**CURRICULUM AND SYLLABUS UNDER THE NEW REGULATIONS FOR THE M.B.B.S. COURSE OF STUDIES OF PHARMACOLOGY.**

**THIRD SEMESTER**:

 **A. Didactic Lectures 40hrs**

 **I. General Consideration & Basic Principles 15hrs**

 (Introduction, Historical perspective, Pharmacokinetic principles, Pharma- codynamics, Issues relating to pharmacotherapeutics, Essential Drugs concept, Steps in New Drug Development: Ethics and Regulation).

 **II. Autonomic Pharmacology 6hrs**

 (Introduction, Historical Perspectives, classification of drugs affecting ANS, Muscarinic receptor agonists and antagonists, Adrenergic receptor agonists and antagonists).

 **III. Autacoids &Related Pharmacology 3hrs**

 (Introduction, Eicosanoids & NSAIDs, Histamine &Antihistaminics, Bradykinin & its antagonists, Renin-angiotensin system, 5HT & its antagonists).

##  IV. Neuropharmacology 16hrs

 (Benzodiazepines, Barbiturates, Anticonvulsants, Antiparkinsonian drugs, Neuroleptics, Anxiolytics, Lithium, Antidepressants, General Anaesthetics, Skeletal Muscle Relaxants, Local Anaesthetics, Opioid & Non-Opioid analgesics, Pharmacotherapy of pain & Gout).

## B. Group Dynamics 40hrs

 (This includes continuous assessment of each student through Item Cards).

 **I. Problem based Learning/Tutorials 25hrs**

 In these small group sessions (comprising of 25 students and one teacher facilitator in each group) the students will be required to resolve specific problems that would be designed by the faculty members of the department addressing issues covered in the didactic lectures in this semester.

 **II. Student’s seminar to be arranged. 15h**rs

**C. Practicals / Demonstration 40hrs**

 (All practical hours must be small group sessions. Students are required to maintain required to maintain record books which will be continuously assessed by teacher).

 **I. Prescription writing**

 Principles & format **2hrs**

 Abbreviations used, Weights & Measures **2hrs**

 Rational Selection of a Drug while prescribing

 (WHO P-drug concept) **4hrs**

 Writing specific problem-led prescriptions

 for common ailments. **10hrs**

 (A list of such specific problem-led prescriptions are given in **Annexure-1**. These may be revised as per the need of the day )

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## II. Therapeutic problem-solving addressing the issues of clinically relevant 10hrs

**adverse drug reactions (ADR’s) and adverse drug interactions (DI’s).**

 (Coloured photographs of some typical ARD’s may be used additionally).

 (A list of such therapeutic problems are given in **Annexure-2**).

 **III. Pharmacy**

 Compounding & Dispensing of some common dosage forms eg. Mixture, **12 hrs**

Lotion/ ointment, Powder, etc.

 I) Alkali mixture/S.S. of Magsulph

 II)Carminative mixture.

 III) ORS Powder

 IV) Calamine lotion

 V) Atropine sulphate ointt.(1%)

 VI) Gamma-benzene hexachloride ointment(1%).

**FOURTH SEMESTER**

**A. Didactic Lectures 30hrs**

##  V. Renal Pharmacology. 4hrs

 Diuretics & Anti Diuretics

 Drugs for acid –base & Electrolyte balance.

 **VI. Cardiovascular Pharmacology. 9hrs**

 Angina pectoris, Myocardial infraction ,Cardiac arrhythmias, Hyperlipidemias, Hypertension, Heart failure.

 **VII. Gastrointestinal Pharmacology 6hrs**

 Laxatives & Non–specific antidiarrhoeals Pharmcotherapy of Peptic ulcer Antiemetic & Prokinetic agents, Drugs for portal hypertension, Pancreatitis, Gall stones, Ulcerative colitis.

 **VIII. Haemato-pharmacology. 4hrs**

 Haematinics, Coagulants & Anticoagulants,Antithrombotics, Fibrinolytic, Antiplatelet agents.

 **IX. Endrocrine Pharmacology. 7hr**s

 Insulin & Oral hypoglycemic agents, Thyroid and anti thyroid drugs,Corticosteroids, Oral contraceptives, Vitamin D, Parathormone, Calcium homeostasis.

