stability and storage, purity, compatibility, disposal
- Therapeutics
- Use of drug in vulnerable population
- Over dosage and treatment of poisoning
- Patient compliance and information
- Therapeutic Drug Monitoring

Syllabus

- ❖ Management of common acute and chronic diseases
- ❖ Major drug classes including biologicals
- ❖ Measurement of drug effects
- ❖ Adverse drug reactions
- ❖ Benefit: risk
- ❖ Prescribing for particular populations e.g. children, elderly, pregnant and breast feeding women, patients with renal or hepatic impairment
- ❖ Controlled drugs and drug dependence

Clinical Development

- ❖ Assessment of preclinical data
- ❖ Planning of studies in Exploratory Development

- ❖ Use of biomarkers and pharmacodynamic endpoints, dose-response
- ❖ Pharmacokinetics, ADME and pharmacokinetic/pharmacodynamic models
- ❖ Drug abuse and dependence
- ❖ Non-therapeutic drug use
- ❖ Life and Storage Safety of Medicinal Products

- ❖ Clinical Pharmacokinetics
- ❖ Concepts – half-life, volume of distribution, clearance
- ❖ Bioavailability and Bioequivalence
- ❖ Drug-Drug and Drug-Disease Interactions (Extrinsic factors)
- ❖ Studies in different populations (Intrinsic factors)
- ❖ Pharmacogenetics
- ❖ Population pharmacokinetics

- ❖ Applicability of pharmacokinetics to dosage regimen and study design
- ❖ Pharmacoeconomics

MODULE: 3 DRUG SAFETY

Core Curriculum

In vitro and in vivo testing.

- ❖ Toxicology: dose-range finding, GLP studies, requirements to support exposure in humans, safety testing of topicals, immunotoxicity, genotoxicity, carcinogenicity, and reproductive toxicity
- ❖ Safety Pharmacology
- ❖ Studies of drug metabolism to predict interactions
- ❖ Implications of findings to studies in humans

Syllabus:

Clinical Trials

- ❖ Planning of Clinical Trial programme – use of preclinical and Phase I data
- ❖ Study types and designs
- ❖ Documentation - protocols, reports, source documents, case report forms, study master file, investigator's brochure
- ❖ Contractual arrangements with investigators and contract research organizations
- ❖ Study conduct
- ❖ Quality control and quality assurance
- ❖ Adverse Events and Serious Adverse Events – definitions, collection, reporting assessment, coding
- ❖ Interpretation of study design, analysis and results

Adverse Drug Reactions

- ❖ Classification of Adverse Reactions, idiosyncrasy, accidents
- ❖ Adverse Events and Serious Adverse Events – definitions, collection, reporting, assessment, coding, ICH and CIOMS
- ❖ Mechanisms, predisposing factors in health and disease
- ❖ Dosage, Cumulation, Interactions
- ❖ Assessment of evidence and management
- ❖ Reporting
- ❖ Carcinogenicity and Genotoxicity
- ❖ Prevention

Regulation

- ❖ Dear Dr Letters and Withdrawal of products
- ❖ Regulatory strategy
- ❖ IND
- ❖ FDA Medical Device Regulation
- ❖ The Practice of Regulatory affairs
- ❖ Medicine regulation in India, UK, USA, Japan
- ❖ Clinical Trial Regulation- IND, EU Directives
- ❖ GMP

Pharmacovigilance

- ❖ Methods and ethics of adverse event monitoring, post-marketing surveillance, spontaneous reporting, Safety Assessment of Marketed Medicines, Periodic Safety Update Reports (PSUR), Causality Analysis,
- ❖ Benefit-risk assessment, AE, VAERS
- ❖ Pharmacovigilance Method
- ❖ Global Monitoring, - WHO Programme

- ❖ Drug Withdrawal from market- Causes and Consequences

Pharmacoepidemiology

- ❖ Pharmacoepidemiological Method

MODULE: 4 Clinical Drug Development, Ethical and Legal Requirements

Core Curriculum

- Overall approach to clinical trials
- Ethical guidelines
- Interpretation of safety & efficacy data
- Issues & problems of clinical data interpretation
- Interpretation of study design, analysis and results

Syllabus:

