



PHARMACY COUNCIL OF INDIA

(Constituted under the Pharmacy Act, 1948)

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NEW DELHI - 110 020

Ref. No.14-55/2021-PCI(A) 3642-45

23 SEP 2021

To

- All institutions approved for D.Pharm Course.
- All State Governments (Technical Education and Health Departments) and admission making authorities.
- All Examining Authorities.

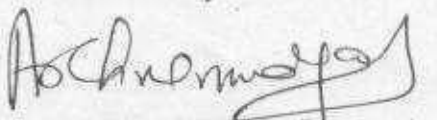
Sub: "Syllabus framed under Regulation 7, List of prescribed equipments and apparatus under Appendix-A of The Education Regulations, 2020 for Diploma Course in Pharmacy."

Sir/Madam

With reference to the subject cited above, it is informed that -

- With due approval of the Ministry of Health and Family Welfare, Government of India, PCI has notified the Education Regulations, 2020 for Diploma course in Pharmacy in the Gazette of India, Extraordinary No. 435, Part-III, Section-4, dt.16.10.2020.
- As empowered under regulation 7 and Appendix-A of ER-20, the PCI has framed the syllabus. A copy of the same titled as under is enclosed as **Annexure-I**.
"Syllabus framed under Regulation 7, List of prescribed equipments and apparatus under Appendix-A of The Education Regulations, 2020 for Diploma Course in Pharmacy."
- It is for implementation and strict compliance from 2021-2022 academic session.

Yours faithfully


(ARCHANA MUDGAL)
Registrar-cum-Secretary



Annexure - I

Pharmacy Council of India New Delhi

“Syllabus framed under Regulation 7, List of prescribed equipment's and apparatus under Appendix-A of The Education Regulations, 2020 For Diploma Course in Pharmacy”

Appendix – 3

List of Instruments and Equipment required for the Conduct of D.Pharm program as per ER-2020

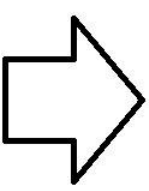
As per ER 2020 regulation;

At least four laboratories specified below should be provided for:

1. Pharmaceutics Lab.
2. Pharm. Chemistry Lab.
3. Physiology, Pharmacology and Pharmacognosy Lab.
4. Biochemistry, Clinical Pathology, Hospital and Clinical Pharmacy Lab.

The institutions shall provide “Model Pharmacy” as per following details

Model Pharmacy	No.	Area
<u>Essential:</u> Running Model Community Pharmacy	01	80 Sq. Mts. (Including 10 Sq. mt. for Drug Information Centre & 10 Sq. mt. for Patient Counselling)
<u>Desirable:</u> Drug Model Store		



NOTE: Wherever animal experimentations are prescribed in the curriculum, the required knowledge and skill should be imparted by using computer assisted modules. Animal hold area shall be as per the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) guidelines.

Practical of Social Pharmacy, Pharmacotherapeutics can be conducted in any one of the laboratories by making necessary provisions.

Department wise List of Minimum Equipment required for D.Pharm
(For a practical batch of 20 students)

1. Physiology, Pharmacology and Pharmacognosy Lab.

S. No.	Name	Minimum required Nos. for DPharm 60 intake
1	Microscopes	20
2	Haemocytometer with Micropipettes	20
3	Sahl's haemoglobinometers	20
4	Sphygmomanometers	5
5	Stethoscopes	10
6	Human Permanent Slides for various tissues	One pair of each tissue Organs and endocrine glands
7	Models for various organs	One model of each organ system
8	Specimen for various organs and systems	One model for each organ system
9	Human Skeleton and bones	One set of skeleton and one spare bone
10	Different Contraceptive Devices and Models	One set of each device
11	Digital Balance (10 mg Sensitivity)	1
12	Computer with LCD	1
13	Licensed Software packages for Physiological & Pharmacological experiment	1
14	IR Thermometer	2
15	Refrigerator	1
16	First aid equipment	Adequate number
17	Stop watch	20
18	Dummy Inhalers and Nebulizer	1
19	Pharmacotherapeutic charts for various diseases & disorders	Adequate number
20	Surgical devices and Sutures	Adequate number
21	Digital BP Instrument	5
22	Mercury Thermometer	10
23	Digital Thermometer	10
24	Pulse Oximeter	5
25	ESR Apparatus (Westergren and Wintrobe)	10
26	Peak Flow meter	10
27	Stadiometer	2
28	Adult Weighing Scale (150 kg)	5
29	Glucometer	10
30	Projection microscope	1
31	Permanent slide set of plants and charts for Pharmacognosy Lab	Adequate number
32	Drug information resources	Adequate number
33	Various types of PPE Kits,	Adequate number

