CENTRAL COUNCIL OF INDIAN MEDICINE

SYLLABUS OF
POST-GRADUATE DIPLOMA
(Ilmul Saidla-Pharmacy)

2 YEARS DIPLOMA COURSE

CENTRAL COUNCIL OF INDIAN MEDICINE
61-65, INSTITUTIONAL AREA,
JANAKPURI
NEW DELHI - 110058

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(existing)
AIMS AND OBJECTIVES

The objective of the course is intended to produce skilled Pharmaceutical professionals to meet out the requirements Unani pharmaceutical industries, manufacturing units and supervision of dispensaries of hospitals and public healthcare services. The course is meant for those who wish to work in the manufacturing/production of Unani/ herbal drugs, analysis and pharmaceutical product development.

The course of study & Examination: Two academic years (Regular course) with each academic year spread over a period of not less than 180 days.

Minimum educational qualification required for the course: B.U.M.S.

Criteria for admission: through competitive examination

Medium of instruction and examinations: Urdu substantiated by English scientific terminology

Scheme of examination: Annual examination system

Part-I----- 3 papers (1\textsuperscript{st} year) Examination will be held at the end of first academic year after admission

Part-II----- 3 papers + Dissertation + Apprenticeship (one month) (2\textsuperscript{nd} year) Examination will be held at the end of second academic year.

Number of Papers and Maximum Marks for Theory & Practical examinations:-

<table>
<thead>
<tr>
<th>Part I - (FIRST YEAR)</th>
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<tbody>
<tr>
<td><strong>Name of Subject</strong></td>
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<tr>
<td>Ilmul Saidla-I</td>
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<tr>
<td>(General aspects of Pharmacy)</td>
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<tr>
<td>Ilmul Saidla-II</td>
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<tr>
<td>(Pharmaceutical Developments and its Application in Saidla)</td>
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<tr>
<td>Ilmul Saidla-III</td>
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<td>(Pharmacognosy- Part A &amp; Basic Pharmacology- Part B)</td>
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Part-II (SECOND YEAR)

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<tr>
<th>Subject</th>
<th>No. of hours for Teaching (Theory &amp; Practicals)</th>
<th>Details of Maximum Marks (Theory + IA) 80 + 20</th>
<th>Practical Marks</th>
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<tbody>
<tr>
<td>Ilmul Saidla-IV (Pharmaceutical Management- Part A, Regulatory Aspects- Part B and Hospital Pharmacy)- Part C</td>
<td>180</td>
<td>100</td>
<td>100</td>
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<td>Ilmul Saidla-V (Quality Control and Quality Assurance)</td>
<td>180</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Ilmul Saidla-VI (Cosmeceuticals Part A, Neutraceuticals-Part B and Calcinology Part-C)</td>
<td>180</td>
<td>100</td>
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<tr>
<td>Project work/Dissertation</td>
<td>-</td>
<td>-</td>
<td>200</td>
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<tr>
<td>Apprenticeship</td>
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Examinations:

- Every examination shall consist of one theory including Internal assessment and one Practical, including oral examination in subject.

- **Pattern of written examination:** Total Marks = 100 (Theory = 80 + Internal Assessment = 20)

- **Pattern of Practical examination:**
  1. Practical Record book/Herbarium Sheet 20
  2. Practicals/ Spotting 30
  3. Viva-voce 50

  **Total 100 Marks**

- **Marks allotted to Project work (Dissertation) : 200**
- Each examination shall have three hours duration.
- There shall be supplementary/second examination which will be held within three months after annual examination.
- The student shall have to pass PG Diploma course within a span of four years otherwise his admission to the course may deemed to be cancelled.
- Passing marks in each subject will be 50% separately in theory and practical examinations. Distinction will be awarded for 75% in a paper.
Pattern of minimum teaching staff for PG Diploma course shall be in the following manner:-

(1) The requirement of minimum teaching staff to run a PG Diploma Course shall be three teachers (one HF + one LF of UG) and additionally one LF for PG Diploma Course.