**B. Group Dynamics 30hrs**

 **I. Problem-based learning / Tutorials similar to 3rd Semester. 20hrs**

**II. Integrated teaching –learning / Student’s seminar.**

 Topics like Anaemia, Hypertension, Angina pectoris, Peptic ulcer, Oral contraceptives, Rickets, Diabetes mellitus etc. should be dealt in integrated sessions involving other para-clinical (and clinical) disciplines like pathology, Microbiology, Community Medicine etc. In such seminars students will take active part and teachers of different disciplines will act as facilitators. The seminars hours will be treated as common credit hours for the para –clinical disciplines that are directly involved in the concerned topic of discussion .For the logistic convenience, these sessions will not be required to attend at a time. Each session will be of 2 hours duration. They may be scheduled to be held on the last Saturday of each month. The minimum number of such integrated sessions will be 5 in this semester.

## C. Practicals /Demonstrations 30hrs

 **I. Prescription writing. 6hrs**

 Writing specific problem led prescriptions (for common aliments)

 **II. Therapeutic problem solving 4hrs**

 Similar to 3rd Semester

 **III. Demonstration of different dosage forms, formulations and delivery systems.**

 **6hrs**

 Tablets, Scored tablets, Capsules, Coated tablets, Drug suspensions, Suppositories, Enema, Eyedrops, Injectables(Ampoules & Vials), Transdermal systems(NTC Patch), Fluid transfusion bottles (Glass vs plastics), Blood Transfusion sets & Donor sets syringes (Tuberculin, Insulin,2 ml, 5 ml, 10 ml, 50ml,) (Glass vs Disposable)

 Needles –different sizes.

 Butterfly canula

 Scalp vein sets

 Inhalers, Spacer devices, Nebulizers.

 Different types of packaging: Blister packs, Coloured bottles.

 **IV. Experimentals. 14hrs**

 Demonstration of drug effects

 **A. Animal experiments**  **8hrs**

 1.Effects of mydriatics &miotics in Rabbit’s eye.

 2.Demostration of drug effect in amphibian heart /cat blood pressure preparation.

 3.Guinea pig ileum

 **B. Actual patient situation**  **6hrs**

 Visit to the indoor/ in patient’s deptt.

 (General medicine, Pediatrics, or Maternity ward.) to oversee the drug prescribing and utilization.

# FIFTH SEMESTER

## A. Didactic Lectures 30hrs

##  X.Respiratory System Pharmacology 2hrs

 Pharmacotherapy of Cough

 Drug therapy of Bronchial Asthma.

 **XI. Chemotherapy & Anti-infectives 14hrs**

 General consideration ,Antiseptics and disinfectants

 B-lactam antibiotic, Aminoglycosides, Tetracyclines, Chloromphenicol, Macrolides, Quinolones & Sulphenamides, Antiamoebic, Anti tubercular, Anti fungal and Antiviral drugs with pharmacotherapy of AIDS.

 **XII. Cancer Chemotherapy 2hrs**

 Principles & general consideration

 Treatment approach in some common malignancies.

 **XIII. Immunopharmacology 1hrs**

 Immuno suppressants & Immunostimulants .

 Vaccines & Sera.

 **XIV. Toxicology 3hrs**

 Drug overdose & poisoning

 Heavy metals & Metal antagonist

 Environmental toxicants & Drug dependence, Drug abuse, Adr monitoring

##  XV. Miscellaneous 8hrs

 Vitamins & minerals

 Dental Pharmacology

 Dermatopharmacology

 Ocular pharmacology

 Drugs & uterine motility

 Drugs used in medical emergencies

 Rational use of drugs/Rational therapy

 Gene therapy

 Drug prescribing in Pregnancy, Infants and Children, Geriatric patients and Hepato-renal insufficiency.

## B. Group Dynamics 30hrs

 **I. Problem-based learning / Tutorials 20hrs**

#  II. Integrated learning / Students seminar 10hrs

 Similar to that in 4th Semester.

## Seminar topics: Bronchial asthma, Rational use of antibiotics, Tuberculosis, Malaria, Worm infestations, Management of poisons, Vaccine preventable diseases, Acute Respiratory Infection and Diarrhoeal Disorders in Children.

 **C. Practicals/Demonstrations 30hrs**

##  I. Prescription writing

 Writing specific problem related prescription ( for common aliments ) **8hrs**

 **II. Therapeutic problem solving** **6hrs**

  **III. Pharmacy**  **10hrs**

 a) Criticism of prescription **6hrs**

 b) Developing critical appraisal skill in scanning information from **4hrs**

 i) Pharmaceuticals Promotional Literature

 ii) Package Inserts/ Patient Information Leaflets

 iii) Published Documents in Independent Medical Journals.

 **IV. Experimentals** **6hrs**

 Actual Patient Situation

 a) Visit to the General Emergency to oversee the management of any one Medical/Surgical Emergency.

 b) Visit to the surgical Operation Theatre to over see the effects of drugs used anaesthetic practice.

