



SANT DNYANESHWAR SHIKSHAN SANSTHA'S  
**ANNSAHEB DANGE COLLEGE OF  
B PHARMACY, ASHTA  
[D.Pharm]**

**ACADEMIC BOOKLET**

**A.Y. 2022-23**



Sant Dnyaneshwar Shikshan Sanstha's  
**Annasaheb Dange College of B.Pharmacy, Ashta**  
**[D.Pharm]**

Tal.-Walwa, Dist.-Sangli, Maharashtra, India 416 301



### **Institute Vision:**

“To create competent pharmacy professionals who can efficiently contribute for the healthcare system of society and to the pharmacy profession.”

### **Institute Mission:**

M1: To nurture the right educational environment for personal and professional growth of students.

M2: To develop communication and management skill of students to become a successful entrepreneur.

M3: To thrive ethical pharmacy professionals with leadership skill to cater health care services for society.

M4: To help the students to disseminate acquired knowledge through the fullest commitment for health care services.

### **Program Educational Objectives**

On successful completion of D. Pharmacy program, the graduates shall be able to-

PEO I: Conclusively demonstrate knowledge, skill, attitude and competencies for successful recruitment in various health care related organizations.

PEO II: Realize the vastness of knowledge and pursue higher education in eminent institute to explore their research and management skills.

PEO III: Plan and commence with small start-ups in medicine and health care services.

PEO IV: Participate voluntarily in non-monetary public welfare activities.



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**Subject List**

Sr.No	Name of Subject	Course Abbreviation	Course Code
01	Pharmaceutics	PHT	20111
02	Pharmaceutics	PHP	20051
03	Pharmaceutical Chemistry	PCT	20112
04	Pharmaceutical Chemistry	PCP	20052
05	Pharmacognosy	PYT	20113
06	Pharmacognosy	PYP	20053
07	Human Anatomy and Physiology	HPT	20114
08	Human Anatomy and Physiology	HPP	20054
09	Social Pharmacy	SPT	20115
10	Social Pharmacy	SPP	20055
11	Pharmacology	PGT	20221
12	Pharmacology	PGP	20056
13	Community Pharmacy and Management	CMT	20222
14	Community Pharmacy and Management	CMP	20057
15	Biochemistry & Clinical Pathology	BCT	20223
16	Biochemistry & Clinical Pathology	BCP	20058
17	Pharmacotherapeutics	PTT	20224
18	Pharmacotherapeutics	PTP	20059
19	Hospital and Clinical Pharmacy	HCT	20225
20	Hospital and Clinical Pharmacy	HCP	20060
21	Pharmacy Law and Ethics	PLT	20226



**ANNASAHEB DANGE COLLEGE  
OF B. PHARMACY, ASHTA(D.Pharm)**

**COURSE DETAILS**

<b>Class</b>	F.Y. D. Pharmacy
<b>Course Code and Course Title</b>	<b>DP20111 Pharmaceutics</b>
<b>Prerequisite/s</b>	Science
<b>Teaching Scheme: Lecture/Tutorial</b>	03/01
<b>Evaluation Scheme: SES-I/SES-II /SES-III/ MSBTE</b>	20/20/20/80

<b>Course Objectives:</b> The course aims:	
01	To focus on basic concepts, types and need
02	Advantages and disadvantages, methods of preparation/formulation
03	Packaging and labelling requirements
04	Basic quality control tests, concepts of quality assurance and good manufacturing practices.

<b>Course Outcomes (COs):</b> Upon successful completion of this course, the student will be able to:	
<b>DP20111.1</b>	Outline the history of profession of pharmacy in India and summarize various pharmacopoeia and its development.
<b>DP20111.2</b>	Differentiate the various pharmaceutical dosage forms.
<b>DP20111.3</b>	Classify different types of excipients and packaging material used in pharmaceutical formulations.
<b>DP20111.4</b>	Illustrate the objective, principles, constructions and working of Industrial equipment used for different operations.
<b>DP20111.5</b>	Describe the conventional and novel drug delivery systems.
<b>DP20111.6</b>	Discuss the basic concept of pharmaceutical manufacturing plants and importance of quality assurance and cGMP.

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
<b>DP20111.1</b>	3	-	1	-	-	-	-	-	2
<b>DP20111.2</b>	3	-	-	-	-	-	2	-	2
<b>DP20111.3</b>	3	-	-	-	-	-	1	-	2
<b>DP20111.4</b>	3	2	-	-	-	-	-	-	2
<b>DP20111.5</b>	3	-	2	2	-	-	2	-	2
<b>DP20111.6</b>	3	-	-	-	2	-	-	2	2
Total	18	2	3	2	2	-	5	2	12
Avg.	<b>3.0</b>	<b>2.0</b>	<b>1.5</b>	<b>2.0</b>	<b>2.0</b>	-	<b>1.67</b>	<b>2.0</b>	<b>2.0</b>
<b>DP20111</b>	<b>3.0</b>	<b>2.0</b>	<b>1.5</b>	<b>2.0</b>	<b>2.0</b>	-	<b>1.67</b>	<b>2.0</b>	<b>2.0</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
DP20111	3.0	2.0	1.5	2.0	2.0	-	1.67	2.0	2.0

Course DP20111	Course Outcomes					
	DP20111. 1	DP20111. 2	DP20111. 3	DP20111. 4	DP20111. 5	DP20111. 6
<b>Target</b>	2.0	3.0	2.0	2.0	2.0	2.0
<b>Target Level</b>	Students scoring more than 40% marks					
<b>1</b>	>50%					
<b>2</b>	>55%					
<b>3</b>	>60%					

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	DP20111.1, DP20111.3	Online MCQ test, Assignment,
SES-II	DP20111.4 , DP20111.5	Written test, Assignment,
SES-III	DP20111.2, DP20111.5, DP20111.6	Written test, Assignment, Seminar,
MSBTE	DP20111.1,DP20111.2,DP20111.3, DP20111.4 , DP20111.5, DP20111.6	Written test

COURSE DETAILS		
1	History of the profession of Pharmacy in India in relation to Pharmacy education, industry, pharmacy practice, and various professional associations. Pharmacy as a career Pharmacopoeia: Introduction to IP, BP, USP, NF and Extra Pharmacopoeia. Salient features of Indian Pharmacopoeia	07 Hours
2	<b>Packaging materials:</b> Types, selection criteria, advantages and disadvantages of glass, plastic, metal, rubber as packaging materials	05 Hours
3	<b>Pharmaceutical aids:</b> Organoleptic (Colouring, flavouring, and sweetening) agents <b>Preservatives:</b> Definition, types with examples and uses	03 Hours
4	<b>Unit operations:</b> Definition, objectives/applications, principles, construction, and workings of:  <b>Size reduction:</b> hammer mill and ball mill	09 Hours

	<p><b>Size separation:</b> Classification of powders according to IP, Cyclone separator, Sieves and standards of sieves</p>	
	<p><b>Mixing:</b> Double cone blender, Turbine mixer, Triple roller mill and Silverson mixer homogenizer</p>	
	<p><b>Filtration:</b> Theory of filtration, membrane filter and sintered glass filter</p>	
	<p><b>Drying:</b> working of fluidized bed dryer and process of freeze drying</p>	
	<p><b>Extraction:</b> Definition, Classification, method, and applications</p>	
5	<p><b>Tablets</b> – coated and uncoated, various modified tablets (sustained release, extended-release, fast dissolving, multilayered, etc.)</p>	08 Hours
	<p><b>Capsules</b> - hard and soft gelatine capsules</p>	04 Hours
	<p><b>Liquid oral preparations</b> - solution, syrup, elixir, emulsion, suspension, dry powder for reconstitution .</p>	06 Hours
	<p><b>Topical preparations</b> - ointments, creams, pastes, gels, liniments and lotions, suppositories, and pessaries Nasal preparations, Ear preparations</p>	02 Hours
	<p><b>Powders and granules</b> - Insufflations, dusting powders, effervescent powders, and effervescent granules</p>	03 Hours
	<p><b>Sterile formulations</b> – Injectables, eye drops and eye ointments</p>	06 Hours
	<p><b>Immunological products:</b> Sera, vaccines, toxoids, and their manufacturing methods</p>	04Hours
6	<p><b>Basic structure, layout, sections, and activities of pharmaceutical manufacturing plants</b></p>	05Hours
	<p><b>Quality control and quality assurance:</b> Definition and concepts of quality control and quality assurance, current good manufacturing practice (cGMP), Introduction to the concept of calibration and validation</p>	
7	<p><b>Novel drug delivery systems:</b> Introduction, Classification with examples, advantages, and challenges</p>	05Hours

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Pharmaceutics	Dr. Ashok Hajare	Nirali Prakashan	1 <sup>st</sup>	2021
02	Pharmaceutics	Dr.A.K.Seth	Pee Vee	1 <sup>st</sup>	2017
03	Pharmaceutics-I	Dr.P.V. Kasture, Dr. S.R. Parakh, S.A. Hasan, S.B. Gokhale	Nirali Prakashan	21 <sup>st</sup>	2015

<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Pharmaceutics-I	R.M.Mehata	Vallabh Prakashan	6 <sup>th</sup>	2015
02	Pharmaceutics-II	R.M.Mehata	Vallabh Prakashan	4 <sup>th</sup>	2015
03	Introduction to Pharmaceutics-I	Ashok K.Gupta	CBS Publishers and Distributors Pvt.Ltd.	3 <sup>rd</sup>	1994
04	Pharmaceutical Engineering	C. V.S.Subrahmanyam, J. Thimma Setty, Mrs.Sarasija Suresh Mrs.V.Kusum Devi	Vallabh Prakashan.	1 <sup>st</sup>	2001
05	A Text book of Pharmaceutics Formulation	B.M. Mithal	Vallabh Prakashan.	6 <sup>th</sup>	1997
06	History of Pharmacy in India	Dr. Harikishan Singh	Vallabh Prakashan.		1994
07	The Theory and Practice of Industrial Pharmacy.	Leon Lachman, Herbert Lieberman	Lea & Febiger,U.S	3 <sup>rd</sup>	1986

**Content Delivery and assessment tools:**



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Unit	Lect. No.	Lesson Plan	TM	TA	AT	Mapping with Outcomes	
		Content Delivery				CO	PO
I	1	<b>History of the Profession of Pharmacy in India in relation to pharmacy education</b>	LT	CB,PP,	QA,CT,	DP20111.1	1,3,9
	2	industry					
	3	pharmacy practice					
	4	various professional Associations					
	5	Pharmacy as a career					
	6	Pharmacopoeia: Introduction to IP, BP, USP, NF and Extra Pharmacopoeia.					
	7	Salient Features of Indian Pharmacopoeia					
II	8	<b>Packaging Materials: Types, selection criteria, advantages and disadvantages of</b>	LT	CB,PP,	QA,CT,	DP20111.3	1,7,9
	9	Glass					
	10	Plastic					
	11	Metal					
	12	Rubber					
III	13	<b>Pharmaceutical aids</b> Organoleptic (Colouring, Flavouring agents)	LT	CB,PP,	QA,CT,	DP20111.3	1,7,9
	14	Sweetening agents.					
	15	Preservatives: Definition, Types with examples and uses					
IV	16	<b>Unit Operations:</b> Definition, Objectives/applications, Principles, construction, working of	LT	CB,PP, VF	QA,CT,	DP20111.4	1, 2,9
	17	SIZE REDUCTION: Hammer mill & Ball mill					
	18	SIZE SEPARATION: Classification of Powders according to IP,					
	19	Cyclone Separator, Sieves and Standard of sieves					
	20	MIXING: Double cone blender, Turbine mixer,					



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	21	Triple roller mill and Silverson mixer homogenizer					
	22	FILTRATION: Theory of Filtration, membrane filter and sintered glass filter.					
	23	DRYING: Working of Fluidized bed dryer and process of freeze drying.					
	24	EXTRACTION: Definition, Classification, method and applications.					
V	25	<b>Tablets</b>	LT	CB,PP, VF	QA,CT	DP20111.2, DP20111.5	1,3,4,7,9
	26	Coated					
	27	Uncoated					
	28	Various modified tablets					
	29	Sustained released					
	30	Extended released					
	31	Fast dissolving					
	32	Multi-layered					
	33	<b>Capsules</b>					
	34	Hard Gelatin capsules					
	35	Hand operated capsule filling machines					
	36	Soft gelatine capsules					
	37	<b>Liquid Oral preparation: Solution</b>					
	38*	Syrup					
	39	Elixir					
	40	Emulsion					
	41	Suspension					
	42	Dry powder for reconstitution					
	43	<b>Topical Preparations</b>					