(2) In order to imparting effective teaching of the subject(s) related to Modern Pharmaceutical Science teachers on contractual basis/part time/adjunct faculty may be appointed or assigned the teaching as per the requirement.

- Pharmaceutical chemistry
- Modern Pharmacy/Pharmaceutics
- Pharmacognosy
- Pharmacology

Dissertation: Every student of PG Diploma Course shall carry out work on an assigned project aimed at contribution to the development of Ilmul Saidla under the guidance of a teacher i.e. supervisor, the result of which will be written up and submitted in the form of a dissertation before the end of academic term (one month before final examination). Every dissertation will be examined/evaluated for the defined marks (200) by an external examiner. The topic for Project/dissertation will be allotted in the beginning of second year by the Department.

Apprenticeship: The student of PG Diploma course shall have to undergo apprenticeship with licensed herbal/Unani pharmaceutical units’ atleast for one month. In the course of practical training the trainee should have expose to the manipulation of pharmaceutical apparatus in common use and storage of drugs and their preparation and dispensing etc.
ILMUL SAIDLA-I (GENERAL ASPECT OF PHARMACY)

1. Brief introduction to History, scope and development of Saidla with special reference to the contribution of pioneers of Ilm-ul-Saidla in different periods.

2. Concept of Pharmacopoeia (Qarabadeen) and Formulary
Knowledge on Pharmacopoeias with special reference to Unani Pharmacopoeia of India, National Formulary of Unani Medicine, Indian Pharmacopoeia, British Pharmacopoeia, nited States Pharmacopoeia and International Pharmacopoeia.

3. Posology – Auzane-e-Advia (Metrology- System of weight and measures along with old weighing system): Dose and Dosage of drugs, Factors influencing dose, Calculations of doses on the basis of age.

4. Introduction to Pharmaceutical terminologies and scientific interpretation of Amaliyate Dawasazi (Pharmaceutical Procedures): Irgha (Removal of Froth), Tarveeq (Clarification), Tareeq (Distillation), Taqteer (Distillation), Iqla (Salt preparation), Tashvia (Roasting), Tabkheer, Tadkheen (Fumigation), Tadheen, Tajfeef (Drying/Siccation), Ghasl (Washing), Tasafia (Cleaning process), Tasveel (Decantation), Ihraq ( Burning, Inceneration), Taklees (Calcination), Tahmees (Torrefaction), Izala Laun (Removal of colours), Itfa (Quenching), Sahaq (Grinding), Tahleel (Dissolution), Taqtee (Cutting), Nakhl (Sieving), Taseer (Squeezing), Tarshveh (Filtration), Tahbeeb (Granulation), Takhmir wa Taafin (Fermentation), Taseed (Sublimation).

5. Introduction and methods of preparation of different classical dosage forms using novel techniques. Classification of classical dosage forms- solid, semisolid, liquid and Gaseous dosage forms; and need of improvisation.
   (i) Jamid Ashkale Advia (Solid Dosage forms): Habb (Pill), Qurs (Tablet)
   (ii) Sufoof Sazi (Powdering): Classification of powder and its grades.
   (iii) Sayyaal Ashkale Advia (Liquid Dosage forms): Theoretical aspects including commonly used badarqa (vehicle). Review of the following liquids with detail method of formulation. Arqiyat, Sharbat, Joshanda, Khaisanda, Zulaal, Sikanjabeen, Nabeez, Sirka, Qatar, Wajoor, Roghan, Huqna, Tila etc.
   Method of preparation of Qiwm (sugar syrup) and materials used for it and measurement of consistency.
   (iv) Haleeb (Emulsion): Types, identification of emulsion system, formulation, selection of emulsifying agents, Instabilities in emulsions, Preservation of emulsions, Evaluation of emulsion. Study of emulsifying equipments like Silverson mixer emulsifier, Laboratory emulsifier etc.
7. Nim-jamid Ashkale Advia (Semi Solid Dosage Form):

(a) Marham (Ointment): Types, Preparation and stability of ointments by the following processes: (i) Trituration (ii) Fusion (iii) Chemical reaction (iv) Emulsification.