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### Annexure-1. (A list of problem-led prescriptions)

1. A drug for “TYPHOID FEVER”.
2. A drug for “BACILLARY DYSENTRY”.
3. A drug for “DUDENAL ULCER”.
4. A drug for “AMOEBIC DYSENTRY”.
5. A drug for “TONIC CLONIC SEIZURES”.
6. PURGATIVE FOR RADIOLOGICAL EXAMINATION.
7. A drug for “MULTI-BACILLARY LEPROSY”.
8. A drug for “TINEASIS”.
9. A drug for “URINARY TRACT INFECTION”.
10. A drug for “ACUTE BACTERIAL CONJUNCTIVITIS”.
11. A drug for “FILARIASIS:”
12. A drug for “ACUTE GOUT”.
13. A drug for “NAUSEA AND VOMITING”.
14. A drug for “UNCOMPLICATED PULMONARY TUBERCULOSIS.”
15. A drug for “MIXED WORM INFESTATION”.
16. A drug for “MIGRAINE”.
17. A drug for “SYPHILIS”.
18. A drug for “GONORRHOEA”.
19. A drug for “ACUTE ATTACK OF ANGINA PECTORIS”.

### Annexure-2 (DRUG INTERACTION)

1. **Amoxicilin & Clavulanic Acid.**
2. **Metronidazole& Ethylalcohol .**
3. **Ciprofloxacin &Theophylline.**
4. **Aspirin &Warfarin.**
5. **Rifampicin & Cobined OCP.**
6. **Chloroquine & Alkali mixture.**
7. **Sucralfate &Antacid.**
8. **L-dopa & Pyridoxine.**
9. **Propranolol & Verapamil.**
10. **Digoxin & Hydroclorothiazide.**
11. **Chlorpropamide & Dicommurol.**
12. **Gentamycin & gallamine.**
13. **Lithium & Thiazide.**
14. **Propranolol & Insulin.**
15. **Enalapril & Spironolactone.**

#### Annexure-3 (THERAPEUTIC PROBLEMS )

1. A 10 year old school girl suffering from mild exercise induced bronchial asthma has been treated with a metered does inhaler containing 500g of Terbutaline per inhalation as and when required, which effectively controls the individual attack. However, she has attacks of wheezing every 3 to 4 weeks occurring during exercise even after above treatment schedule.

What treatment should now be given to reduce the frequency of attacks?

1. A 16 years old girls has admitted to the emergency department with severe short of breath. She is diagnosed as acute bronchial asthma. She has been using metered dose inhalation of Salbutamol, Ipratropium and Beclomethasone. In spite of the above treatment, the present attack is not controlled.

What will be her immediate treatment?

1. A 69 year old woman suffering from congestive heart failure has been treated with 0.25 mg Digoxin tablet daily for last 3 months. But the heart failure is not controlled adequately.

What will be the treatment to control the heart failure adequately?

1. A 45 year old male patient with history of smoking presented with exertional retrosternal compressing pain radiating to the left arm and lasts for 2-5 minutes. The pain is relieved after taking rest. After proper investigation, he has been diagnosed as a case of stable angina pectoris.

What will be the treatment to control the attack?

1. A 45 old patient suffering from angina pectoris was on treatment with isosorbide dinitrate. He is admitted to the hospital with severe chest pain and sweating and diagnosed to be a case of acute myocardial infarction.

What will be the management of this patient?

1. An overweight middle aged man is found to be hypertensive while attending a clinic for medical cheek up. His B.P. is 170/105 mm of Hg on two successive observations.

What will be the treatment for this patient?

1. A 58 year old man with history of severe hypertension for 20 years, which was well controlled with medication. He stopped taking drugs for a prolonged period. His blood pressure is found to be 240/135 mm of Hg with papillaedema.

What will be the management of this case?

 8. A 25 year old lady is brought to emergency unit by her family members. She is unconscious with constricted pupils and froth coming out of her mouth. She is reported to consume an organo-phosphorus insecticide.

 How will you manage the case?

 9 A middle aged person was watching T.V. in dark ,suddenly develops pain in right eye, vomiting and blurring of vision. On examination, right pupil is dilated, sluggishly reacting to light with raised intra-ocular pressure. The condition is diagnosed as a case of acute congestive glaucoma.

What will be the medical management of this clinical condition?

1. A 20 year old diabetic man on insulin therapy suddenly developed fever and

Missed his usual doses of insulin and became unconscious.

What measures will you take to manage this condition?

1. A middle aged diabetic patient with oral anti-diabetic agent (Tolbutamide) underwent prolonged exercise and missed his usual breakfast. He developed unconsciousness, respiratory distress and profuse sweating with tachycardia.