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	44	Ointments					
	45	Creams					
	46	Pastes					
	47	Gels					
	48	Liniments and lotions					
	49	Suppositories					
	50	Pessaries					
	51	Nasal Preparations					
	52	Ear Preparations					
	53	<b>Powders and granules:</b> Insufflations, Dusting Powders					
	54	Effervescent Powders					
	55	Effervescent Granules					
	56	<b>Sterile Formulations:</b>					
	57	Injectables					
	58	Injectables					
	59	Eye drops					
	60	Eye drops					
	61	Eye ointments					
	62	<b>Immunological products</b>					
	63	Sera					
	64	Vaccines					
	65	Toxoids					
VI	66	<b>Basic structure, Layout, Sections and activities of pharmaceutical manufacturing plants.</b>	LT	CB,PP	QA,CT	DP20111.6	1,5,8,9



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	67	Definition and concepts of Quality Control and Quality Assurance,					
	68	Current Good Manufacturing Practices [cGMP]					
	69	Introduction to the concept of Calibration					
	70	Validation					
VII	71	<b>Novel drug delivery systems:</b> Introduction	LT	CB,PP	QA,CT	DP20111.2 DP20111.5	1,3,4,7,9
	72	Classification with examples					
	73	Classification with examples					
	74	Advantages					
	75	Challenges					

**TM-Teaching Method-** Lecture (LT).

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Class Tests (CT), Question Answers (QA), MSBT Examinations (EX), Rubrics (RB) , Course End Survey filled by students,

**COURSE DETAILS**

<b>Class</b>	F.Y. D. Pharmacy
<b>Course Code and Course Title</b>	<b>DP20051Pharmaceutics</b>
<b>Prerequisite/s</b>	Science
<b>Teaching Scheme: Practical</b>	03 Hours
<b>Total contact hours</b>	75 Hours
<b>Evaluation Scheme: SES-I /SES-II/SES-III / MSBTE</b>	10/10/10/80

<b>Course Objectives:</b> The course aims:	
01	Calculation of working formula from the official master formula
02	Formulation of dosage forms based on working formula
03	Methods of basic quality control tests

<b>Course Outcomes (COs):</b> Upon successful completion of this course, the student will be able to:	
<b>DP20051.1</b>	Describe the Indian Pharmacopoeia, National formulary and various types of pharmaceutical dosage forms.
<b>DP20051.2</b>	Calculate the working formula from the given master formula.
<b>DP20051.3</b>	Prepare the selected dosage forms and dispense in appropriate container.
<b>DP20051.4</b>	Demonstrate the equipments used in manufacturing processes and selected devices with its uses.
<b>DP20051.5</b>	Illustrate and Perform the evaluation test of dosage forms.

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
<b>DP20051.1</b>	3	-	-	2	2	2	-	-	2
<b>DP20051.2</b>	3	-	1	-	2	-	-	-	2
<b>DP20051.3</b>	3	2	1	2	2	-	-	-	2
<b>DP20051.4</b>	3	2	1	2	2	-	-	-	2
<b>DP20051.5</b>	3	2	1	2	2	2	-	-	2
Total	15	6	4	8	10	4	-	-	10
Avg.	<b>3.0</b>	<b>2.0</b>	<b>1.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	-	-	<b>2.0</b>
<b>DP20051</b>	<b>3.0</b>	<b>2.0</b>	<b>1.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	-	-	<b>2.0</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
DP20051	3.0	2.0	1.0	2.0	2.0	2.0	-	-	2.0

Course DP20051	Course outcome				
	DP20051.1	DP20051.2	DP20051.3	DP20051.4	DP20051.5
Target	3.0	2.0	2.0	2.0	2.0
Target Level	Students scoring above 40% marks				
1	>50%				
2	>55%				
3	>60%				

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	DP20051.1, DP20051.3, DP20051.5	Online test
SES-II	DP20051.1, DP20051.2, DP20051.3	Written test
SES-III	DP20051.1, DP20051.2, DP20051.3, DP20051.4, DP20051.5	Journal and Viva examination
MSBTE	DP20051.1, DP20051.2, DP20051.3, DP20051.4, DP20051.5	Practical exam

Expt No	Title of Experiment	CO	PO
1	Handling and referring the official references: Pharmacopoeia, Formularies, etc. for retrieving formulas, procedures, etc.	DP20051.1	1,9
2,3	To prepare and submit simple syrup. To prepare and submit piperazine citrate elixir.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
4,5	To prepare and submit aqueous iodine solution. To prepare and submit strong iodine solution.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9

6	To prepare and submit Castor oil emulsion. To prepare and submit cod liver oil emulsion.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
7&8	To prepare and submit olive oil emulsion. To prepare and submit calamine lotion.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
9&10	To prepare and submit magnesium hydroxide mixture. To prepare and submit simple ointment base.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
11&12	To prepare and submit sulphur ointment. To prepare and submit cetrimide cream.		
13&14	To prepare and submit sodium alginate gel. To prepare and submit turpentine liniment.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
15&16	To prepare and submit white liniment. To prepare and submit effervescent powder.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
17&18	To prepare and submit talc dusting powder. To prepare and submit normal saline solution.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
19&20	To prepare and submit glycerol suppositories. To prepare and submit electrolyte dry powder for reconstitution.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9

21&22	To prepare and submit calcium gluconate injection. To prepare and submit zinc sulphate eye drops.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
23&24	To prepare and submit indometacin capsule. To prepare and submit tetracycline capsule.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
25&26	To prepare and submit paracetamol tablet granules. To prepare and submit cold cream.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
27&28	To prepare and submit shampoo. To prepare and submit sunscreen lotion.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
29&30	To prepare and submit toothpaste. To prepare and submit tooth powder.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
31&32	To prepare and submit face powder. To demonstrate tablet manufacturing process.	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5,6,9
33&34	To demonstrate tablet coating process (sugar coating) To demonstrate uses of inhalers.	DP20051.1 DP20051.2 DP20051.3 DP20051.4	1,2,3,4,5,6,9
35	To demonstrate uses of spacers.	DP20051.4	1,2,3,4,5,9
36	To demonstrate uses of insulin pens.	DP20051.4	1,2,3,4,5,9



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37	To evaluate the given tablet sample.	DP20051.5	1,2,3,4,5,6,9
38	To evaluate the given hard gelatin capsule sample.	DP20051.5	1,2,3,4,5,6,9
39	To evaluate the given sample of emulsion.	DP20051.5	1,2,3,4,5,6,9
40	To demonstrate the evaluation the given sample of sterile product (ampoule).	DP20051.5	1,2,3,4,5,6,9
41	Visit to pharmaceutical Industry.	--	-

**Assessment Tools:** Laboratory Evaluation & assessment Rubric.

**Text Books:**

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Practical Manual of Pharmaceutics	Dr. G.D. Gupta Dr. Shailaish Sharama Dr. Neelam Sharma	Nirali Prakashan	1 <sup>st</sup>	2021

**Reference Books:**

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Indian Pharmacopeia 2014- Volume -II	-----	Indian Pharmacopeia Commission	7 <sup>th</sup>	2014

**Content Delivery and assessment tools:**

**COURSE DETAILS-PRACTICAL**

<b>Expt No</b>	<b>Title of Experiment</b>	<b>TM Teaching Methodology</b>	<b>Mapping with CO</b>	<b>Mapping with PO</b>
1	Handling and referring the official references: Pharmacopoeia, Formularies, etc. for retrieving formulas, procedures, etc.	LT,CB	DP20051.1	1,9
2,3	To prepare and submit simple syrup. To prepare and submit piperazine citrate elixir.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
4,5	To prepare and submit aqueous iodine solution. To prepare and submit strong iodine solution.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
6	To prepare and submit Castor oil emulsion. To prepare and submit cod liver oil emulsion.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
7&8	To prepare and submit olive oil emulsion. To prepare and submit calamine lotion.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
9&10	To prepare and submit magnesium hydroxide mixture. To prepare and submit simple ointment base.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
11&12	To prepare and submit sulphur ointment. To prepare and submit cetrimide cream.	LT,CB,DM		
13&14	To prepare and submit sodium alginate gel. To prepare and submit turpentine liniment.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9

15&16	To prepare and submit white liniment. To prepare and submit effervescent powder.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
17&18	To prepare and submit talc dusting powder. To prepare and submit normal saline solution.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
19&20	To prepare and submit glycerol suppositories. To prepare and submit electrolyte dry powder for reconstitution.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
21&22	To prepare and submit calcium gluconate injection. To prepare and submit zinc sulphate eye drops.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
23&24	To prepare and submit indometacin capsule. To prepare and submit tetracycline capsule.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
25&26	To prepare and submit paracetamol tablet granules. To prepare and submit cold cream.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
27&28	To prepare and submit shampoo. To prepare and submit sunscreen lotion.	LT,CB,DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9

29&30	To prepare and submit toothpaste. To prepare and submit tooth powder.	LT, CB, DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
31&32	To prepare and submit face powder. To demonstrate tablet manufacturing process.	LT, CB, DM	DP20051.1 DP20051.2 DP20051.3	1,2,3,4,5, 6,9
33&34	To demonstrate tablet coating process (sugar coating) To demonstrate uses of inhalers.	LT, CB, DM, VF	DP20051.1 DP20051.2 DP20051.3 DP20051.4	1,2,3,4,5, 6,9
35	To demonstrate uses of spacers.	LT, CB, DM	DP20051.4	1,2,3,4,5, 9
36	To demonstrate uses of insulin pens.	LT, CB, DM, VF	DP20051.4	1,2,3,4,5, 9
37	To evaluate the given tablet sample.	LT, CB, DM	DP20051.5	1,2,3,4,5, 6,9
38	To evaluate the given hard gelatin capsule sample.	LT, CB, DM	DP20051.5	1,2,3,4,5, 6,9
39	To evaluate the given sample of emulsion.	LT, CB, DM	DP20051.5	1,2,3,4,5, 6,9
40	To demonstrate the evaluation the given sample of sterile product (ampoule).	LT, CB, DM	DP20051.5	1,2,3,4,5, 6,9
41	Visit to pharmaceutical Industry.		--	-

**TM-Teaching Method-** Lecture (LT), Demonstration (DM), Chart (C), Model (M)

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Question Answers (QA), Class Tests (CT), Sessional Examination (SE), Final Examinations (FE), Rubrics (RB) , Course End Survey filled by students,



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**COURSE DETAILS**

<b>Class</b>	D. Pharmacy 1 <sup>st</sup> year
<b>Course Code and Course Title</b>	Pharmaceutical Chemistry (20112)
<b>Prerequisite/s</b>	Basic & preliminary knowledge of Chemistry is essential
<b>Teaching Scheme:</b> (Lecture/Practical/Tutorial)	03/03/01
<b>Evaluation Scheme:</b> Theory Paper/SE/Practical Exam/SE	80/20/80/20 (10+10)

<b>Course Objectives:</b> The course aims: (What teacher want to do with course while teaching) This course will discuss the following aspects of the chemical substances used as a drugs and pharmaceuticals for various disease conditions.	
01	Chemical classification, chemical name, chemical structure
02	Pharmacological uses, doses, stability, and storage conditions
03	Different type of formulations/ dosage forms available and their brand names
04	Impurity testing and basic quality control tests.

<b>Course Outcomes (COs):</b> Upon successful completion of this course, the student will be able to:	
DP20112.1	Discuss significance of error and basic principles of quality control of drugs with their impurity profiling.
DP20112.2	Describe the quantitative and qualitative analysis of selected drugs
DP20112.3	Define different terms and diseases, Classify the medicinal compounds according to their chemical structure
DP20112.4	Explain the storage condition, dose and therapeutic value of drugs.
DP20112.5	Outline the monographic content and marketed preparations of selected inorganic and organic compounds
DP20112.6	Draw chemical structure and interpret chemical name of medicinal drug according to the IUPAC System.

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	PO								
	1	2	3	4	5	6	7	8	9
DP20112.1T	3		1			1	-	1	
DP20112.2T	3		1	1		1			1
DP20112.3T	3	1	1			1	-		1
DP20112.4T	3		1			1	-	1	1
DP20112.5T	3		1			1	-		
DP20112.6T	3	1	1	1	1	1			1
Total	18	2	6	2	1	6	-	2	4



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Avg.	3	1	1	1	1	1	1	1
<b>DP20112T</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>

**Targets for Course Outcome:**

20112	Course Outcomes					
	DP20112.1	DP20112.2	DP20112.3	DP20112.4	DP20112.5	DP20112.6
<b>Target</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>

Target Level	Description
1	50% students scoring more than Board average percentage marks in the final examination or in internal exams
2	55% students scoring more than Board average percentage marks in the final examination or in internal exams
3	60% students scoring more than Board average percentage marks in the final examination or in internal exams

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	CO603.1, CO603.2	Written test
SES-II	CO603.3, CO603.4	Written test
TM	CO603.1, CO603.2, CO603.3, CO603.4, CO603.5	MCQ, Assignment, Open book test, Seminar,
ESE	CO603.1, CO603.2, CO603.3, CO603.4, CO603.5	Written test

Course Details		Hours
<b>Chapter 1</b>	<b>INTRODUCTION TO PHARMACEUTICAL CHEMISTRY</b>	<b>8 Hours</b>
UO20212.1	Scope and objective	
UO20212.2	Sources and types of errors: Accuracy, precision, Significant figures	
UO20212.3	Impurities in pharmaceuticals: Sources and effect of Impurities in pharmaceuticals	
UO20212.4	Limit test and its importance, Limit test for chloride, Limit test for sulphate, Limit test for iron and heavy metals, Limit test for Arsenic.	