(b) Zimaad (Pastes): Difference between ointments and pastes, bases of pastes. Preparation of pastes and their preservation.

(c) Majoon, Itreefal, Jawarish, Khameerah, Laooq, Gulqand


10. Method of preparation of johar, usara, rub and sat.

11. Extraction of oils with novel techniques

12. Labelling instructions and precautions while dispensing various dosage forms

PRACTICALS

Preparation of following classes of products involving the use of calculations in metrology (at least one product from each category wherever applicable):

1. Arqiyat, Mahlool (Solution), Muffarihat (Elixir), Lotions, Zimad (Paste), Mucilage, Qurs (Tablet), Sufuf (Powder) and Capsules. Sharbat (Syrup), Majoon (Electuary), Khamira (Fermented confection), Laooq (Linctus electuary), Jawarish, Joshanda (Decoction), Khaisanda (Infusion), Emulsions (Haleeb), Suspension (Mazeej), Tila (Liniment), Marham (Ointment), Qairuti (Paste specially used on Thorax), Shayaf (Suppository), Farzajah (Vaginal Suppository), Nabeez, Sibgha (tincture) etc.

2. Visit to GMP certified manufacturing units.
ILMUL SAIDLA-II (PHARMACEUTICAL DEVELOPMENTS AND ITS APPLICATION IN ILMUL SAIDLA)

1. Detailed knowledge of ancient and contemporary pharmaceutical instruments used in Unani Pharmacy
   Khural, Aalae Tareeq, Patal Jantar, Jaljantar, Sieves, Granulator, Tablet making machine, Coating machine, Grinders, Distillation apparatus, Desiccator, Oven, Crucibles, Boota.


   ii) Different methods of size reduction, study of Hammer mill, Cutter mill, Roller mill, Ball mill, Fluid energy mill and disintegrator.

   iii) Various methods and equipments employed for size separation e. g., sieving, sedimentation, centrifugal elutriation, microscopic methods.

4. Mixing and Homogenization: Theory of mixing: solid-solid, solid-liquid, liquid-liquid and semisolid mixing. Study of different types of mixers used in pharmaceuticals such as Planetary mixers, Sigma mixers, Turbo dispensers, Double cone mixers, Colloid mill, Triple roller mill, Magnetic stirrer.

5. Clarification and Filtration: Definitions, theory and factors affecting filtration and clarification, types of filter media, filter aids, and selection of filters.


   Distillation: Importance of distillation in Pharmacy, methods of distillation.

   Brief introduction to freeze drying, sublimation, desiccation.

7. Extraction of Drugs: Introduction to extraction processes, classification of extraction like liquid-liquid and solid liquid extraction. Theory of extraction of drugs, properties of solvents used for extracting drugs and different process involved in the extraction like maceration, percolation, digestion, expression, decoction.


   Brief introduction to freeze drying, sublimation and desiccation.


   Evaluation of the efficiency of sterilization methods. Equipments employed in large scale sterilization. Examples of the materials sterilized by different methods, sterility indicators.

11. Processing of Capsules: Introduction, Types and different sizes of capsules.

- **Hard gelatin capsules**: Formulation of shell and contents, capsule production, filling operation and equipment employed.
- **Soft gelatin capsules**: Manufacturing, processing and quality control.

12. Packaging technology: Materials used, unit dose and multi dose packaging, strip and blister packaging and materials. Packaging of solid, liquid, parenterals and ophthalmic dosage forms. Stability aspects of packaging. Qualities of the package, choosing the form of package, hazards encountered by the package and protection by the package.