How will you manage the case?

1. A person is willing to travel an endemic area of malaria. What chemoprophylaxis has to be given to him?

Subsequently, he developed chloroquine-resistant malaria. How will you manage the case?

1. A male patient develops fever with chill and rigor. P. vivax is found in his blood smear.

What will be the management of this case?

1. A woman in 2nd trimester pregnancy is found to be moderately anemic on routine antenatal check-up.

What will be the management of this case ?

1. A 6 year old boy while playing in a village ground was beaten by a snake. The snake was identified as a poisonous one.

How will you manage this case?

16. A patient with chronic psychiatric illness was treated with largactil (chlorpromazine) for a prolonged period. He developed tremor, bradykinesia and rigidity

 What treatment should be given to the patient without stopping the drug ?

**ITEM CARD OF PHARMACOLOGY**

**CONTINUOUS DAY-TO-DAY ASSESSMENT**

**NAME: COLLEGE:**

**ROLL NO: BATCH: SESSION**

**Signature of teacher-in-charge Signature of the H.O.D.**

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| **THIRD SEMESTER:THEORETICALS** |
|  ITEM | DATE | TOTAL MARKS | MARKS OBTAINED | EXAMINER |
| **I. GENERAL PHARMACOLOGY**Historical considerations, Steps of drug development, Dosage forms, Drug delivery systems Routs of drug administration, Pharmacokinetics, Phamacodynemics, Factors affecting therapeutic outcome, Drug prescribing in altered physiological states (Pregnancy and lactation, neonates and elderly, hepatic and renal impairment), Essential drugs concept, Rational use of drugs and Good prescribing practice. |  | 15 |  |  |
| **II. AUTONOMIC PHARMACOLOGY** Basic considerations, Muscarinic& Adrenergic receptor agonists and antagonists. |  | 15 |  |  |
| **III. AUTACOIDS & RELATED PHARMACOLOGY** Eicosanoids, Histamine & antihistaminics, 5HT & drugs used in Migraine, Kinins and Angiontensin. |  | 15 |  |  |
| **IV. NEUROPHARMACOLOGY**Benzodiazepines & Barbiturates, Drug treatment of Parkinsonism & Epilepsy, Neuroleptics & Anxiolytics, Antidepressants & Lithium, Drugs used in Anaesthetic practice including Neuromuscular blocker, Opioids & non-opioid analgesics and Pharmacotherapy.  |  | 15 |  |  |
| THIRD SEMESTER: PRACTICALS |
|  **ITEM** | **DATE** | **TOTAL****MARKS** | **MARKS****OBTAINED** | **EXAMINE**R |
| **I. Prescription writing****II.Therapeutic problem solving****III. Pharmacy****IV. Experimentals****V. Criticism of prescription** |  | 1515151515 |  |  |
| **FOURTH SEMESTER: THEORETICALS** |
|  **ITEM** | **DATE** | **TOTAL****MARKS**  | **MARKS OBTAINED** | **EXAMINER** |
| **I. RENAL PHARMACOLOGY**Diuretics & Antidiuretics, Drugs for BHP; Drugs for ACID-BASE and Electrolyte imbalance,  |  | 15 |  |  |
| **II. CARDIOVASCULAR PHARMACOLOGY**Drug therapy of CHF, Hypertension, Hyperlipidemias, Cardiac Arrhythmias and in Ischaemic heart diseases. |  | 15 |  |  |
| **III. GASTROINTESTINAL** **PHARMACOLGY**Drug treatment for peptic ulcer, laxatives & antidiarrhoeals, Antiemetics & prokinetics agents and drugs for portal hypertension, pancreatitis, Gallstones and ulcerative colitis. |  | 15 |  |  |
| **IV. HAEMAOPHARMACOLOGY**Iron, folic acid, Treatment of anaemias, Heparin and anticoagulants; Antithrombotic and fibrinolytic & antiplatelet agents. |  | 15 |  |  |
| **V. ENDOCRINE PHARMACOLOGY**Insulin & Oral hypoglycemics, Thyroid & antithyroid drugs, Estrogens & Antiestrogens, Oral contraceptives, Androgens & antiandrogens, Corticosteroids, Calcium, Vitamin D, Parathormone & calcitonin. |  | 15 |  |  |
| **FOURTH SEMESTER: PRACTICALS** |
| **ITEM** | **DATE** | **TOTAL** **MARKS** | **MARKS****OBTAINED** | **EXAMINER** |
| I. PRESCRIPTIONII. THERAPEUTIC PROBLEM SOLVINGIII.PHARMACYIV.EXPERIMENTALSV. CRITISM OF PRESCRIPTION |  | 1515151515 |  |  |
| **FIFTH SEMESTER: THEORETICALS** |
| **ITEM**  | **DATE**  | **TOTAL****MARKS** | **MARKS****OBTAINED** | **EXAMINER** |
| **I. RESPIRATORY SYSTEM**Pharmacotherapy of cough and Pharmacotherapy of bronchial asthma. |  | **15** |  |  |
| **II. CHEMOTHERAPY & ANTI-INFECTIVES**Beta-lactam antibiotics, Quinolones & Sulfonamides, Aminoglycosides, Tetracyclines, Chloramphenicol & Macrolides, Drug therapy of tuberculosis and leprosy, Antivirals and drug treatment of AIDS, Antifungals, Anthelmintics & antiamoebics and drug treatment of malaria & Kala-azar. |  | **15** |  |  |
| **III. CANCER CHEMOTHERAPY**Principles & general considerations & Methotrexate, Cyclophosphamide, vinca alkaloids and Corticosteriods and others  |  | **15** |  |  |
| **IV. IMMUNOPHARMACOLOGY**Vaccines & sera, Immuno modualators. |  | **15** |  |  |
| **V. TOXICOLOGY**Heavy metal poisoning & drug poisoning & treatment, Drug dependence & treatment and ADR monitoring center & poisoning information center. |  | **15** |  |  |
| **VI. MISCELLANEOUS**  Drugs & uterine motility and Vitamins & Nutrients |  | **15** |  |  |
| **FIFTH SEMESTER: PRACTICALS** |
|  ITEM | DATE | TOTAL MARKS | MARKSOBTAINED | EXAMINER |
| I. PRESCRIPTIONII. THERAPEUTIC PROBLEM SOLVINGIII.PHARMACYIV.EXPERIMENTALSV. CRITISM OF PRESCRIPTION |  | 1515151515 |  |  |