34	Charts /displays/ AVs on tobacco control, glycemic index of foods, nutrition, reproductive health	Adequate number
35	Menstrual hygiene products	Adequate number
36	Display for various disinfectants, mosquito repellents etc	Adequate number
37	Water Testing Kit	Adequate number
38	Permanent slide of different microbes	Adequate number

NOTE: Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Study and report the local anaesthetic, mydriatic and mitotic effects of the given drug on the rabbit eye
2. Choose appropriate animal experiment model to study the effects of the given drugs acting on the central nervous system and submit the report
3. Perform the effects of given tissues (simulated) on isolated organs / tissues and interpret the results
4. Interpret the dose dependent responses of drugs in various animal experiment models Practical's.

Introduction to the following topics pertaining to the experimental pharmacology have to be discussed and documented in the practical manuals.

1. Introduction to experimental pharmacology
2. Study of laboratory animals
(a) Mice; (b) Rats; (c) Guinea pigs; (d) Rabbits
3. Commonly used instruments in experimental pharmacology
4. Different routes of administration of drugs in animals
5. Types of pre-clinical experiments: In-Vivo, In-Vitro, Ex-Vivo, etc.
6. Techniques of blood collection from animals

Experiments

Note: Animals shall not be used for doing / demonstrating any of the experiments given. The given experiments shall be carried out / demonstrated as the case may be, ONLY with the use of software program(s) such as "Ex Pharm" or any other suitable software



1. Study of local anaesthetics on rabbit eye
2. Study of Mydriatic effect on rabbit eye
3. Study of Mitotic effect on rabbit eye
4. Effect of analgesics using Analgesiometer
5. Study of analgesic activity by writhing test
6. Screening of anti-convulsant using Electro Convulsimeter
7. Screening of Muscle relaxants using Rota-Rod apparatus
8. Screening of CNS stimulants and depressants using Actophotometer
9. Study of anxiolytic activity using elevated plus maze method
10. Study of effect of drugs (any 2) on isolated heart
11. Effect of drugs on ciliary motility on frog's buccal cavity
12. Pyrogen testing by rabbit method

Ex Pharm – Software

Trade Mark Registration Number - 2967042

List of Experiments

01-05. Experiment on effects of various drugs (Mydriatic, Mitotic and Local Anaesthetic) on rabbit's eye.

- 01 - Epinephrine
- 02 - Atropine
- 03 - Ephedrine
- 04 - Physostigmine
- 05 - Lignocaine