<b>Chapter 2</b>	<b>VOLUMETRIC ANALYSIS</b>	<b>8 Hours</b>
UO20212.5	Introduction, Fundamentals of volumetric analysis,	
UO20212.6	Acid- base titration, Non- aqueous titration	
UO20212.7	Precipitation titration, Complexometric titration	
UO20212.8	Redox titration, Gravimetric analysis: principle and method	
<b>Chapter 3</b>	<b>INORGANIC PHARMACEUTICALS</b> Pharmaceutical formulations, marketed preparations, storage conditions and uses of:	<b>7 Hours</b>
UO20212.9	<b>Haematinics</b> Ferrous sulphate, Ferrous Fumarate, Ferric ammonium citrate, Ferrous ascorbate, carbonyl iron	
UO20212.10	<b>Gastro-Intestinal Agents</b> Antacids, Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, calcium carbonate, Acidifying agents, Adsorbents, Protectives, Cathartics	
UO20212.11	<b>Topical Agents</b> silver nitrate, ionic silver, chlorhexidine Gluconate Hydrogen Peroxide, boric acid, bleaching powder, potassium permanganate,	
UO20212.12	<b>Dental Products</b> Calcium carbonate, sodium fluoride, Denture cleaners, Denture Adhesives, Mouth washes	
UO20212.13	<b>Medicinal Gases:</b> carbon dioxide, nitrous oxide, Oxygen	
<b>Chapter 4</b>	<b>HETEROCYCLIC SYSTEM</b>	
UO20212.14	Introduction to the nomenclature of organic chemical system with reference to heterocyclic system containing up to 3 rings	
The chemistry of following category of medicinal compounds with respect to classification, chemical name, chemical structure (compounds marked with*) uses, stability and storage conditions, different types of formulations and their popular brand names.		
<b>Chapter 5</b>	<b>DRUGS ACTING ON CENTRAL NERVOUS SYSTEM</b>	<b>9 Hours</b>
UO20212.15	<b>Anaesthetics</b> Introduction & Classification Thiopental sodium*, Ketamine Hydrochloride*, Propofol	
UO20212.16	<b>Sedatives Hypnotics</b> Introduction and Classification Diazepam*, Alprazolam*, Nitrazepam, Phenobarbital*	
UO20212.17	<b>Antipsychotics</b> Introduction and Classification Chlorpromazine Hydrochloride*, Haloperidol*,	

	Resperidone*, Sulpiride*, Olanzapine, Quetiapine, Lurasidone	
UO20212.18	<b>Anticonvulsants</b> Introduction and Classification Phenytoin*, carbamazepine*, clonazepam, valproic acid*, Gabapentin*, topiramate, vigabatrin, lamotrigine	
UO20212.19	<b>Antidepressant</b> Defination& Classification Imipramine hydrochloride*, Amitryptiline hydrochloride *, Fluoxetine*, venlafaxine, Duloxetine, Sertaline, Citalopram, Escitalopram, Fluvoxamine, paroxetine	
<b>Chapter 6</b>	<b>DRUGS ACTING ON AUTONOMIC NERVOUS SYSTEM</b>	
UO20212.20	<b>Sympathomimetic agents:</b> Introduction and Classification <b>direct acting agents</b> Nor-epinephrine*, Epinephrine, Phenylephrine, Dopamine*, Terbutaline, Salmeterol, Salbutamol, Albuterol, Naphazoline*, Tetrahydrazoline, <b>Indirect acting agents</b> Hydroxyamphetamine, Pseudoephedrine, <b>Agents with mixed mechanism</b> Ephedrine, Metaraminol.	
UO20212.21	<b>Adrenergic Antagonist</b> <b>Alpha adrenergic blockers</b> Tolazoline, Phentolamine, Phenoxybenzamine, Prazosin <b>Beta adrenergic blockers:</b> Propranolol*, Atenolol*, Carvedilol	<b>9 Hours</b>
UO20212.22	<b>Cholinergic Agonist</b> <b>Direct acting agents</b> Acetylcholine*, Carbachol, and Pilocarpine. <b>Cholinesterase inhibitors</b> Neostigmine*, Edrophonium chloride, Tacrine hydrochloride, Pralidoxime chloride, Echothiophate iodide <b>Cholinergic Blocking agents</b> <b>Solanaceous alkaloids and analogues</b> Atropine sulphate*, Ipratropium bromide. <b>Synthetic cholinergic blocking agents</b> Tropicamide, Cyclopentolate hydrochloride, Clindinium bromide, Dicyclomine hydrochloride*	
<b>Chapter 7</b>	<b>DRUGS ACTING ON CARDIOVASCULAR SYSTEM</b>	
UO20212.23	<b>Antiarrhythmic Drugs</b> Quinidine Sulphate, Procainamide Hydrochloride, Verapamil, Phenytoin Sodium*, Lidocaine	<b>5 Hours</b>



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	Hydrochloride, Lorcaïnide Hydrochloride, Amiodarone and Sotalol	
UO20212.24	<b>Antihypertensive Drugs</b> Propranolol*, Captopril*, Ramipril, Methyldopate Hydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine	
UO20212.25	<b>Antianginal Agents</b> Isosorbidedinitrate	

<b>Chapter 8</b> UO20212.26	<b>DIURETICS</b> Acetazolamide, Frusemide*, Bumetanide, Chlorthalidone, Benzthiazide, Metolazone, Xipamide, Spironolactone	<b>2 Hours</b>
<b>Chapter 9</b> UO20212.27	<b>HYPOGYCEMIC AGENTS</b> Insulin and Its Preparations, Metformin*, Glibenclamide*, Glimepiride, Pioglitazone, Repaglinide, Gliflozins, Gliptins	<b>3 Hours</b>
<b>Chapter 10</b> UO20212.28	<b>ANALGESIC AND ANTI-INFLAMMATORY AGENTS</b> Morphine Analogues, Narcotic Antagonists; Nonsteroidal Anti-Inflammatory Agents (NSAIDs) - Aspirin*, Diclofenac, Ibuprofen*, Piroxicam, Celecoxib, Mefenamic Acid, Paracetamol*, Aceclofenac	<b>3 Hours</b>
<b>Chapter 11</b>	<b>ANTI INFECTIVE</b>	
UO20212.29	<b>Antifungal Agents</b> Amphotericin-B, Griseofulvin, Miconazole, Ketoconazole*, Itraconazole, Fluconazole*, Naftifine Hydrochloride	
UO20212.30	<b>Urinary Tract Anti-Infective Agents</b> Norfloxacin, Ciprofloxacin, Ofloxacin*, Moxifloxacin,	<b>8 Hours</b>
UO20212.31	<b>Antitubercular Drugs</b> INH*, Ethambutol, Para Amino Salicylic Acid, Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, Pretomanid*	
UO20212.32	<b>Antiviral Agents</b> Amantadine Hydrochloride, Idoxuridine, Acyclovir*, Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir	
UO20212.33	<b>Antimalarials</b> Quinine Sulphate, Chloroquine Phosphate*, Primaquine Phosphate, Mefloquine*, Cycloguanil, Pyrimethamine, Artemisinin	
UO20212.34	<b>Sulfonamides</b> Sulfanilamide, Sulfadiazine, Sulfamethoxazole, Sulfacetamide*, Mafenide Acetate, Cotrimoxazole,	

	Dapsone*	
<b>Chapter 12</b> UO20212.35	<b>ANTIBIOTICS</b> Definition, Classification, Nomenclature Penicillin G, Amoxicillin*, Cloxacillin, Streptomycin, <b>Tetracyclines:</b> Doxycycline, Minocycline <b>Macrolides:</b> Erythromycin, Azithromycin <b>Miscellaneous:</b> Chloramphenicol* Clindamycin	<b>8 Hours</b>
<b>Chapter 13</b> UO20212.36	<b>ANTI-NEOPLASTIC DRUGS</b> Introduction and classification Cyclophosphamide*, Busulfan, Mercaptopurine, Fluorouracil*, Methotrexate, Dactinomycin, Doxorubicin Hydrochloride, Vinblastine Sulphate, Cisplatin*, Dromostanolone Propionate	<b>3 Hours</b>

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Pharmaceutical Chemistry- Inorganic	G.R.Chatwal	Himalaya Publishing House	5 <sup>th</sup>	2016
02	Pharmaceutical Inorganic Chemistry	Dr. Mrs. Jyoti Gupta Mohit Sanduja Mrs. Maduri Grover	Nirali Prakashan	2 <sup>nd</sup>	2018
03	Pharmaceutical Chemistry-I	Dr.A.V.Kasture Late.Dr.S.G.Wadodkar	Nirali Prakashan	3 <sup>rd</sup>	2017
04	Concise Inorganic Pharmaceutical Chemistry	Dr.K.R Mahadik Dr B S Kuchekar	Nirali Prakashan	15 <sup>th</sup>	2017
05	Practical Pharmaceutical Chemistry-I	Dr.A.V.Kasture Late.Dr.S.G.Wadodkar S.B.Gokale	Nirali Prakashan	19 <sup>th</sup>	2017
06	A practical Book of Pharmaceutical inorganic Chemistry	Dr. Mrs. Jyoti Gupta Mohit Sanduja Mrs. Maduri Grover	Nirali Prakashan	2 <sup>nd</sup>	2018
07	Concise Organic Pharmaceutical Chemistry-II	K. R. Mahadik	Nirali Publisher	16 <sup>th</sup>	2017
08	Pharmaceutical Chemistry-II	V. N. Rajsekaran	C. B. S. Publication	1 <sup>st</sup>	2016
09	Pharmaceutical chemistry –II	Dr.A.V.Kasture Dr. S.G Wadodkar	Niraliprakashan	-----	2014



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<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Practical Pharmaceutical Chemistry(Part one)	A.H.Beckett J.B.Stenlake	CBS Publisher & Distributers Pvt.Ltd.	1 <sup>st</sup>	1997
02	Indian Pharmacopoeia 2014 Vol.I,II,III,IV	Government of India Min. Of health & Family Welfare	The Indian Pharmacopoeia Commission Ghaziabad		2014
03	Wilson and Gisvold's textbook of Organic Medicinal and Pharmaceutical Chemistry	John M Beale, John H. Block	Lippincott Williams and Wilkins	12 <sup>th</sup>	2010
04	A companion to Medicinal Chemistry	N. N. Inamdar	Career Publication		

**Content Delivery and assessment tools:**

Unit	Lect. No.	Lesson Plan	TM	TA	AT	Mapping with Outcomes	
		Content Delivery				CO	PO
I	1	<b>Introduction to Pharmaceutical chemistry</b> Scope and objective	LT	CB,PP,	QA,CT, EX, RB	DP20112.1	1,3,6,8
	2	Sources and types of errors: Accuracy, precision, Significant figures					
	3	Impurities in pharmaceuticals: Sources and effect of Impurities in pharmaceuticals					
	4	Limit test and its importance					
	5	Limit test for chloride					
	6	Limit test for sulphate					
	7	Limit test for iron and heavy metals					
	8	Limit test for Arsenic					
II	9	<b>Volumetric Analysis</b> Introduction	LT	CB,PP,	QA,CT, EX, RB	DP20112.2	1,3,4,6,9
	10	Fundamentals of volumetric analysis					
	11	Acid- base titration					
	12	Non- aqueous titration					
	13	Precipitation titration					
	14	Complexometric titration					
	15	Redox titration					
	16	Gravimetric analysis: principle and method					
III	17	<b>Inorganic Pharmaceuticals</b> <b>Haematinics:</b> Ferrous sulphate, Ferrous Fumarate, Ferric ammonium citrate, Ferrous ascorbate, carbonyl iron	LT	CB,PP, VF	QA,CT EX,RB	DP20112.5	1,3,6
	18	<b>Gastro-Intestinal Agents:</b> Antacids, Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, calcium carbonate,					
	19	Acidifying agents, Adsorbents, Protectives, Cathartics					

