COURSE MODULE

Program Title	B. Pharmacy
Department	Pharmacology
Course Title	PHARMACOLOGY-II

1. **NAME OF INSTITUTION** : Y. B. CHAVAN COLLEGE OF PHARMACY,

AURANGABAD

2. **AFFILIATED UNIVERSITY** : DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

3. **DEPARTMENT** : PHARMACOLOGY

4. **PROGRAM TITLE** : B. PHARM.

4.1. Program Outcomes (PO):

PO 01:Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

PO 02:Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO 03:Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO 04:Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

PO 05:Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.

PO 06: Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

PO 07: Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO 08:Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

PO 09:The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

PO 10:Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 11:Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

5. COURSE SPECIFICATION :

5.1.Course Identification and General Information

a. Course Title:	**Pharmacology-II**	
b. Course Number/Code	**BP 503T and BP 503P**	
c. Credit Hours	Theory	Practical
	45 (3 hrs/Week)	**60 (4h/wk)**
d. Study level/semester at which this course is offered	**B. Pharm Vth Semester**	
e. Pre-requisite	**B. Pharm- Vth Sem**	
f. Co-requisite	**Pharmacology I (404)**	
g. Program in which the course is offered	**Pathophysiology (204)**	
h. Language of teaching the course	**English**	
i. Prepared by	**1. Dr. Nikhilkumar S. Sakle** **2. Dr. H. D. Une**	
j. Approved by HOD	**Dr. Syed Ayaz Ali**	

5.2. Course Description:

This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.

5.3. Course Objectives:

Upon completion of this course the student should be able to:

1. Understand the mechanism of drug action and its relevance in the treatment of different diseases
2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
3. Demonstrate the various receptor actions using isolated tissue preparation
4. Appreciate correlation of pharmacology with related medical sciences

6.0.Course Outcomes (COs) : (Min. 4 and Max. 6)

(Use Bloom's Taxonomy words)

CO Code	Course outcome

CO 503T.01	**Choose and plan the applications, mechanism of action, adverse drug reactions, and drug interactions of drugs affecting cardiovascular system.**
CO 503T.02	**Demonstrate and find the applications, mechanism of action, adverse drug reactions, drug interactions of drugs affecting cardiovascular and urinary system**
CO 503T.03	**Choose and plan the biosynthesis, applications, mechanism of action and drugs related to Autocoids.**
CO 503T.04	**Demonstrate and find the applications, mechanism of action, adverse drug reactions, drug interactions of drugs affecting endocrine system.**
CO 503T.05	**Explain the principles and applications with types of Bioassays.**

6.1. Knowledge and Understanding

(Alignment of POs to COs)

CO Code	**Program Outcome (PO)**										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO 503T.01	**H**	**-**	**-**	**-**	**-**	**H**	**-**	**-**	**H**	**-**	**H**
CO 503T.02	**H**	**-**	**-**	**-**	**-**	**H**	**-**	**-**	**H**	**-**	**H**
CO 503T.03	**H**	**S**	**S**	**-**	**-**	**H**	**-**	**-**	**H**	**-**	**H**
CO 503T.04	**H**	**-**	**-**	**-**	**-**	**H**	**-**	**-**	**H**	**-**	**H**
CO 503T.05	**H**	**M**	**M**	**H**	**-**	**H**	**M**	**-**	**H**	**M**	**H**

Correlation levels 1, 2 or 3 as defined below:

1: Slight (Low); 2: Moderate (Medium); 3: Substantial (High); If there is no correlation, put '-'

6.2.Teaching and Assessment Methods for achieving learning outcome:

Teaching Strategies(methods)/Tools used	Methods of Assessment
Lectures (Constructivist learning) Collaborative learning (Discussion) Project based Learning Blended learning Inquiry based learning Flash cards Video Equipment models	Formative Assessment Case study Class test Multiple choice questions Assignments Seminar Viva Voce Synopsis Tutorials Summative Assessment

6.3.Tools for the Teaching and learning

Theory subjects	Practical Subjects
• PowerPoints presentation • Videos • Flash Card • Models • Software • Charts • Smart Boards • White boards • Online Platform	• White boards • Glassware • Chemicals • Instruments • Equipment • Software • Models • Plants/Crude Drugs • Animal

6.4.COURSE CONTENT

6.1. Theoretical Aspect:

Order	Topic list/units	Subtopics list	Number of Weeks	Contact Hours
1	**Unit I**	**Pharmacology of drugs acting on cardio vascular system** a. Introduction to hemodynamic and electrophysiology of heart. b. Drugs used in congestive heart failure c. Anti-hypertensive drugs. d. Anti-anginal drugs. e. Anti-arrhythmic drugs. f. Anti-hyperlipidemic drugs.	3 and Half week	10
2	**Unit II**	**Pharmacology of drugs acting on cardio vascular system** a. Drug used in the therapy of shock. b. Hematinics, coagulants and anticoagulants. c. Fibrinolytics and anti-platelet drugs d. Plasma volume expanders	3 and Half week	10
3		**Pharmacology of drugs acting on urinary system** a. Diuretics b. Anti-diuretics	3 and Half week	
4	**Unit III**	**Autocoids and related drugs** a. Introduction to autacoids and classification b. Histamine, 5-HT and their antagonists. c. Prostaglandins, Thromboxanes and Leukotrienes. d. Angiotensin, Bradykinin and Substance P. e. Non-steroidal anti-inflammatory agents f. Anti-gout drugs g. Antirheumatic drugs	3 and half week	10
5	**Unit IV**	**Pharmacology of drugs acting on endocrine system** a. Basic concepts in endocrine pharmacology. b. Anterior Pituitary hormones- analogues and their inhibitors. c. Thyroid hormones- analogues and their inhibitors. d. Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin-D. d. Insulin, Oral Hypoglycemic agents and glucagon. e. ACTH and corticosteroids.	3 and half week	8
6	**Unit V**	**Pharmacology of drugs acting on endocrine system** a. Androgens and Anabolic steroids. b. Estrogens, progesterone and oral contraceptives. c. Drugs acting on the uterus.		
7		**Bioassay** a. Principles and applications of bioassay. b. Types of bioassay c. Bioassay of insulin, oxytocin, vasopressin, ACTH, d-tubocurarine, digitalis, histamine and 5-HT	2 and half week	7