**PRACTICALS**

**Demonstration of equipments (working procedure) for**

i) Size Reduction and size separation
ii) Mixing and homogenization
iii) Clarification and filtration
iv) Evaporation
v) Distillation
vi) Extraction
vii) Tablet coating

**Evaluation of Dosage Forms**

1. **Tablet**
   1. Disintegration
   2. Friability Test
   3. Dissolution
   4. Hardness
   5. Powder Flow
   6. Weight Variation

2. **Semisolid Dosage Forms**
   1. Moisture content
   2. Sugar content
   3. Viscosity
   4. Specific Gravity

3. **Liquid Dosage Forms**
   1. pH Value
   2. Specific gravity
   3. Determination of refractive index
   4. Viscosity
ILMUL SAIDLA-III (PHARMACOGNOSY & BASIC PHARMACOLOGY)

PART A: PHARMACOGNOSY

1. Introduction to Pharmacognosy and Plant Nomenclature.
2. General principles of good cultivation, collection, storage and lab practices and shelf life of raw materials
3. Factors affecting the quality of drugs.
4. Deterioration of stored drugs.
5. Identification of crude drugs/ single Unani drugs.
   Morphology of Root, leaf, stem, fruit, seeds, flowers and its types.
   Anatomical Studies: Microtomy, Powder study,
   Quantitative Microscopy: Stomatal number, Stomatal index, Pallisade ratio, Vein islet no.
6. Alkaloids and alkaloid containing drugs: Kuchla, Ergot, Suranjan, Afyoon, Afsanteen, Asrol
7. Glycosides and glycoside containing drugs: Revand, Senna, Sibr, Squill, Digitalis
8. Volatile oil & Resin containing drugs: Ustokhuddus, Eucalyptus, Zeera, Darchini Anisoon
11. Tannin containing drugs: Halela, Balela, Ashok chhal, Katha, Sandal Surkh, Arjun chhal

PART B: BASIC PHARMACOLOGY

1. Definition, scope and branches of pharmacology. Historical development with special reference to India.
2. Routes of drugs administration and drug delivery systems.
3. Pharmacodynamics of drugs.
4. Pharmacokinetic parameters employed in the use of drugs, their bioavailability and biotransformations, metabolizing enzymes as targets of drugs action (induction and inhibition).
5. Mechanisms of drugs action, drug receptors and cellular signaling systems.
6. Drug antagonism and synergism.
7. Drug dependence and related conditions.
8. Adverse drug effects and their monitoring, Iatrogenic diseases.
9. Pharmacovigilance and its status in India, with reference to Unani drugs.
PRACTICALS

1. Organoleptic identification of ten medicinal plants
2. Morphological identification of any five families mentioned in the theory.
3. Anatomical characteristics and dissection of root, stem and leaf of two medicinal plants
4. Floral formula and floral diagram of five medicinal plants
5. Qualitative chemical tests of phytoconstituents.

Second Year

ILMUL SAIDLA-IV (PHARMACEUTICAL MANAGEMENT, REGULATORY ASPECTS AND HOSPITAL PHARMACY)

PART A: PHARMACEUTICAL MANAGEMENT

1. Drug House Management – Selection of Site, Space Lay-out and legal requirements.
2. Importance and objectives of Purchasing, selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto. Codification, handling of drug stores and other hospital supplies.
3. Inventory Control – objects and importance, modern techniques like ABC, VED analysis, the lead time, inventory carrying cost, safety stock, minimum and maximum stock levels, economic order quantity, scrap and surplus disposal.
4. Sales Promotion, Market Research, Salesmanship, qualities of a salesman, Advertising and Window Display.
5. Introduction to Traditional Knowledge Digital Library (TKDL).
6. New Drug Application (NDA) and Abbreviated New Drug Application (ANDA)

PART B: REGULATORY ASPECTS

1. Good Manufacturing Practices (GMPs)
   Status and applicability of regulation, current good manufacturing practices in manufacturing, processing, packaging and holding of drugs, production and process control, ISO 9000 and other certification and accreditation.

2. Laws governing pharmacy
   ii. Factory Act 1948
   iv. Law pertaining to Drugs and Magic remedies (objectionable advertisement) Act 1954.
   v. Prevention of Food Adulteration (PFA) Act
   vi. Law pertaining to Narcotics
   vii. Consumer Protection Act 1986
   viii. Labour Act
   ix. Drug Price Control Order (Govt. of India Rules)
   x. The Indian Patents Act 1970 and Indian Patents (Amendments) Act 2005.