- ❖ Populations for exploratory studies - healthy volunteers and patients
- ❖ Phases of clinical trial
- ❖ Clinical Trial Designs
- ❖ Developing & writing clinical protocols
- ❖ Preparation of clinical trial documents (CRF, PIS, Consent form & Study logs)
- ❖ Ethics – principles, peer review, informed consent, Declaration of Helsinki
- ❖ Regulation
- ❖ Studies - objectives, design, conduct and analysis, choice of site
- ❖ Tolerability and safety studies

MODULE: 5 BIO-STATISTICS AND DATA MANAGEMENT

Core Curriculum

- Principles & techniques of statistical analysis
- Methods of data collection
- Analysis of efficacy end-points of safety study
- Sample size calculation

Syllabus:

The purpose and fundamentals of statistics

Sources and Presentation of data

Variability and its measures

Normal Distribution and Normal curve

Sampling

Chi- Square Test

Correlation and Regression

Trial design, hypothesis testing, power

- ❖ Pre-trial decisions and specification
- ❖ Risk factors, confounding variables
- ❖ The null hypothesis, Type I and II errors, significance, power

Measurement and types of data

- ❖ Standardisation
- ❖ Variations in biometry in population, in disease

Measurement and types of data

- ❖ Standardization
- ❖ Variations in biometry in population, in disease

Types of analysis

- ❖ Analysis of efficacy end-points and of safety

- ❖ Paired and non-paired tests, parametric and non-parametric tests, confidence limits
- ❖ Handling of rating and visual analogue scales, patient diaries and laboratory values

Interpretation of study design, analysis and results

- ❖ Assessment of violations, withdrawals, errors, bias
- ❖ Statistical principles and issues in report writing: data manipulation, transposition, merging
- ❖ Clinical interpretation of trial
- ❖ Final report writing and formatting for registration dossier and publications

Data collection and management

- ❖ Options for data collection (manual and electronic)
- ❖ Creation, maintenance and security of databases, software validation and archiving
- ❖ Data management from clinical trials: corrections, computer capture, verifications and extraction
- ❖ Within-trial decisions, data management, extraction and manipulation
- ❖ Formation of Project team
- ❖ Project set up
- ❖ Data Processing, Data Entry
- ❖ Disaster Recovery Plan
- ❖ Internet Database
- ❖ Data Mining

MODULE: 6 DISCOVERIES OF NEW MEDICINES & PHARMACEUTICAL MEDICINE (Pharma Perspective)

Core Curriculum

- The philosophy behind and organization of research
- Pharmaceutical medicine is a medical specialty
- Basic chemical & structural research
- Integrated drug discovery R & D process & drug development
- Receptor-based approaches, agonists, antagonists, enzyme inhibitors, genomics, proteomics
- Sub specialization in pharmaceutical medicine

Syllabus

- An appreciation of the elements necessary in the integrated development of a new medicine at a corporate and international level and within the medical research functions.
 - The strategic, tactical and operational issues and options, and the practical management of projects by critical path analysis;
 - The organization of a programme of clinical trials from conception to finalization of written reports and compilation of the clinical section of a registration dossier with the use of planning, tracking and reporting techniques.
 - The selection of a drug candidate, its perceived therapeutic indications and efficacy end-points. The supporting information needed before administration to man.
 - Training Monitoring and Auditing, of clinical trial
-
- Drug Discovery : Design and Serendipity
 - Pharmaceutics
 - Patenting new active substances
 - Lead optimization and candidate selection of molecules for exploratory human investigation
 - In vitro and in vivo testing of new compounds
 - Relationship between animal and human pharmacology

MODULE: 7 DEVELOPMENT OF DRUG FROM HERBAL SOURCES

Core Curriculum

- Isolation, extraction and phytoanalysis
- Standardization and its necessity
- Botanical standards : markers or active compounds
- Herbal dietary supplements
- Problems in development of drug from herbal sources
- Advances in preclinical and clinical studies with herbal products
- Regulatory guidelines

Syllabus :

- ❖ Brief history of medicinal use of herbal / botanical products
- ❖ Identification of herbal drug
- ❖ Principles of standardization of herbal/ botanical product, markers, finger printing
- ❖ Classification of herbal drugs
- ❖ Quality assessment of herbal drugs
- ❖ Regulatory aspect in herbal drug development
- ❖ Safety assessment of herbal drug

iii) Practicals & Syllabus: i) Study Period:

- One year certificate Course comprising of Two Terms
- This course will run in - Ist and IInd Term at MUHS, Nashik

ii) Lectures & Seminars:-

- ❖ Lecture on course orientation and basic training in allopathic Preclinical Para-clinical and Clinical subjects.
- ❖ Lectures in modular form
- ❖ Seminar presentation: - Individual or in group.