**ASSESSMENT OF STUDENTS:**

1.Internal Assessment:

 Theoretical …….15marks

 Practical …….15 marks

 Assessment of theoretical and practical are to be done through day-to-day assessment (Weekly /fortnightly) through ITEM CARDS and THREE PERIODICAL Examination at the end of 3rd ,4th & 5th Semester .

Assessment for practical will also be done through day to day evaluation of the students’ performance in the Practical Record Book. No Marks should be separately allocated for Practical Record Book- but its maintenance must be made mandatory.

Marks of Theory + oral and Practical are to be computed separately.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  Written/Oral |  Practical |
|  |  | Full marks | Marks obtained | Full marks |  Marks obtained |
|  | At the end of first semester | 50 |  | 25 |  |
|  | At the end of second semester | 50 |  | 25 |  |
|  | At the end of third semester | 50 |  | 25 |  |

**Periodical Institutional Assessment Examination:**

# Final Internal Assessment: PHARMACOLOGY

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| --- | --- | --- |
| **Continuous day to day Assessment** | **Periodical Assessment** | **Total Internal Assessment** |
| **Theory/oral(a)** **7.5** | **Practical(b)** **7.5** | **Theory/oral(c)** **7.5** | **Practical(d)** **7.5** | **Theory/oral(a+c)****7.5+7.5=15** | **Practical(b+d)****7.5+7.5=15** |
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**Signature of the Principal Signature of the H.O.D**

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##### PHARMACOLOGY ORAL: 15 marks

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PHARMACOLOGY PRACTICAL: Total 25 marks

1. **Prescription-one**  Total

 Format- 1

 Writing- 1

 Oral Crossing- 2

 **Total: 4**

2. **Pharmacy- one item**

 Preparation & Labeling- 2

 Oral Crossing- 2

 **Total: 4**

3. **Therapeutic Problem – One**

 Correct interpretation of

 Therapeutic Situation

 In writing 2

 Oral Crossing 2

 **Total: 4**

4. **Drug interaction-one**

 Interpretation in writing- 2

 Oral Crossing- 2

 **Total: 4**

5. **Experimental Pharmacology**

 Chart and diagram on

 Experiments demonstrated Identification-2

 In Practical classes & Interpretation-2

 charts on pharmacokinetics

#####  Total: 4

6. **Sample based Knowledge testing**- **2**

 Two samples per question in writing

7. **Criticism of prescription** - **3** ( Oral table)

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**Practical Notebooks**- **Two**

 **One-**Therapeutics Record Book-Containing patterns utilization of drugs in emergency and in-patient departments.

 **One**-Pharmacy.

Practical Note-books must be submitted in practical Examination- without which students are **NOT ALLOWED** to appear.