4. Regulatory affairs related to International Trade and Practices of Unani Drugs
5. Knowledge of US FDA and statutory regulations as applicable to plant drugs in US.

**PART C: HOSPITAL PHARMACY**

1. **Hospital Pharmacy:**
   (a) Definition
   (b) Functions and objectives of Hospital Pharmaceutical services.
   (c) Location, Layout, Supply-chain of material and men.
   (d) Personnel and facilities requirements including equipments based on individual and basic needs.
   (e) Requirements and abilities required for Hospital pharmacists.

2. **Drug Distribution system in Hospital:**
   (a) Out – patient services
   (b) In- patient services – (a) types of services (b) detailed discussion of unit Dose system, Floor ward stock system, Satellite pharmacy services, Central sterile services, Bed Side Pharmacy

3. **Procurement of stores and testing of raw materials.**

4. **Hospital Formulary System and their organisation, functioning, composition.**

5. **Computer application:** Application of computer in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital and retail pharmacy establishments.

6. **Toxicology**
   i. Definition, scope and its branches
   ii. Heavy metal poisoning, insecticide and pesticide poisoning
   iii. Drugs in Clinical Toxicity – Narcotic drugs, Barbiturates, Organophosphorus poisons.
   iv. Drug interactions
      a. Definition and introduction
      b. Mechanism of drug interaction
      c. Drug-drug interactions with reference to allopathic medicines, e.g. antibiotics, analgesics, cardiovascular drugs, gastrointestinal agents, vitamins etc.
      d. Drug-food interactions
   v. Drug dependences, Drug abuse, addictive drugs.
   vi. Safety and Efficacy of Unani formulations.
   vii. LD$_{50}$ and ED$_{50}$
PRACTICALS

Viva voce examination 100

ILMUL SAIDLA-V (QUALITY CONTROL AND QUALITY ASSURANCE)

1. Aims and Objectives of Quality Control and Standardization
2. General principals of good cultivation, collection, storage and lab practices
3. Standardization of Herbal, Mineral and Animal origin drugs:

   *Physico-Chemical Studies*
   i) **Ash Values:** Total Ash, Acid Insoluble Ash, Water Soluble Ash
   ii) **Extractive Values:** Successive Extraction, Non Successive Extraction
   iii) **Moisture Content:** Loss of Drying Method at 105 ℃, Toluene Distillation Method

   *Melting Point*

   *pH:* pH at 1% solution, pH at 10% solution

   *Constants for Fatty substances, Fats, Fixed oils and waxes:* Acid value, saponification value, iodine value

   *Chemical Analysis:* Qualitative analysis, quantitative analysis

4. Brief introduction to Analytical methods for analysis of drugs:
   ➢ **Chromatography**
   - Aims and objectives of chromatography
   - Thin Layer Chromatography
   - Paper Chromatography
   - Column Chromatography
   - Gas Chromatography
   - High Performance Liquid Chromatography
   - High Performance Thin layer Chromatography

5. Spectroscopy: Introduction, types, scope and applications


7. Determination of pesticides and Heavy metals.

8. Quality Assurance of compound formulations: Arq, Majoon, Safoof, Qurs, Kushta and other dosage forms:

9. **Powder flow properties:** Tapped density, Bulk density, Porosity, Angle of repose, Carrs’ index, Hausners’ ratio etc.

10. Detailed knowledge of Standard operating Procedures (SOPs).


PRACTICALS

Macroscopic and microscopic plant material examination

1. Organoleptic testing
2. Estimation of Foreign materials
3. Moisture content
4. Determination of Ash values- total, water soluble and acid insoluble ash
5. Specific gravity
6. Solubility- water and alcohol
7. Successive extraction
8. Determination of Rf value by TLC
9. Determination of optical density
10. Refractive index
11. pH estimation.
12. Determination of viscosity.
13. Swelling Index
15. Melting point and boiling point
ILMUL SAIDLA-VI (COSMECEUTICALS, NUTRACEUTICALS AND CALCINOLOGY)