A	CASE STUDIES
B	SHORTS PROJECTS
C	DEMONSTRATIONS
D	EXERCISES
E	PHARMA INDUSTRY VISITS

23) Final Exam Schedule

Annual Examinations	500 Marks
Theory Papers (3 x 100)	300 Marks
Practical + Oral (100 + 50)	150 Marks
Log Book + Attendance (15 + 10)	25 Marks
Short Project	25 marks

24. Nomenclature of Papers and Marks

Paper	Nomenclature	Marks per Paper
I	Module 1 - Preclinical (animal) studies, safety and toxicity testing Module 2 – General and Clinical Pharmacology	100
II	Module 3 – Drug Safety Module 4 – Clinical Drug Development, Ethical and legal Requirement	100
III	Module 5 – Biostatistics and Data Management Module 6 – Discovery of New Medicines, Pharmaceutical Medicine (pharma. perspective) Module 7 - Development Of Drug From Herbal Source	100

25) Examination Scheme:-

One Year Certificate in Pharmaceutical Medicine will be conferred to a participant who succeeds in University examination by obtaining 50% marks in each heading.

- a) Written examination (Three papers 100 Marks for each paper (**Total Marks 300**)
Three papers at the end of second term (after completion of course)
- b) Practical examination+ Log book + Attendance: (**Total 100+15+10 marks**)
- c) Short Project work will start from first term itself and will have to be submitted 6 weeks prior to final examination (**Total for Short Project 50 Marks**)

50% passing under each heading (Examination shall be at the end of the year)

At a glance (Examination Scheme):

	Theory	Practical + Oral	Log Book + Attendance	Short Project	Total
Marks	300	100 + 50	15 + 10	25	500

LOG BOOK : (15)

ATTENDANCE : (10)

Rules for Attendance :

- < 80% not eligible to appear for exam**
- =80-85% -- 6 marks**
- >85-90% -- 8 marks**
- > 90 % -- 10 marks**

26. Future Prospects:-

This course will help the candidate to develop career & choice in future in the sphere of pharmaceutical companies, regulatory bodies, research organizations. Further, this course will also be useful in starting an independent contractual research unit. Candidates will have an excellent opportunity to acquire a University Certificate, which will provide a platform to step into the pharmaceutical world or enter into the field of national or international research.

27. Future Plans (UDIRT):-

In coming years, UDIRT is planning to start following courses

1. Specialization in particular Module (Short Term Course)
2. Ph. D. in Pharmaceutical Medicine

28. Reference Books:-

BASICS OF ALLOPAHIC SUBJECTS, DRUG DEVELOPMENT : PRECLINICAL, CLINICAL PHARMACOLOGY & DRUG DEVELOPMENT : CLINICAL		
Sr.No.	Name of Books	Author
1)	Pharmacology	H.P. Rang & M.M. Dale
2)	Essentials of Medical Pharmacology	K.D. Tripathi
3)	Text Book of Pharmacology – (Essentials of Pharmacotherapeutic)	F.S.K. Barar
4)	Clinical Pharmacology	P.N. Bennett M.J. Brown
5)	Goodman and Gillman's: The Pharmacological Basis of Therapeutic J.G. Hardman, L.E. Limbird 11th Edition.	Brunton Lawrence: Lazo John, Parker
6)	Pharmacology and Pharmacotherapeutics	R.S. Satoskar, N.N. Rege, & S.D. Bhandarkar
7)	Quintessence of Medical Pharmacology	S. K. Chaudhari
8)	M.C.Q.S in Pharmacology	K.D. Tripathi
9)	Guide to Clinical Trials	Bert Spilkar
10)	Drugs Benefit & Risk	Van
11)	Vogel's Text book of Pre-Clinical Pharmacology	Vogel's