06. Study of analgesic activity with the help of "Tail Flick Apparatus" (Analgesiometer).

07. Study of analgesic activity with the help of "Hot Plate Apparatus" (Analgesiometer).
08. To study analgesic activity by "Writhing Test".
09. Study of "Antihistaminic drugs/Anti allergic" drugs by mast cell stabilization method with help of "Histamine Chamber".
10. Study of "Muscle Relaxant" activity with the help of "Rota-Rod Apparatus".
11. Study of "CNS Depressants & Stimulants" Using "Actophotometer".
- 12-14. Study of drugs acting on CNS (Including Anxiolytic Activity) using following modules
 - a. Elevated Plus Maze Method
 - b. Pole Climbing Method
 - Evaluation of Anti Psychotic Drugs
 - Evaluation of Sedative Drugs
15. Study of anticonvulsant activity using "Electro Convulsimeter".
16. To study PTZ induced convulsions in mice.
17. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
18. To study the action of strychnine/ anaesthetic on frog neurons (excitability).
19. Test for pyrogens using rabbits.
20. Effect of drugs on isolated guinea pig ileum (in-vitro).
21. To study respiratory depression effect on rabbit.
22. Study of stereotype and anti-catatonic activity of drugs on mice.
23. Experiments on thyroid and antithyroid drugs
 - The effect of thyroxine, TSH and propylthiouracil on metabolism.
24. Experiments on blood sugar
 - The effect of insulin (hypoglycemic activity) and alloxan on blood glucose.
25. Study of anti-inflammatory activity using carrageenan induced paw oedema method
26. Study of diuretic activity using metabolic cage
- 27-30. Experiments on amphibian nerve-muscle (sciatic nerve and gastrocnemius muscle) preparation.
 27. Recording of Simple Muscle Twitch
 28. Effect of Temperature
 29. Effect of stimuli of increasing frequency.
 30. Effect of stimuli of increasing strength.
- 31-38. Experiment on effect of various drugs on isolated frog's heart. (DRC- Dose Response Curve)
 31. Epinephrine
 32. Norepinephrine
 33. Isoprenaline
 34. Calcium chloride
 35. Propranolol
 36. Acetylcholine
 37. Potassium chloride
 38. Atropine sulphate
- 39-53. Experiments on effect of different drugs on dog BP & heart rate.

- Virtual Practice- Effects of drugs on the dog BP and heart rate.

39. Epinephrine (Adrenaline)

40. Norepinephrine (Noradrenaline)

41. Isoprenaline

42. Acetylcholine

43. Histamine

44. Ephedrine

45. Phentolamine

46. Propranolol

47. Atropine

48. Cimetidine

49. Carotid Occlusion

50. Central Vagus

51. Peripheral Vagus.

- Effects of vasopressor and vasodepressor with appropriate blockers.

52. Virtual Practice- Reversal action of adrenaline on blood pressure and heart rate.

53. Virtual Practice- Reversal action of acetylcholine on blood pressure and heart rate.

54-55. Experiments on "Lagendorff's Apparatus".

- Effect of coronary vasodilators on isolated heart

- Effect of parasympathomimetics

56. Recording of DRC, evaluation of effect of agonist and antagonist and bioassay of histamine using guinea pig ileum by matching method.

57-64. Recording of DRC & Bioassay on isolated tissues and organs by Matching, Interpolation, 3 Point & 4 Point Bioassay.

57-58. Recording of DRC and bioassay of acetylcholine using guinea pig ileum.

59-60. Recording of DRC and bioassay of oxytocin using rat uterine horn.

61-62. Recording of DRC and bioassay of serotonin using rat fundus strip.

63-64. Recording of DRC and bioassay of acetylcholine using rat ileum.

65-66. To record the DRC and to determine the pD₂ value for acetylcholine on frog rectus abdominis muscle.

67-68. To record the DRC and determination of pD₂ value of histamine on guinea pig ileum.

69-70. To record the DRC and determination of pD₂ value of serotonin on rat stomach (fundus part) strip.

71-72. To record the DRC and determination of pA₂ Value of prazosin using rat anococcygeus muscle (by Schilds plot method)

73. Study of anti-ulcer activity - using pylorus ligation method.

74. Evaluation of effect of acetylcholine (spasmogens) using rabbit jejunum.

75. Evaluation of effect of different drugs on ciliary motility.

76. Evaluation of effect of saline purgatives on frog intestine.

77-78. Determination of acute irritation of a test substance.

- Skin irritation (Including edema formation)

- Eye irritation

* In addition to above mentioned interactive experiments, modules are provided for following:

79. Animals used in experimental pharmacology.

80. Instruments used in experimental pharmacology.

81. Physiological salt solutions used in experimental pharmacology.

82. Different routes of drug administration.

83. Blood withdrawal techniques.

- 84. Methods of anaesthesia & euthanasia.
- 85. Dose calculation in pharmacological experiments.
- 86. Calculation of pharmacokinetic parameters.
- 87. Biostatistics methods in experimental pharmacology.

*** Additionally "Examination Mode" is provided for the experiments.**

*** Covers specific supportive physiology modules also, to provide better understanding of pharmacology modules.**

*** Separate observation table/finding download option is available for each student, with student name and experiment readings/findings.**

*** Freely accessible additional study material in form of lab manual with the complete content of each module.**