	TOTAL			45

6.2.Practical Aspects:-

Order	Tasks/Experiments	Number of Weeks	Contact Hours
1	Introduction to in-vitro pharmacology and physiological salt solutions.	01	4h/wk
2	Effect of drugs on isolated frog heart.	01	4h/wk
3	Effect of drugs on blood pressure and heart rate of dog	01	4h/wk
4	Study of diuretic activity of drugs using rats/mice	01	4h/wk
5	DRC of acetylcholine using frog rectus abdominis muscle	01	4h/wk
6	Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively	01	4h/wk
7	Bioassay of histamine using guinea pig ileum by matching method	01	4h/wk
8	Bioassay of oxytocin using rat uterine horn by interpolation method	01	4h/wk
9	Bioassay of serotonin using rat fundus strip by three point bioassay	01	4h/wk
10	Bioassay of acetylcholine using rat ileum/colon by four point bioassay	01	4h/wk
11	Determination of PA_2 value of prazosin using rat anococcygeus muscle (by Schilds plot method)	01	4h/wk
12	Determination of PD_2 value using guinea pig ileum	01	4h/wk
13	Effect of spasmogens and spasmolytics using rabbit jejunum	01	4h/wk
14	Anti-inflammatory activity of drugs using carrageenan induced paw-edema model	01	4h/wk
15	Analgesic activity of drug using central and peripheral methods	01	4h/wk

7.0. ASSESSMENT MECHANISM:

Sr. No.	Assessment Mechanism	Week due	Marks	Proportion of Final Assessment
1	Assignments, Exercises & Home works	2nd week of every month	10	6%
2	Sessional (Internal Theory exam)	As per scheduled examination	15	10%
3	Continuous Practical Assessment (Sessional Practical exam)	Weekly during practical	15	10%
4	Final exam (theory)		75	50%

5	Final exam (practical)	As per University at end of course	35	24%
Total			150	**100%**

8.0.STUDENT SUPPORT:

Office hours/week	Other procedures
Two hours minimum	**nikhilsakle@gmail.com** **hemantune@gmail.com**

9.0.TEACHER'S AVAILABILITY FOR STUDENT SUPPORT:

Days	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Time	**04:00-5:00**	**04:00-5:00**	**04:00-5:00**	**04:00-5:00**	**04:00-5:00**	**10:00-12:00**

10.0. LEARNING RESOURCES:

Sr.No.	Title of Learning Material	Details
1	Text books	Barar F.S.K., Essentials Of Pharmacotherapeutics, S.Chand & Co.Pvt.Ltd.,
2	Essential references (as per syllabus)	Rang. M.P., Dale M.M., Riter J. M. /4thed, Pharmacology, Churchill, Livingstone
3	Reference material	Text books in college library
4	E-materials and websites	You tube videos
5	Other learning material	Handwritten notes

11.0. FACILITIES REQUIRED:

Sr.No.	Particular of Facility Required
1	Lecture Rooms (capacity for 60 students)
2	Laboratory (capacity for 20 students)
3	Computing resources: PC with latest version and hardware/software and utilization of open source and licensed application software

4	Other resources: Appropriate laboratory tools, Chemicals, Glass ware, Apparatus, Instrumentation

12.0. COURSE IMPROVEMENT PROCESSES:

12.1. Strategies for obtaining student feedback on effectiveness of teaching:

Course delivery evaluation by students using: Questionnaire forms and online questionnaires

12.2. Other strategies for evaluation of teaching by the instructor or by the department:

Periodic review by Academic Planning & Monitoring Committee and departmental review committee, Observations and assistance of colleagues, External assessments by advisors/ examiners and auditors.

12.3. Process for improvement of teaching:

Use of ICT tools, teaching aids, Simultaneous practical orientation and theory classes (SPOT), Adoption of reflective teaching.

12.4. Describe the planning procedures for periodically reviewing of course effectiveness and planning for improvement:

Periodic review by departmental meeting, Review of course delivery and outcome through assessment and feedback from all stake holders.

12.5. Course development plans:

Provide inputs for course improvement and update to University Course development Committees (Board of Studies)

13.0. INFORMATION ABOUT FACULTY MEMBER RESPONSIBLE FOR THE COURSE:

Name	Dr. Nikhilkumar S Sakle
Location	Dept of Pharmacology Lab M. Pharm Research lab.
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Office Hours	10:00 AM to 5:00 PM
Name	**Dr. Hemant D Une (HDU)**

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