	20	<b>Topical Agents:</b> silver nitrate, ionic silver, chlorhexidine Gluconate					
	21	Hydrogen Peroxide, boric acid, bleaching powder, potassium permanganate					
	22	<b>Dental Products:</b> Cal.carbonate, sodium fluoride, Denture cleaners, Denture Adhhesives, Mouth washes					
	23	<b>Medicinal Gases:</b> carbon dioxide, nitrous oxide, Oxygen					
IV	24	<b>HETEROCYCLIC SYSTEM :</b> Introduction to the nomenclature of organic chemical system with reference to heterocyclic system containing up to 3 rings	LT	CB,PP, VF	QA,CT, EX, RB	DP20112.6	1,2,3,4,5,6,9
	25	<b>HETEROCYCLIC SYSTEM :</b> Introduction to the nomenclature of organic chemical system with reference to heterocyclic system containing up to 3 rings					
V	26	<b>DRUGS ACTING ON CENTRAL NERVOUS SYSTEM</b> <b>ANAESTHETICS</b> Introduction & Classification	LT	CB,PP, VF	QA,CT, EX, RB	DP20112.3 DP20112.4 DP20112.5 DP20112.6	1,2,3,4,5,6,8, 9
	27	Thiopental sodium*, Ketamine Hydrochloride*, Propofol					
	28	<b>SEDATIVES HYPNOTICS</b> Introduction and Classification Diazepam*, Alprazolam*, Nirazepam Phenobarbital*					
	29	<b>ANTIPSYCHOTICS</b> Introduction and Classification					
	30	Chlorpromazine Hydrochloride*, Haloperidol*, Resperidone*, Sulpiride*, Olanzapine, Quetiapine, Lurasidone					
	31	<b>ANTICONVULSANTS</b> Phenytoin*, carbamazepine*, clonazepam, valproic acid*,					
	32	Gabapentin*, topiramate, vigabatrin, lamotrigine					
	33	<b>ANTIDEPRESSANT</b> Defination& Classification					
	34	Imipramine hydrochloride*, Amitryptiline hydrochloride *, Fluoxetine*,					

		venlafaxine, Duloxetine, Sertaline, Citalopram, Escitalopram, Fluvoxamine, paroxetine					
VI	35	<b>DRUGS ACTING ON AUTONOMIC NERVOUS SYSTEM</b>	LT	CB,PP, VF	QA,CT, EX, RB	DP20112.3 DP20112.4 DP20112.5 DP20112.6	1,2,3,4,5,6,8, 9
		<b>SYMPATHOMIMETIC AGENTS</b>					
		<b>direct acting</b> Introduction and Classification Nor-epinephrine*, Epinephrine, Phenylephrine, Dopamine*, Terbutaline, Salmeterol, Salbutamol, Albuterol, Naphazoline*, Tetrahydrozoline,					
	36	<b>Indirect acting agents:</b> Hydroxyamphetamine, Pseudoephedrine,					
	37	<b>Agents with mixed mechanism:</b> Ephedrine, Metaraminol.					
	38	<b>ADRENERGIC ANTAGONIST</b> <b>Alpha adrenergic blockers:</b> Tolazoline, Phentolamine, Phenoxybenzamine, Prazosin					
	39	<b>Beta adrenergic blockers:</b> Propranolol*, Atenolol*, Carvedilol*					
	40	<b>CHOLINERGIC AGONIST</b> <b>Direct acting agents:</b> Acetylcholine*, Carbachol, and Pilocarpine.					
	41	<b>Cholinesterase inhibitors:</b> Neostigmine*, Edrophonium chloride, Tacrine hydrochloride, Pralidoxime chloride, Echothiophate iodide					
42	<b>CHOLINERGIC BLOCKING AGENTS:</b> <b>Solanaceous alkaloids and analogues:</b> Atropine sulphate*, Ipratropium bromide.						
43	<b>Synthetic cholinergic blocking agents:</b> Tropicamide, Cyclopentolate hydrochloride, Clindinium bromide, Dicyclomine hydrochloride*						
VII	44	<b>DRUGS ACTING ON CARDIOVASCULAR SYSTEM</b>	LT	CB,PP, VF	QA,CT, EX, RB	DP20112.3 DP20112.4 DP20112.5 DP20112.6	1,2,3,4,5,6,8, 9
		<b>ANTIARRHYTHMIC DRUGS</b> Quinidine Sulphate, Procainamide Hydrochloride, Verapamil, Phenytoin Sodium*,					
	45	Lidocaine Hydrochloride, Lorcaïnide Hydrochloride, Amiodarone and Sotalol					
46	<b>ANTIHYPERTENSIVE DRUGS</b> Propranolol*, Captopril*, Ramipril,						

	47	Methyldopate Hydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine					
	48	<b>ANTIANGINAL AGENTS</b> Isosorbidedinitrate					
VIII	49	<b>DIURETICS</b> Acetazolamide, Frusemide*, Bumetanide,	LT	CB,PP, VF	QA,CT, EX, RB	DP20112.3 DP20112.4 DP20112.5 DP20112.6	1,2,3,4,5,6,8, 9
	50	Chlorthalidone, Benzthiazide, Metolazone, Xipamide, Spironolactone					
XV	51	<b>HYPOGYCEMIC AGENTS</b> Insulin and Its Preparations, Glimepiride,	LT	CB,PP, VF	QA,CT, EX, RB	DP20112.3 DP20112.4 DP20112.5 DP20112.6	1,2,3,4,5,6,8, 9
	52	Metformin*, Glibenclamide*,,					
	53	Pioglitazone, Repaglinide, Gliflozins, Gliptins					
X	54	<b>ANALGESIC AND ANTI-INFLAMMATORY AGENTS</b> Morphine Analogues, Narcotic Antagonists;	LT	CB,PP, VF	QA,CT, EX, RB	DP20112.3 DP20112.4 DP20112.5 DP20112.6	1,2,3,4,5,6,8, 9
	55	Nonsteroidal Anti-Inflammatory Agents (NSAIDs) - Aspirin*, Diclofenac, Ibuprofen*,					
	56	Piroxicam, Celecoxib, Mefenamic Acid, Paracetamol*, Aceclofenac					
XI	57	<b>ANTI INFECTIVE</b>	LT	CB,PP, VF	QA,CT, EX, RB	DP20112.3 DP20112.4 DP20112.5 DP20112.6	1,2,3,4,5,6,8, 9
		<b>ANTIFUNGAL AGENTS</b> Amphotericin-B, Griseofulvin, Miconazole, Ketoconazole*, Itraconazole, Fluconazole*, Naftifine Hydrochloride					
	58	<b>URINARY TRACT ANTI-INFECTIVE AGENTS</b> Norfloxacin, Ciprofloxacin, Ofloxacin*, Moxifloxacin,					
	69	<b>ANTITUBERCULAR DRUGS</b> INH*, Ethambutol, Para Amino Salicylic Acid,					
	60	Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, Pretomanid*					
	61	<b>ANTIVIRAL AGENTS</b> Amantadine Hydrochloride, Idoxuridine, Acyclovir*,					
	62	Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir					
63	<b>ANTIMALARIALS</b>						

		Quinine Sulphate, Chloroquine Phosphate*, Primaquine Phosphate, Mefloquine*, Cycloguanil, Pyrimethamine, Artemisinin					
	64	<b>SULFONAMIDES</b> Sulfanilamide, Sulfadiazine, Sulfamethoxazole, Sulfacetamide*, Mafenide Acetate, Cotrimoxazole, Dapsone*.					
XII	65	<b>ANTIBIOTICS</b> Definition, Classification, Nomenclature	LT	CB, PP, VF	QA, CT, EX, RB	DP20112.3 DP20112.4 DP20112.5 DP20112.6	1,2,3,4,5,6,8,9
	66	Chemistry of Penicillin, Amoxicillin*,					
	67	Cloxacillin, Streptomycin,					
	68	<b>Tetracycline</b> Doxycycline					
	69	Doxycycline, Minocycline					
	70	<b>Macrolide Introduction</b> Erythromycin					
	71	Erythromycin, Azithromycin					
72	<b>Miscellaneous:</b> Chloramphenicol* Clindamycin						
XIII	73	<b>ANTI-NEOPLASTIC DRUGS</b> Introduction and classification Cyclophosphamide*, Busulfan, Mercaptopurine, Fluorouracil*,	LT	CB, PP, VF	QA, CT, EX, RB	DP20112.3 DP20112.4 DP20112.5 DP20112.6	1,2,3,4,5,6,8,9
	74	Methotrexate, Dactinomycin, Doxorubicin Hydrochloride,					
	75	Vinblastine Sulphate, Cisplatin*, Dromostanolone Propionate					

**TM-Teaching Method-** Lecture (LT).

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Class Tests (CT), Question Answers (QA), University Examinations (EX), Rubrics (RB) , Course End Survey filled by students,



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**COURSE DETAILS**

<b>Class</b>	F.Y. D. Pharmacy
<b>Course Code and Course Title</b>	<b>DP20052 Pharmaceutical Chemistry</b>
<b>Prerequisite/s</b>	12 <sup>th</sup> standard Chemistry
<b>Teaching Scheme: Practical</b>	03 Hours
<b>Total contact hours</b>	03
<b>Evaluation Scheme:</b>	20/80

<b>Course Objectives:</b> The course aims: (What teacher want to do with course while teaching)	
01	To introduce the laboratory of Pharmaceutical Chemistry
02	To understand and perform volumetric analysis of given compound.
03	To provide guidelines and procedure for systematic qualitative analysis of Organic drug.
04	To inculcate the knowledge about the synthesis of compounds.

<b>Course Outcomes (COs):</b> Upon successful completion of this course, the student will be able to:	
DP20052.1	Explain reactions, principle, mechanisms involved in the synthesis & analysis of various organic compounds
DP20052.2	Prepare and standardize selected standard solutions by using principles of volumetric analysis.
DP20052.3	Synthesize medicinally important compounds / intermediates by using available resources and calculate the percentage yield
DP20052.4	Examine the various organic compounds by systematic qualitative analysis.
DP20052.5	Analyze the selected organic/inorganic compounds by performing limit test and identification test as per specified in I.P.

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Program Outcome								
	1	2	3	4	5	6	7	8	9
<b>DP20052.1</b>	3	2	1	-	1	2	-	-	1
<b>DP20052.2</b>	3	2	1	-	1	2	-	-	1
<b>DP20052.3</b>	3	2	1	-	1	2	-	-	1
<b>DP20052.4</b>	3		1	1	1	2	-	-	1
<b>DP20052.5</b>	3	2	1	1	1	2	-	-	1
Total	15	8	5	2	5	10	-	-	5
Avg.	3	2	1	1	1	2	-	-	1
<b>DP20052</b>	3	2	1	1	1	2	-	-	1

**COURSE SKILL ACQUISITION MATRIX:**

Course	Program Outcome								
	1	2	3	4	5	6	7	8	9
DP20052	3	2	1	1	1	2	-	-	1

Course	Course outcome				
	DP20052.1	DP20052.2	DP20052.3	DP20052.4	DP20052.5
(DP20052)					
Target	3	3	2	2	2
Target Level	Students scoring above 50% marks				
1	>50%				
2	>55%				
3	>60%				

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	DP20052.1, DP20052.2	Practical exam, viva
SES-II	DP20052.3, DP20052.4	Practical exam, viva
SES-III	DP20052.4, DP20052.5	Practical exam, viva
PM	DP20052.1, DP20052.2, DP20052.3, DP20052.4, DP20052.5	Day to day assessment, Journal and Viva examination
ESE	DP20052.1, DP20052.2, DP20052.3, DP20052.4, DP20052.5	Practical exam

Expt. No.	Title of Experiment	Planned week	CO	PO
1.	Introduction to laboratory	1 <sup>st</sup>	DP20052.1	1,2,3,5,6,9
2.	To study glassware and Lab equipment	2 <sup>nd</sup>	DP20052.1	1,2,3,5,6,9
3.	To Perform Limit Test for Chloride	3 <sup>rd</sup>	DP20052.5	1,2,3,5,6,9
4.	To Perform Limit Test for Sulphate	4 <sup>th</sup>	DP20052.5	1,2,3,5,6,9
5.	To Perform Limit Test for Iron	5 <sup>th</sup>	DP20052.5	1,2,3,5,6,9
6.	To Perform Limit Test for Heavy Metal	6 <sup>th</sup>	DP20052.5	1,2,3,5,6,9
7.	*To Perform Limit test for Arsenic	7 <sup>th</sup>	DP20052.5	1,2,3,5,6,9