CLINICAL PHARMACOLOGY & DRUG DEVELOPMENT		
23)	Hutchison's clinical Methods	Swash Michael
24)	Harrison's principles of internal medicine Vol - I & II	J. D. Wilson
25)	Medicine for Student's-A Hand Book for the practitioner	Asif Golwalla Sharukh Golwalla
26)	Davidson's Principles & practice of Medicine	N. A. Boon Nicki R. Colledge Brian R. Walker John A. A. Hunter

27)	Cecil Text Book of Medicine Vol – I, II	Lee Goldman Dennis Ausiello
28)	A Text Book of Medicine 9 th Ed. 1994 Vol-I , II	Sainani
29)	Clinical Medicine	Kumar & Clark
30)	Preventive & Social Medicine 19 th ed. 2007	Park
31)	Clinical Epidemiology & Evidence Based Medicine	Kalz
32)	Designing Experiment & Analysing Data	Scotte, Maxwell
33)	Forensic Medicine & Toxicology	Parikh
34)	Textbook of Pharmaceutical Medicine	Griffin
35)	Principles & Practice of Pharmaceutical Medicine	Fletcher Edward
36)	Clinical Pharmacology	Katzung

BIOSTATISTICS		
	Medical Biostatistics	Abhay Indrayan
	Fundamental of Biostatistics	Bernard Rosner
	Primer of Biostatistics	Stanton A. Glantz
	Statistics Method for Clinical Trials (Biostatistics)	Mark X. Norleans
	Medical Statistics at a Glance	Aviva Petrie
42)	Basic Epidemiological methods and Biostatistics : A Practical Guide book	Randy M. Page
43)	Essentials of Medical Statistics	Betty Kirkwood
44)	Basic & Clinical Biostatistics	Beth Dawson
45)	Introduction to Biostatistics & Research Methods	P. S. S. Sundrao

LEGAL, ETHICAL & REGULATORY ISSUES		
46)	Guide to Clinical Trials	Bert Spilker
	Patent Act 1970 & Patent Rules 1972 with short Notes	EBC
	Pharmacy Act 1948 with short note	EBC
	Drug & Cosmetic Act 1940 & Drug & Cosmetic Rules	Malik Vijay

Analytic Methods, QC & QA		
50)	Vogle's :- Textbook of Quantitative Chemicals Analysis	J. Mendham , M.J. Thomas
51)	Jenkins :- Quantitative Pharmaceutical Chemistry 7 th Ed.	Adelbert M. Knewel , Frank E. Degangi
52)	Pharmaceutical Analysis Vol – 1 & 2	Dr. K.R. Mahadik Dr. S. G. Wadodker
53)	Pharmaceutical Biochemistry (Theory & Practice)	P. K. Sharma & P. C. Dandiya
54)	Textbook of Medical Laboratory Technology 2 nd Ed.	Prafulla Godkar & Darshan Godkar
55)	Medical Laboratory Technology (A Practical Manual for Routine Diagnostic) Vol – I, II, III, 8 th Ed.	Talib N. H
56)	Identification of Drugs in Pharmaceutical By thin layer Chromatography in Pharma	Sethi P. D
57)	Text book of Quantitative Chemical Analysis 6 th Ed.	J. Medham , M. J. Thomas
58)	Medical Laboratory technology (A Practical Manual for Routine Digno) Vol – I, II & III	Tanai Mukharji
59)	Hand book of Chromatography Vol – I & II	Toshiko Hanat
60)	Practical Pharmaceutical Chemistry Vol – I & II	Beckett & Stenla
61)	Analytical Chemistry	Christian G.D
62)	Instrumental Methods of Chemical Analysis	Chatwal Anand
63)	Pharmaceutical Analysis Vol – I & II	K.R.Mahadik , S.G. Wadodkar
64)	Inorganic Qualitative Analysis	A.H. Becketts & Stenle

PREPARED BY:-

Mr. Avinash S. Khairnar (Lecturer, UDIRT)

Officer On Special Duty

Director-Professor

Registrar

Vice Chancellor