PART A: COSMETICOLOGY
1. Concept of cosmetology in Unani Medicine
2. Important single and compound formulations used as cosmetics in Unani medicine
3. Preparation used on face: Ghaza, Ghalia, Ubtana etc
4. Preparation used on skin: Marham Cream, Lotion, Ubtana, Aabiyat, Zimad, Tila, Adhaan, Ghasool.
5. Preparation used on hair: Khizab, Camouflage
6. Preparation used in eye: Kajal, Lamelle
7. Preparation used on nails: Sibgha, Mehndi
8. Preparations used on teeth, gums and oral cavity: Sunoon, Gargara (Gargle), Mazmaza (Mouth wash)
9. Atriyat (Perfumes and Deodorants)
10. Dental and Cosmetic Preparations: Introduction to Dentrifices, Facial cosmetics, Deodorants, Antiperspirants, Shampoos, Hair dressing and Hair removers.
12. Adverse effects of cosmetics

PART B: NUTRACEUTICALS
1. Concept of Ghiza-e-dawai (Neutraceutical) in Unani, food suppliments, Probiotics, Antioxidants etc.
2. Clinically recommended diets according to age and mizaj.
4. Malnutrition and special diets prescribed in Unani Medicine
5. Preparation and standardization of special diets.

PART C: ILMUL TAKLEES (CALCINOLOGY)
1. Historical background of Ilm-ul-Taklees (Calcinoology),
2. Definition, Aims, objectives and scope of kushtasazi.
3. Basics of inorganic Chemistry in context of metals, non-metals and minerals used in Kushtasazi.
4. Principles of calcinations and general methods of preparation of various Kushtajat, e.g. faulad, hadeed, hartal, shangraf, sadaf, marjaan, qalyee, gaudanti, qarnul ayyil, sammul faar, hajarul yahood, nuqra, tila, jast. etc. and their scientific evaluation.
5. Calcination, incineration, temperature (pyrology) and Standardization of Kushta
6. Identification of kushta: i) Classical methods ii) Recent techniques useful in identification and Analysis of Kushta
7. Grading of temperature.
8. Instruments used in preparation of kushta (Classical and Modern)
9. Use of herbs in calcinations.
10. General precautions to be taken during calcinations process.
11. Adverse effects, Pharmacological action, doses, precaution in use, determination of shelf life etc

PRACTICALS
1. Preparation and formulation of creams, gels, pastes, shampoos, oils, face pack
2. Preparation of specialized diets e.g. Maul Asal, Halwajat, Hareera, Maushaeer etc.
3. Method of preparation of various kushtajat with classical and modern methods
REFERENCE BOOKS

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4. Qarabadeen Qadri, Md. Akbar Arzani, Munshi Naval Kishore Lucknow, 1880 AD.
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41. Nutrition for Mother & Child, National Institute of nutrition, Hyderabad
42. Diet and Heart disease, National Institute of nutrition, Hyderabad
43. Nutrient requirements and Dietary allowances for Indians, Indian Council of Medical research
44. Some Therapeutic Diets, National Institute of nutrition
46. Nutritive values of Indian Foods, Gopalan, Shastri, National Institute of nutrition 1996
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63. Pharmaceutical Product Development, In Vitro and In Vivo Corelation, Dakshina Murthy Chilukri
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77. Text book of forensic medicine and toxicology – Dr. V.V. Pillay
78. Animal origin drugs of Unani Medicine; S.B.Vohra, MSY Khan; CBS New Delhi.
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80. Chemistry of Medicinal plants; CCRUM New Delhi; CCRUM New Delhi.
81. Standardization of herbal drugs; S.H. Afaq; Publication Division, AMU, Aligarh.
82. Current good manufacturing practices
83. Drug and cosmetic act 1940 and Rules 1945 with latest amendments
84. Drugs and magic remedies (objectionable advertisement act) 1954
85. Prevention of food adulteration (PFA) act
86. Loss pertaining to narcotics
87. Factory and pharmacy act
88. Consumer protection act 1986