8.	Preparation of standard solution and standardization of sodium hydroxide	8 <sup>th</sup>	DP20052.2	1, 2, 3,5,6,9
9.	Preparation of standard solution and standardization of Potassium Permanganate	9 <sup>th</sup>	DP20052.2	1, 2, 3, 5,6,9
10.	To perform assay of ferrous sulphate	10 <sup>th</sup>	DP20052.2	1, 2, 3, 5,6,9
11.	To perform Assay of calcium gluconate	11 <sup>th</sup>	DP20052.2	1, 2, 3, 5,6,9
12.	To perform Assay of Sodium chloride	12 <sup>th</sup>	DP20052.2	1, 2, 3, 5,6,9
13.	To perform Assay of Ibuprofen	13 <sup>th</sup>	DP20052.2	1, 2, 3, 5,6,9
14.	To perform Assay of Ascorbic acid	14 <sup>th</sup>	DP20052.2	1, 2, 3, 5,6,9
15.	To determine the Melting point , Boiling point of organic compound	15 <sup>th</sup>	DP20052.5	1, 2, 3, 5,6,9
16.	To identify given sample by performing identification test for Aspirin	16 <sup>th</sup>	DP20052.5	1, 2, 3, 5,6,9
17.	To identify given sample by performing identification test of Caffeine	17 <sup>th</sup>	DP20052.5	1, 2, 3, 5,6,9
18.	To identify given sample by performing identification test for Paracetamol	18 <sup>th</sup>	DP20052.5	1, 2, 3, 5,6,9
19.	To identify given sample by performing identification test for Sulphanilamide	19 <sup>th</sup>	DP20052.5	1, 2, 3, 5,6,9
20.	To Perform Systemic qualitative analysis of organic compound D1	20 <sup>th</sup>	DP20052.4	1, 2, 3, 5,6,9
21.	To Perform Systemic qualitative analysis of organic compound D2	21 <sup>th</sup>	DP20052.4	1, 2, 3, 5,6,9
22.	To Perform Systemic qualitative analysis of organic compound D3	22 <sup>th</sup>	DP20052.4	1, 2, 3, 5,6,9
23.	To Perform Systemic qualitative analysis of organic compound D4.	23 <sup>th</sup>	DP20052.4	1, 2, 3, 5,6,9
24.	To Prepare and submit the Benzoic acid from benzamide.	25 <sup>th</sup>	DP20052.1 DP20052.3	1, 2, 3, 5,6,9
25.	To Prepare and submit the Picric acid from Phenol.	26 <sup>th</sup>	DP20052.1 DP20052.3	1, 2, 3,5,6,9
27.	To Perform Identification test for cations and anions.	27 <sup>th</sup>	DP20052.1	1, 2, 3, 5,6,9

**Assessment Tools: Laboratory Evaluation & assessment Rubrics**

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Indian Pharmacopoeia	-	Ministry of health and family welfare	-	2014
02	Practical Manual of Pharmaceutical Chemistry	Dr. B.S.Kuchekar, Mr.K.D. Mahadik	Nirali Publisher	First	2021
03	Pharmaceutical Chemistry-II	V. N. Rajsekaran	C. B. S. Publication	1 <sup>st</sup>	2016
04	Pharmaceutical chemistry –II	Dr.A.V.Kasture Dr. S.G Wadodkar	Nirali prakashan	-----	2014

<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Indian Pharmacopoeia	-	Ministry of health and family welfare	-	2014
02	Practical Pharmaceutical Chemistry	A.H. Backett J.B.Stenlake		4 <sup>th</sup>	2005
03	Practical Pharmaceutical Chemistry	Dr.G.D. Gupta, Dr.Shailesh Sharma	Nirali Publisher	1 <sup>st</sup>	2021
04	Practical Pharmaceutical Chemistry	Hitesh Sahare	Nirali Publisher	1 st	2021

<b>Other Books/E-material:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Practical Pharmaceutical Chemistry	Jyoti Gupta, Mohit Sanduja	Nirali publication	7 <sup>th</sup>	2019

**Self-Study Materials and References:**

Websites:



1. <https://youtu.be/qTJwwY-wDJI>
2. <https://youtu.be/r98cjAmzNCY>
3. [https://youtu.be/FAkbYY9Y\\_vQ](https://youtu.be/FAkbYY9Y_vQ)
4. MSBTE Laboratory manuals



**COURSE DETAILS**

<b>Class</b>	F.Y. D. Pharmacy
<b>Course Code and Course Title</b>	<b>DP20113 Pharmacognosy</b>
<b>Prerequisite/s</b>	Science
<b>Teaching Scheme: Lecture/Tutorial</b>	03/01
<b>Evaluation Scheme: SES-I/SES-II /SES-III/ MSBTE</b>	20/20/20/80

<b>Course Objectives: This course will discuss the following aspects of drug Substances derived from natural resources</b>	
01	Occurrence, distribution, isolation, identification tests of common phytoconstituents
02	Therapeutic activity and pharmaceutical applications of various natural drug substances and phytoconstituents
03	Biological source, chemical constituents of selected crude drugs and their therapeutic efficacy in common diseases and ailments
04	Basic concepts in quality control of crude drugs and various system of medicines
05	Applications of herbs in health foods and cosmetics

<b>Course Outcomes (COs):</b>	
Upon successful completion of this course, the student will be able to:	
<b>DP20113.1</b>	State history & scope of Pharmacognosy with its current status
<b>DP20113.2</b>	Describe Classification & Evaluation of crude drugs
<b>DP20113.3</b>	Discuss the principles of alternative system of medicine
<b>DP20113.4</b>	Explain Pharmacognostic profile of selected crude drug
<b>DP20113.5</b>	Describe the applications of herbs in nutraceuticals and cosmeceuticals
<b>DP20113.6</b>	Explain basic concepts of herbal formulation & Phytochemical investigation

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
<b>DP20113.1</b>	3	-	2	-	-	-	-	-	-
<b>DP20113.2</b>	3	2	2	-	-	-	2	-	-
<b>DP20113.3</b>	3	3	2	-	-	2	2	2	-
<b>DP20113.4</b>	3	3	2	2	1	2	2	-	2
<b>DP20113.5</b>	3	2	2	-	1	2	1	-	1
<b>DP20113.6</b>	3	2	1	-	-	2		-	2
Total	18	12	11	2	2	8	7	2	5
Avg.	<b>3.00</b>	<b>2.4</b>	<b>1.83</b>	<b>2.00</b>	<b>1.00</b>	<b>2.00</b>	<b>1.75</b>	<b>2.00</b>	<b>1.6</b>
<b>DP20113</b>	<b>3.00</b>	<b>2.4</b>	<b>1.83</b>	<b>2.00</b>	<b>1.00</b>	<b>2.00</b>	<b>1.75</b>	<b>2.00</b>	<b>1.6</b>



**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
DP20113	3.00	2.4	1.83	2.00	1.00	2.00	1.75	2.00	1.6

Course DP20113	Course Outcomes					
	DP20113.1	DP20113.2	DP20113.3	DP20113.4	DP20113.5	DP20113.6
Target	3	2	2	2	2	2
Target Level	Students scoring above 40% marks					
1	>50%					
2	>55%					
3	>60%					

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	DP20113.1, DP20113.4	Written test
SES-II	DP20113.2, DP20113.4	Written test
SES-III	DP20113.1, DP20113.4, DP20113.5	Written test
MSBTE	DP20113.1, DP20113.2, DP20113.3, DP20113.4, DP20113.5, DP20113.6	Written test

COURSE DETAILS		
1	Definition, history, present status and scope of Pharmacognosy	02Hours
2	<b>Classification of drugs:</b> Alphabetical, Taxonomical, Morphological, Pharmacological, Chemical, Chemo-taxonomical	04 Hours
3	<b>Quality control of crude drugs:</b> Different methods of adulteration of crude drugs, Evaluation of crude drugs	06 Hours
4	Brief outline of occurrence, distribution, isolation, identification tests, therapeutic activity and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils,	06 Hours

	tannins and resins.	
5	<b>Biological source, chemical constituents and therapeutic efficacy of the following categories of crude drugs.</b>	30Hours
	<b>Laxatives</b>	Aloe, Castor oil, Ispaghula, Senna
	<b>Cardiotonic</b>	Digitalis, Arjuna
	<b>Carminatives and G.I. regulators</b>	Coriander, Fennel, Cardamom, Ginger, Clove, Black Pepper, Asafoetida, Nutmeg, Cinnamon
	<b>Astringents</b>	Myrobalan, Black Catechu, Pale Catechu
	<b>Drugs acting on nervous system</b>	Hyoscyamus, Belladonna, Ephedra, Opium, Tea leaves, Coffee seeds, Coca
	<b>Anti-hypertensive</b>	Rauwolfia
	<b>Anti-tussive</b>	Vasaka, Tolu Balsam
	<b>Anti-rheumatics</b>	Colchicum seed
	<b>Anti-tumour</b>	Vinca, Podophyllum
	<b>Antidiabetics</b>	Pterocarpus, Gymnema
	<b>Diuretics</b>	Gokhru, Punarnava
	<b>Anti-dysenteric</b>	Ipecacuanha
	<b>Antiseptics and disinfectants</b>	Benzoin, Myrrh, Neem, Turmeric
	<b>Antimalarials</b>	Cinchona, Artemisia
<b>Oxytocic</b>	Ergot	
<b>Vitamins</b>	Cod liver oil, Shark liver oil	



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	<b>Enzymes</b>	Papaya, Diastase, Pancreatin, Yeast	
	<b>Pharmaceutical Aids</b>	Kaolin, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Gelatine	
	<b>Miscellaneous</b>	Squill, Galls, Ashwagandha, Tulsi, Guggul	
6	<b>Plant fibres used as surgical dressings:</b> Cotton, silk, wool and regenerated fibres Sutures – Surgical Catgut and Ligatures		03Hours
7	<b>Basic principles involved in the traditional systems of medicine like:</b> Ayurveda, Siddha, Unani and Homeopathy Method of preparation of Ayurvedic formulations like: Arista, Asava, Gutika, Taila, Churna, Lehya and Bhasma		08Hours
8	<b>Role of medicinal and aromatic plants in national economy and their export potentia</b>		02Hours
9	<b>Herbs as health food:</b> Brief introduction and therapeutic applications of: Nutraceuticals, Antioxidants, Pro-biotics, Pre-biotics, Dietary fibres, Omega-3-fatty acids, Spirulina, Carotenoids, Soya and Garlic		04Hours
10	<b>Introduction to herbal formulation</b>		04Hours
11	<b>Herbal cosmetics:</b> <b>Sources, chemical constituents, commercial preparations, therapeutic and cosmetic uses of:</b> Aloe vera gel, Almond oil, Lavender oil, Olive oil, Rosemary oil, Sandal Wood oil		04Hours
12	<b>Phytochemical investigation of drugs</b>		02Hours



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<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Pharmacognosy	Dr. C.K.Kokate	Nirali Prakashan	1 <sup>st</sup>	2021
02	Pharmacognosy	Dr. C.K.Kokate	Nirali Prakashan	29 <sup>th</sup>	2009

<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Pharmacognosy	Biren Shah	ELSEVIER	1 <sup>st</sup>	2010

**Content Delivery and assessment tools:**



**ANNASAHEB DANGE COLLEGE OF B. PHARMACY,  
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Chapter	Lect. No.	Lesson Plan	TM	TA	AT	Mapping with Outcomes	
		Content Delivery				CO	PO
I	1	<b>Definition, history and Scope of Pharmacognosy:</b> Definition and history	LT	CB, PP	QA	DP20113.1	1,8,9
	2	Scope of Pharmacognosy					
II	3	<b>Classification of Natural Drugs:</b> Alphabetical	LT	CB, PP	QA	DP20113.2	1,2,8,9
	4	Taxonomical					
	5	Morphological, Pharmacological					
	6	Chemical, Chemo-taxonomical					
III	7	<b>Quality control of crude drugs:</b> Different methods of adulteration of crude drugs Replacement by exhausted drug, Substitution with superficially similar but inferior Drug	LT	CB, PP	QA	DP20113.2	1,7,9
	8	Substitution by artificially manufactured drug substitutes, Substitution by Sub-standard commercial varieties					
	9	Presence of organic matter obtained from the same plant, Other adulterants					
	10	Evaluation of crude drugs, Organoleptic Evaluation					
	11	Microscopic Evaluation, Physical Evaluation					
	12	Chemical Evaluation, Biological Evaluation					
IV	13	<b>Brief outline of occurrence, distribution, isolation, identification tests, therapeutic activity and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins:</b> alkaloids	LT	CB, PP	QA	DP20113.2	1,7,9
	14	Terpenoids					
	15	Glycosides					
	16	Volatile oils					
	17	Tannins					
	18	Resins					
V	19	<b>Biological source, chemical constituents and therapeutic efficacy of the following categories of crude drugs.</b>	LT	CB,	QA,	DP20111.4	1, 2,7,9



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	<b>Laxatives:</b> Aloe, Castor oil		PP, VF			
20	Ispaghula, Senna					
21	<b>Cardiotonic :</b> Digitalis, Arjuna					
22	<b>Carminatives and G.I. regulators :</b> Coriander, Fennel,					
23	Cardamom ,Ginger					
24	Clove, Black Pepper					
25	Asafoetida, Nutmeg, Cinnamon					
26	<b>Astringents:</b> Myrobalan, Black Catechu, Pale Catechu					
27	<b>Drugs acting on nervous system:</b> Hyoscyamus, Belladonna					
28	Ephedra, Opium, Tea leaves					
29	Coffee seeds, Coca					
30	<b>Anti-hypertensive:</b> Rauwolfia					
31	<b>Anti-tussive:</b> Vasaka, Tolu Balsam <b>Anti-rheumatics:</b> Colchicum seed					
32	<b>Anti-tumour :</b> Vinca, Podophyllum					
33	<b>Antidiabetics:</b> Pterocarpus, Gymnema					
34	<b>Diuretics:</b> Gokhru, Punarnava					
35	<b>Anti-dysenteric:</b> Ipecacuanha					
36	<b>Antiseptics and disinfectants:</b> Benzoin, Myrrh,					
37	Neem, Turmeric					
38	<b>Antimalarials:</b> Cinchona, Artemisia					
39	<b>Oxytocic :</b> Ergot					
40	<b>Vitamins:</b> Cod liver oil, Shark liver oil					
41	<b>Enzymes:</b> Papaya, Diastase, Pancreatin, Yeast					
42	<b>Pharmaceutical Aids:</b> Kaolin, Lanolin,					
43	Beeswax, Acacia,					
44	Tragacanth, Sodium alginate,					



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	45	Agar, Guar gum, Gelatine					
	46	<b>Miscellaneous:</b> Squill, Galls,					
	47	Ashwagandha, Tulsi,					
	48	Guggul					
VI	49	<b>Plant fibres used as surgical dressings: Cotton, silk</b>	LT	CB, PP, VF	QA,	DP20113.4,	1,7,9
	50	Wool and regenerated fibres					
	51	Sutures – Surgical Catgut and Ligatures					
VII	52	<b>Basic principles involved in the traditional systems of medicine like: Ayurveda,</b>	LT	CB, PP, VF	QA, CT QA,	DP20113.3,	1,7,9
	53	Siddha					
	54	Unani					
	55	Homeopathy					
	56	<b>Method of preparation of Ayurvedic formulations like: Arista, Asava,</b>					
	57	Gutika, Taila,					
	58	Churna					
	59	Lehya and Bhasma					
VIII	60	<b>Role of medicinal and aromatic plants in national economy and their export potential: Role of medicinal and aromatic plants in national economy</b>	LT	CB, PP, VF	QA,	DP20113.1,	1,9
	61	Medicinal and aromatic plants export potential					
IX	62	<b>Herbs as health food:</b> Brief introduction and therapeutic applications of: Nutraceuticals, Antioxidants	LT	CB, PP, VF	QA,	DP20113.5,	1,9
	63	Pro-biotics, Pre-biotics, Dietary fibres,					
	64	Omega-3-fatty acids, Spirulina					
	65	Carotenoids, Soya and Garlic					



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X	66	<b>Introduction to herbal formulations:</b> Infusion, Decoction, Tinctures	LT	CB, PP, VF	QA	DP20113.6,	1,7,9
	67	Syrups, Herbal Powders, Herbal Granules					
	68	Capsules, Tablets, Lozenges					
	69	Ointment, Herbal paste, Herbal Balm					
XI	70	<b>Herbal cosmetics: Sources, chemical constituents, commercial preparations, therapeutic and cosmetic uses of:</b> Aloe vera gel,	LT	CB, PP, VF	QA	DP20113.5	1,7,9
	71	Almond oil, Lavender oil					
	72	Olive oil, Rosemary oil,					
	73	Sandal Wood oil					
XII	74	<b>Phytochemical investigation of drugs:</b> Procurement of raw material and quality control, Extraction, Purification and characterization of the constituents of pharmaceutical interest and in quality control	LT	CB, PP, VF	QA	DP20113.6,	1,7,9
	75	Investigation of biosynthetic pathways to particular compound Quantitative evaluation					

**TM-Teaching Method-** Lecture (LT).

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)**AT- Assessment Tool** - Class Tests (CT), Question Answers (QA), MSBT Examinations (EX), Rubrics (RB) , Course End Survey filled by students,



**COURSE DETAILS**

<b>Class</b>	F.Y. D. Pharmacy
<b>Course Code and Course Title</b>	<b>DP20053 Pharmacognosy</b>
<b>Prerequisite/s</b>	Science
<b>Teaching Scheme: Practical</b>	03 Hours
<b>Total contact hours</b>	75 Hours
<b>Evaluation Scheme: SES-I /SES-II/SES-III / MSBTE</b>	10/10/10/80

<b>Course Objectives:</b> This course will provide hands-on experiences to the students in	
01	Identification of the crude drugs based on their morphological characteristics
02	Various characteristic anatomical characteristics of the herbal drugs studied through transverse section
03	Physical and chemical tests to evaluate the crude drugs

<b>Course Outcomes (COs):</b> Upon successful completion of this course, the student will be able to:	
<b>DP20053.1</b>	Explain the given crude drug based on the morphological & Microscopical characteristics
<b>DP20053.2</b>	Explain physicochemical test of crude drugs
<b>DP20053.3</b>	Identify the crude drug on the basis of morphological & Microscopical characteristics
<b>DP20053.4</b>	Perform Physical & chemical test for evaluation of crude drug

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20053.1P	3	2	1	-	1	2	1	-	1
DP20053.2P	3	-	1	1	1	2	1	-	1
DP20053.3P	3	2	1	-	1	2	1	-	1
DP20053.4P	3	1	1	1	1	2	1	-	1
Total	18	5	4	2	4	8	4	-	4
Avg.	<b>3.00</b>	<b>1.6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2.00</b>	<b>1</b>	-	<b>1</b>
<b>DP20053</b>	<b>3.00</b>	<b>1.6</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2.00</b>	<b>1</b>	-	<b>1</b>



**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
DP20053	3.00	1.6	1	1	1	2.00	1	-	1

Course DP20053	Course outcome			
	DP20053.1	DP20053.2	DP20053.3	DP20053.4
Target	3	2	2	2
Target Level	Students scoring above 40% marks			
1	>50%			
2	>55%			
3	>60%			

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	DP20053.1, DP20053.2, DP20053.3	Written test
SES-II	DP20053.1, DP20053.2, DP20053.3, DP20053.4	Written test
SES-III	DP20053.1, DP20053.2, DP20053.3, DP20053.4	Written test
MSBTE	DP20053.1, DP20053.2, DP20053.3, DP20053.4	Practical exam

Expt No	Title of Experiment	Planned week	CO	PO
1	Introduction to compound microscope	3 & 1	DP20053.1	1,2,3,9
2	To understand the techniques of section Cutting, Staining, and Mounting	1	DP20053.1	1,2,3,9
3	To study the Micro chemical Reagents	2&3	DP20053.1	1,2,3,9
4	To study the morphological characteristics of Laxative (Ispagula, and Senna).	3	DP20053.3	1,2,3,5,6,9
5	To study the morphological characteristics of Carminative (Coriander, Fennel, Cardamom, Ginger, Nutmeg and Black Pepper, Cinnamon and Clove).	4&1	DP20053.3	1,2,3,5,6,9



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6	To study the morphological characteristics of drugs acting on CNS and Antihypertensive (Ephedra and Rauwolfia).	1&2	DP20053.3	1,2,3,5,6,9
7	To study the morphological characteristics of Diuretics (Gokhru and Punarnava)	2&3	DP20053.3	1,2,3,5,6,9
8	To study the morphological characteristics of Antimalarial and Pharmaceutical Aids (Cinchona and Agar).	4	DP20053.3	1,2,3,5,6,9
9	To study the morphological and microscopical characteristics of Ajwain.	1	DP20053.1 DP20053.3	1,2,3,5,6,9
10	To study the morphological and microscopical characteristics of Datura	2	DP20053.1 DP20053.3	1,2,3,5,6,9
11	To study the morphological and microscopical characteristics of Cinnamon	3	DP20053.1 DP20053.3	1,2,3,5,6,9
12	To study the morphological and microscopical characteristics of Cinchona	4	DP20053.1 DP20053.3	1,2,3,5,6,9
13	To study the morphological and microscopical characteristics of Coriander	4&1	DP20053.1 DP20053.3	1,2,3,5,6,9
14	To study the morphological and microscopical characteristics of Ashwagandha	1&2	DP20053.1 DP20053.3	1,2,3,5,6,9
15	To study the morphological and microscopical characteristics of Liquorice	2&3	DP20053.1 DP20053.3	1,2,3,5,6,9
16	To study the morphological and microscopical characteristics of Clove	3&4	DP20053.1 DP20053.3	1,2,3,5,6,9
17	To study the morphological and microscopical characteristics of Curcuma	4	DP20053.1 DP20053.3	1,2,3,5,6,9
18	To study the morphological and microscopical characteristics of Nux-Vomica	1&3	DP20053.1 DP20053.3	1,2,3,5,6,9



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19	To study the morphological and microscopical characteristics of Vasaka	3	DP20053.1 DP20053.3	1,2,3,5,6,9
20	To identify unknown unorganised powder drug with the help of physical and chemical test.(Asafoetida and Benzoin)	3&4	DP20053.2 DP20053.4	1,2,3,5,6,9
21	To identify unknown unorganised powder drug with the help of physical and chemical test.(Tannins – Pale Catechu and Black Catechu )	1&2	DP20053.2 DP20053.4	1,2,3,5,6,9
22	To identify unknown unorganised powder drug with the help of physical and chemical test.(Laxative -Castor oil and Carbohydrate- Accacia	2	DP20053.2 DP20053.4	1,2,3,5,6,9
23	To identify unknown unorganised powder drug with the help of physical and chemical test (Carbohydrate - Tragacanth and Agar )	2&3	DP20053.2 DP20053.4	1,2,3,5,6,9
24	To identify unknown unorganised powder drug with the help of physical and chemical test (Carbohydrate- Guar Gum )	4	DP20053.2 DP20053.4	1,2,3,5,6,9
25	To identify unknown unorganised powder drug with the help of physical and chemical test ( Gelatin)	1&2	DP20053.2 DP20053.4	1,2,3,5,6,9

**Assessment Tools:** Laboratory Evaluation & assessment Rubric.

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Practical Manual of Pharmacognosy	Dr. G.D. Gupta Dr. Shailesh Sharma Navjit Kaur	Nirali Prakashan	1 <sup>st</sup>	2021
02	Practical Pharmacognosy Techniques and experiments	Dr. K.R Khandelwal Dr. V. Sethi	Nirali Prakashan	30 <sup>th</sup>	2019



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**COURSE DETAILS**

<b>Class</b>	F.Y. D. Pharmacy
<b>Course Code and Course Title</b>	<b>20114 Human Anatomy And Physiology</b>
<b>Prerequisite/s</b>	Biology
<b>Teaching Scheme: Lecture/Tutorial</b>	03/01
<b>Credits</b>	03
<b>Evaluation Scheme: DCP-I</b>	20/80

<b>Course Objectives:</b> The course aims: (What teacher want to do with course while teaching)	
01	Describe the various organ systems of the human body
02	Discuss the anatomical features of the important human organs and tissues
03	Explain the homeostatic mechanisms regulating the normal physiology in the human system
04	Discuss the significance of various vital physiological parameters of the human body

*At the end of the course, students should be able to :*

DP20114.1	Define various anatomical terminologies used to identify organs and systems of human body
DP20114.2	Describe the structure and functions of cell and tissues
DP20114.3	Discuss the composition and physiology of body fluids
DP20114.4	Explain anatomy of different organs of human body
DP20114.5	Explain physiology of different organs of human body
DP20114.6	Discuss the physiological parameters of the human body

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

**COURSE SKILL ACQUISITION MATRIX:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20114.1	3	2	-	-	2	3	2	-	2
DP20114.2	3	2	-	-	2	2	2	-	2
DP20114.3	3	2	-	-	2	2	2	-	2
DP20114.4	3	2	-	-	2	2	2	-	2
DP20114.5	3	2	-	-	2	2	2	-	2
DP20114.6	3	2	-	-	2	3	3	-	2
Total	18	12	-	-	12	14	13	-	12
Avg.	<b>3.00</b>	<b>2.00</b>	-	-	<b>2.00</b>	<b>2.33</b>	<b>2.16</b>	-	<b>2.00</b>
<b>20114</b>	<b>3.00</b>	<b>2.00</b>	-	-	<b>2.00</b>	<b>2.33</b>	<b>2.16</b>	-	<b>2.00</b>



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**Targets for Course Outcome:**

20114	Course Outcomes					
	DP20114.1	DP20114.2	DP20114.3	DP20114.4	DP20114.5	DP20114.6
Target	3	2	2	3	3	2

Course DP20114	Course Outcomes					
	DP20114.1	DP20114.2	DP20114.3	DP20114.4	DP20114.5	DP20114.6
Target	3	2	2	3	3	2
Target Level	Students scoring above 50% marks					
1	>50%					
2	>55%					
3	>60%					

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
Sessional-I	DP20114.1,DP20114.2	Written test
Sessional-II	DP20114.3,DP20114.4	Written test
Sessional-III	DP20114.5,DP20114.6	Written test,
Final	DP20114.1,DP20114.2 DP20114.3,DP20114.4 DP20114.5,DP20114.6	Written test

**COURSE DETAILS**

Unit	Topic	Hours
Unit 1	<i>Introduction &amp; Organization of Human Body</i>	10 Hours
Unit 2	<i>Cardiovascular system</i>	18 Hours
Unit 3	Skeleton system	06 Hours
Unit 4	Respiratory System	04 Hours
Unit 5	Urinary System	05 Hours
Unit 6	<i>Nervous System</i>	10 Hours
Unit 7	<i>Digestive System</i>	06 Hours
Unit 8	<i>Muscular System</i>	04 Hours
Unit 9	<i>Sensory organs</i>	07 Hours
Unit 10	<i>Endocrine System</i>	04 Hours
Unit 11	<i>Reproductive System</i>	05 Hours



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<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Human Anatomy & Physiology	Bhise	NiraliPrakashan	--	2015
02	Human Anatomy & Physiology	Rahul Phate	NiraliPrakashan	--	2015
03	Basic Human Anatomy & Physiology	N.Murgesh	Satya Publication	--	2011
04	Human Anatomy & Physiology	Bhise&Yadav	NiraliPrakashan	--	2016
05	Elements Human Anatomy & Physiology	Gandhi E.D.	B.S.ShahaPubluication	--	2020

<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Elementary of Human Anatomy & Physiology	Raghunandan V	VallabhPrakashan	-	2015
02	Elements Human Anatomy & Physiology	Goyal Ramesh	B.S.Shaha Publication	-	2014
03	Human Anatomy & Physiology	Ross & Wilson	Elsever	-	2014
04	Human Anatomy & Physiology	Chatterji C	C.B.S Publication	-	2020

**Content Delivery and assessment tools:**



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Unit	Lect. No.	Lesson Plan	TM	TA	AT	Mapping with Outcomes	
		Content Delivery				CO	PO
I	1	<b>SCOPE OF ANATOMY &amp; PHYSIOLOGY</b> Definition of Anatomy & Physiology	LT	CB,PP, VF	QA,CT, EX, RB	DP20114.1,DP20114.2 DP20114.3,DP20114.4	1, 2, 4,5,6 8,11
	2	Various Terms Used In Anatomy & Physiology					
	3	<b>THE CELL</b> Defination, Structure & Function of Its Components,					
	4	Reproduction & Its Phases					
	5	<b>THE TISSUE</b> Defination& Classification					
	6	Structure & Function of A) Epithelial Tissue					
	7	B) Muscular Tissue					
	8	C) Nervous Tissue					
	9	D) Connective Tissue					
	10						
	11	<b>BLOOD</b> Composition of Blood					
II	12	Functions of Blood Elements,Blood Groups	LT	CB,PP, VF	QA,CT, EX, RB	DP20114.1,DP20114.2 DP20114.3,DP20114.4	1, 2, 4,5,6 8,11
	13	Blood Coagulation					
	14	Disorders of Blood					
	15	<b>LYMPHATIC SYSTEM</b> Composition & Functions of Lymph,					
	16	Lymphatic System, Lymph Capillaries					
	17	Lymph Vessels, Lymph Node , Lymphatic Ducts					
	18	<b>SKELETON</b> Definition and Function					



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III	19	Structure & Function of Axial Skeleton	LT	CB,PP, VF	QA,CT EX,RB	DP20114.1,DP20114.2 DP20114.3,DP20114.4	1, 2, 4,5,6 8,11
	20	Structure & Function of Appendicular Skeleton					
	21	Definition of joints					
	22	Types & Functions of Joints					
	23	Disorders of Joints					
	24	<b>CARDIOVASCULAR SYSTEM</b> Structure And Functions of Various Parts of Heart					
	25	Cardiac cycle					
	26	Conducting system of Heart					
	27	ECG, Heart rate, Pulse rate, Heart sound					
	28*	Circulation of blood					
IV	29	Arterial and venous system a. Structure of artery b. Structure of vein	LT	CB,PP, VF	QA,CT, EX, RB	DP20114.1,DP20114.2 DP20114.3,DP20114.4	1, 2, 4,5,6 8,11
	30	Blood pressure a. Definition b. Factors maintaining B.P.					
	31	Cardiovascular Disorders A) Rheumatic Heart Disease B) Bacterial Endocarditis C) Coronary Artery Occlusion D) Hypertensive Heart Disease					
	32	Congenital Heart Disease F) Arteriosclerosis G) Arteritis H) Varicose Veins I) Haemorrhoids					
	33	<b>RESPIRATORY SYSTEM</b> Various Parts of Respiratory System					
	34	Function of Respiratory system					
	35	Physiological of Respiration					
	36	Tidal Volume, Vital Capacity,					
	37	<b>URINARY SYSTEM</b> Various Parts of Urinary System & Their Function					



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	38	Structure & Function of Kidney					
V	39	Physiology of Urine Formation	LT	CB,PP, VF	QA,CT, EX, RB	DP20114.1,DP20114.2 DP20114.3,DP20114.4	1, 2, 4,5,6 8,11
	40	Renal Diseases & Oedema					
	41	<b>SKELETAL MUSCLES</b> Structure of Skeletal Muscle					
	42	Physiology of Muscle Contraction					
	43	Physiology of Neuromuscular Junction					
	44	Various Skeletal Muscles					
	45	<b>CENTRAL NERVOUS SYSTEM</b> A) Various Parts of CNS					
VI	46	Various Parts of CNS	LT	CB,PP, VF	QA,CT, EX, RB	DP20114.1,DP20114.2 DP20114.3,DP20114.4	1, 2, 4,5,6 8,11
	47	B) Brain & Its Parts					
	48	B) Brain & Its Parts					
	49	C) Functions of Brain Parts					
	50	C) Functions of Brain Parts					
	51	D) Reflex Action					
	52	D) Reflex Action					
	53	E) Anatomy & Physiology of ANS					
	54	E) Anatomy & Physiology of ANS					
VII	55	<b>THE SPECIAL SENSES</b> A) Elementary Knowledge of Structure & Function Of,	LT	CB,PP, VF	QA,CT, EX, RB	DP20114.1,DP20114.2 DP20114.3,DP20114.4	1, 2, 4,5,6 8,11
	56	Tongue,					
	57	Nose					
	58	Ear					
	59	Tounge					



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	60	Eyes					
	61	Skin					
	62	B) Physiology Of Pain					
VIII	63	<b>DIGESTIVE SYSTEM</b> A) Names of The Various Parts of Digestive System & Their Functions	LT	CB,PP, VF	QA,CT, EX, RB	DP20114.1,DP20114.2 DP20114.3,DP20114.4	1, 2, 4,5,6 8,11
	64	Names of The Various Parts of Digestive System & Their Functions					
	65	B) Structure & Functions of Liver					
	66	B) Structure & Functions of Liver					
IX	67	<b>REPRODUCTIVE SYSTEM:-</b> Anatomy & Physiology of Male reproductive system	LT	CB,PP, VF	QA,CT, EX, RB	DP20114.1,DP20114.2 DP20114.3,DP20114.4	1, 2, 4,5,6 8,11
	68	Anatomy & Physiology of Female reproductive system					
	69	Female reproductive cycle					
	70	Menstrual Cycle					
	71	Menstrual Cycle					
X	72	<b>ENDOCRINE GLANDS :-</b> Feedback mechanism of secretion of hormones.	LT	CB,PP, VF	QA,CT, EX, RB	DP20114.1,DP20114.2 DP20114.3,DP20114.4	1, 2, 4,5,6 8,11
	73	Location, Hormones & Function of Pituitary gland, Adrenal gland					
	74	Thyroid gland & Parathyroid gland					
	75	Pancrease, Testes Gland, Pineal Gland					

**TM-Teaching Method-** Lecture (LT).

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Class Tests (CT), Question Answers (QA), University Examinations (EX), Rubrics (RB) , Course End Survey filled by students



**COURSE DETAILS**

<b>Class</b>	F.Y.D.Pharmacy
<b>Course Code and Course Title</b>	<b>20054 Human Anatomy &amp; Physiology</b>
<b>Prerequisite/s</b>	Biology
<b>Teaching Scheme: Practical</b>	03 Hours
<b>Total contact hours</b>	60
<b>Evaluation Scheme: SES-I and SES-II/ TM/ ESE</b>	20/80

**Course Objectives:** The course aims: (What teacher want to do with course while teaching)

01	General blood collection techniques and carrying out various haematological assessments and interpreting the results
02	Recording and monitoring the vital physiological parameters in human subjects and the basic interpretations of the results
03	Microscopic examinations of the various tissues permanently mounted in glass slides
04	Discuss the anatomical and physiological characteristics of various organ systems of the body using models, charts, and other teaching aids

*At the end of the course, students should be able to :*

DP20054.1	Explain the apparatus and instrument used during practical's
DP20054.2	Discuss the basic principles of haematological and physiological investigation
DP20054.3	Describe the microscopic features of human tissues using histological slides
DP20054.4	Perform and report different haematological tests
DP20054.5	Record and report physiological parameters of human body
DP20054.6	Identify the various organs, systems of body using anatomical models
DP20054.7	Interpret the results of haematological and physiological investigation

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20054.1	3	3	-	-	2	2	-	-	2
DP20054.2	3	2	-	-	2	2	-	-	2
DP20054.3	3	2	-	1	2	2	-	-	2
DP20054.4	3	3	1	2	2	3	1	-	2
DP20054.5	3	3	1	2	2	3	1	-	2
DP20054.6	3	2	-	1	2	3	1	1	2
DP20054.7	3	-	-	1	2	3	1	-	2
Total	21	15	2	7	14	18	4	1	14
<b>Avg. of each PO</b>	<b>3.00</b>	<b>2.50</b>	<b>1.00</b>	<b>1.40</b>	<b>2.00</b>	<b>2.57</b>	<b>1.00</b>	<b>1.00</b>	<b>2.00</b>



**COURSE SKILL ACQUISITION MATRIX:**

**Targets for Course Outcome:**

20054	Course Outcomes						
	DP20054.1	DP20054.2	DP20054.3	DP20054.4	DP20054.5	DP20054.6	DP20054.7
Target	2.0	3.0	2.0	3.0	3.0	3.0	3.0

Course DP20054	Course Outcomes						
	DP20054.1	DP20054.2	DP20054.3	DP20054.4	DP20054.5	DP20054.6	DP20054.7
Target	2.0	3.0	2.0	3.0	3.0	3.0	3.0
Target Level	Students scoring above 50% marks						
1	>50%						
2	>55%						
3	>60%						

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode		Assessment tool
SES-I	DP20054.1, DP20054.2, DP20054.3	Written test
SES-II	DP20054.4, DP20054.5, DP20054.6	Written test
SES-III	DP20054.4, DP20054.5, DP20054.6, DP20054.7,	Written test
Final	DP20054.1, DP20054.2, DP20054.3 DP20054.4, DP20054.5, DP20054.6, DP20054.7	Journal and Viva examination Practical exam

Expt No	Title of Experiment	Planned week	CO	PO
1.	Introduction to Human Anatomy Laboratory & work & Study of Compound Microscope	1 <sup>st</sup>	DP20054.1, DP20054.2,	1, 2, 3, 4,5,7,9
2.	To study collection of Blood sample by Pricking & Capillary method To determine Bleeding time of own blood by Duke's method	2 <sup>nd</sup>	DP20054.1, DP20054.2, DP20054.4 DP20054.7	1, 2, 3, 4,5,7,9
3.	To determine Clotting time of blood sample by Capillary glass method	3 <sup>rd</sup>	DP20054.1, DP20054.2, DP20054.4 DP20054.7	1, 2, 3, 4,5,7,9
4.	To find out total White Blood Cell count in human blood	4 <sup>th</sup>	DP20054.1, DP20054.2, DP20054.4	1, 2, 3, 4,5,7,9



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			DP20054.7	
5.	To find out total Red Blood Cell count in the human blood	5 <sup>th</sup>	DP20054.1, DP20054.2, DP20054.4 DP20054.7	1, 2, 3, 4,5,7,9
6.	To determine Blood Group of own blood by ABO system	6 <sup>th</sup>	DP20054.1, DP20054.2, DP20054.4 DP20054.7	1, 2, 3, 4,5,7,9
7.	To determine the Haemoglobin content & Oxygen carrying capacity of the blood by Sahli's Hellige method	7 <sup>th</sup>	DP20054.1, DP20054.2, DP20054.4 DP20054.7	1, 2, 4 5,6,7,8,9
8.	To count obtain Differential Leukocyte Count of own blood (DLC)	8 <sup>th</sup>	DP20054.1, DP20054.2, DP20054.4 DP20054.7,	1, 2, 4 5,6,7,8,9
9.	To determine the Erythrocyte Sedimentation Rate (ESR) by Wintrobe's method or Westergren's method	9 <sup>th</sup>	DP20054.1, DP20054.2, DP20054.4 DP20054.7	1, 2, 4 5,6,7,8,9
10.	To study Microscopic Structural Human Tissue Epithelial Tissue, Muscular Tissue, Nervous Tissue & Connective Tissue, To Examine Malarial Parasite	10 <sup>th</sup>	DP20054.3	1, 2, 4 5,6,7,8,9
11.	To record the Radial Pulse Rate ,To record the Heart Rate using stethoscope	11 <sup>th</sup>	DP20054.5	1, 2, 4 5,6,7,8,9
12.	To record Oral and Atrial body temperature by using clinical thermometer	12 <sup>th</sup>	DP20054.5	1, 2, 4 5,6,7,8,9
13.	To record the Blood Pressure using sphygmomanometer	13 <sup>th</sup>	DP20054.5	1, 2, 4 5,6,7,8,9
14.	To Study Axial Skeletal System of Human	14 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9
15.	To Study Appendicular Skeletal System of Human	15 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9
16.	To Study The Human Central Nervous System	16 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9
17.	To Study The Human Respiratory System	17 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9
18.	To Study The Human Urinary System	18 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9
19.	To Study The Human Cardiovascular System	19 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9
20.	To Study Structure & Function of Human Digestive System	20 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9
21.	To Study Human Male and Female Reproductive System	21 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9



22.	Study of Sense Organs- Skin	22 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9
23.	Study of Sense Organs-Eye	23 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9
24.	Study of Sense Organs-Ear	24 <sup>th</sup>	DP20054.6	1, 2, 4 5,6,7,8,9
25.	To Study Human organs and their T.S. i.e Stomach, Liver, Small Intestine, Pancreas, Kidney, Testis, Ovary	25 <sup>th</sup>	DP20054.3	1, 2, 4 5,6,7,8,9

**Plan to Cover Contents beyond Syllabus:**

Planed Date/ Week	Topic Beyond Syllabus	Resource Person with Affiliation	CO	PO
25	Clinical significance of Hb	Dr.M.G.Saralaya Principal ADCPB,Ashta	DP20054.7	1,9

**Assessment Tools:** Laboratory Evaluation & assessment Rubric.

<b>Text Books:</b>					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Human Anatomy &Physiology	Dr.A.V.Yadav	Nirali publication	7 <sup>th</sup>	2019
02					
03					
04					
05					

<b>Reference Books:</b>					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Human Anatomy &Physiology	Dr.S.N.Goyal	Briliant Publication	1 <sup>st</sup>	2021
02					
03					
04					
05					



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<b>Other Books/E-material:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	MSBTE Manuals	-	-	-	-
02					
03					
04					
05					

**Additional Comments:**

The E-books, Videos as well as manuals papers are available in the Library.



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**COURSE DETAILS**

<b>Class</b>	F. Y. D. Pharmacy
<b>Course Code and Course Title</b>	<b>20115 Social Pharmacy</b>
<b>Prerequisite/s</b>	Biology, Environmental Science
<b>Teaching Scheme: Lecture/Tutorial</b>	03/01
<b>Evaluation Scheme: SES-I and SES-II/SES-III, TM/ ESE</b>	20/80

**THEORY**

<b>Course Objectives:</b> The course aims: (What teacher want to do with course while teaching)	
01	To understand the Public health and national health programs
02	Describe the Preventive healthcare
03	To understood the Food and nutrition related health issues
04	Health education and health promotion
05	General roles and responsibilities of pharmacists in public health

<b>Course Outcomes (COs):</b> Upon successful completion of this course, the student will be able to:	
DP20115.1	Explain basic concepts of Social Pharmacy and elaborate different health programmes within the country and worldwide.
DP20115.2	Describe concepts of Demography, family planning and national immunization programme.
DP20115.3	Demonstrate the impact of socio-cultural factors and urbanization on health.
DP20115.4	Summarize the healthcare issues associated with food and nutritional substances.
DP20115.5	Apply knowledge of pathogens to create awareness about various preventive measures of selected communicable diseases.
DP20115.6	Discuss importance of pharmacoeconomics in health care system.



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**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20115.1	3	-	1	2	1	2	2	-	1
DP20115.2	3	-	2	2	2	2	2	-	2
DP20115.3	3	-	1	2	-	2	2	1	1
DP20115.4	3	-	1	2	-	2	2	-	2
DP20115.5	3	-	2	2	1	2	2	1	2
DP20115.6	3	-	1	2	-	2	-	-	1
Total	15	-	8	10	4	10	10	2	9
<b>Avg. of each PO</b>	<b>3.00</b>	<b>-</b>	<b>1.33</b>	<b>1.66</b>	<b>1.33</b>	<b>1.66</b>	<b>2.00</b>	<b>1.00</b>	<b>1.50</b>
20115	<b>3.00</b>	<b>-</b>	<b>1.33</b>	<b>1.66</b>	<b>1.33</b>	<b>1.66</b>	<b>2.00</b>	<b>1.00</b>	<b>1.50</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
<b>0812</b>	<b>3.00</b>	<b>-</b>	<b>1.33</b>	<b>1.66</b>	<b>1.33</b>	<b>1.66</b>	<b>2.00</b>	<b>1.00</b>	<b>1.50</b>

Course <b>0812</b>	Course Outcomes				
	DP812.1T	DP812.2T	DP812.3T	DP812.4T	DP812.5T
<b>Target</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Target Level</b>	Students scoring above 40% marks				
<b>1</b>	>50%				
<b>2</b>	>55%				
<b>3</b>	>60%				

**MODES FOR ASSESSMENT OF COURSE OUTCOMES-THEORY**

Mode	CO	Assessment tool
SES-I	DP20115.1, DP20115.2	Written test
SES-II	DP20115.2, DP20115.3, DP20115.4	Written test
SES-II	DP20115.4, DP20115.5, DP20115.6	MCQ, Assignment, Open book test, Seminar,



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FE	DP20115.1, DP20115.2, DP20115.3, DP20115.4, DP20115.5, DP20115.6	Written test
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<b>COURSE DETAILS</b>		
<b>Unit 1</b>	<p><b>Introduction to Social Pharmacy</b></p> <ul style="list-style-type: none"> <li>• Definition and Scope. Social Pharmacy as a discipline and its scope in improving the public health. Role of Pharmacists in Public Health. (2)</li> <li>• Concept of Health -WHO Definition, various dimensions, determinants, and health indicators. (3)</li> <li>• National Health Policy – Indian perspective (1)</li> <li>• Public and Private Health System in India, National Health Mission (2)</li> <li>• Introduction to Millennium Development Goals, Sustainable Development Goals, FIP Development Goals (1)</li> </ul>	09 Hours
<b>Unit 2</b>	<p><b>Preventive healthcare – Role of Pharmacists in the following</b></p> <ul style="list-style-type: none"> <li>• Demography and Family Planning (3)</li> <li>• Mother and child health, importance of breastfeeding, effects of infant milk substitutes and bottle feeding (2)</li> <li>• Overview of Vaccines, types of immunity and immunization (4)</li> <li>• Effect of Environment on Health – Water pollution, importance of safe drinking water, waterborne diseases, air pollution, noise pollution, sewage and solid waste disposal, occupational illnesses, Environmental pollution due to pharmaceuticals (7)</li> <li>• Psychosocial Pharmacy: Drugs of misuse and abuse – psychotropics, narcotics, alcohol, tobacco products. Social Impact of these habits on social health and productivity and suicidal behaviours (2)</li> </ul>	18 Hours
<b>Unit 3</b>	<p><b>Nutrition and Health</b></p> <ul style="list-style-type: none"> <li>• Basics of nutrition – Macronutrients and Micronutrients (3)</li> <li>• Importance of water and fibres in diet (1)</li> <li>• Balanced diet, Malnutrition, nutrition deficiency diseases, ill effects of junk foods, calorific and nutritive values of various foods, fortification of food (3)</li> <li>• Introduction to food safety, adulteration of foods, effects of artificial ripening, use of pesticides, genetically modified foods (1)</li> <li>• Dietary supplements, nutraceuticals, food supplements – indications, benefits, Drug-Food Interactions (2)</li> </ul>	10 Hours
<b>Unit 4</b>	<ul style="list-style-type: none"> <li>• Introduction to Microbiology and common microorganisms (3)</li> <li>• Epidemiology: Introduction to epidemiology, and its Applications. Understanding of terms such as epidemic, Pandemic, endemic, mode of transmission, outbreak, quarantine, isolation, incubation period, contact tracing, morbidity, mortality. (2)</li> </ul>	28 Hours



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	<ul style="list-style-type: none"><li>• Causative agents, epidemiology and clinical presentations and Role of Pharmacists in educating the public in prevention of the following communicable diseases:</li><li>• <b>Respiratory infections</b> – chickenpox, measles, rubella, mumps, influenza (including Avian-Flu, H1N1, SARS, MERS, COVID-19), diphtheria, whooping cough, meningococcal meningitis, acute respiratory infections, tuberculosis, Ebola (7)</li><li>• <b>Intestinal infections</b> – poliomyelitis, viral hepatitis, cholera, acute diarrheal diseases, typhoid, Amebiasis, worm infestations, food poisoning (7)</li><li>• <b>Arthropod-borne infections</b> - dengue, malaria, Filariasis and, chikungunya (4)</li><li>• <b>Surface infections</b> – trachoma, tetanus, leprosy (2)</li><li>• <b>STDs, HIV/AIDS</b> (3)</li></ul>	
<b>Unit 5</b>	Introduction to health systems and <b>all on-going National Health programs</b> in India, their objectives, functioning, outcome, and the role of pharmacists.	08 Hours
<b>Unit 6</b>	<b>Pharmacoeconomics</b> – Introduction, basic terminologies, importance of pharmacoeconomics	02 Hours

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Social Pharmacy	Dr. R. A. Ahirrao, Mr. Azam Zahir Shaikh	Pee Vee	01 <sup>st</sup>	2022
02	Social Pharmacy	Dr. S. B. Bhise Mrs. M. S. Bhise	Nirali Prakashan	01 <sup>st</sup>	2021
03	Social Pharmacy	Dr. N. Murugesha, Dr. S. Sambath Kumar	Sathyapublishers	1 <sup>st</sup>	2021

<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Parks Textbook of Social and Preventive Pharmacy	K. Park	Banarsidas Bhanot Publishers	26 <sup>th</sup>	2021

**Content Delivery and assessment tools:**



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Unit	Lect. No.	Lesson Plan	TM	TA	AT	Mapping with Outcomes	
		Content Delivery				CO	PO
I	1	<b>CONCEPT OF HEALTH</b> Introduction Definition and scope of Social Pharmacy. Social Pharmacy as a discipline	LT	CB,PP,	QA,CT, EX, RB	DP20115.1	1,3,4,5,6,7,9
	2	Scope in improving public health. Role of Pharmacist in Public Health.					
	3	Concept of Health-WHO definition, Various aspects of health.					
	4	Determinants of Health					
	5	Health Indicators, Concept of disease, Causes of disease, Prevention of Disease					
	6	National Health Policy-Indian Perspective					
	7	Public and private health system in India					
	8	National Health Mission					
	9	Introduction to Millennium Development Goals, Sustainable Development Goals, FIP Development Goals					
II	10	<b>Preventive healthcare - Role of Pharmacist in the following:</b> Demography & Demographic cycle	LT	CB,PP,	QA,CT, EX, RB	DP20115.2 DP20115.3	1,3,4,5,6,7,9
	11	Family planning and Family welfare					
	12	Contraceptive methods					
	13	Mother and Child Health, Importance of breastfeeding					
	14	Ill effects of infant milk substitutes and bottle feeding					
	15	<b>Introduction of Vaccines</b>					
	16	Types of Immunity					
	17	Immunization					
	18	Importance of vaccination or immunization					
	19	Effect of Environment on Health: Water Pollution					
	20	Importance of safe drinking water, Water born disease.					



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	21	Air pollution: Effect on health					
	22	Noise Pollution: Effect on health					
	23	Sewage and Solid waste disposal					
	24	Occupational Illness					
	25	Environmental Pollution due to pharmaceuticals					
	26	Psychosocial Pharmacy: Drugs of misuse and abuse Psychotropics, narcotics, alcohol, tobacco products.					
	27	Social Impact of these habits on social health and productivity and suicidal behaviours					
III	28	<b>Nutrition and Health</b> Macronutrients- Carbohydrates, Proteins	LT	CB,PP,	QA,CT EX,RB	DP20115.4	1,3,4,6,7,9
	29	Lipids and fats					
	30	Micronutrients: Vitamins and Minerals					
	31	Importance of water and fibres in diet					
	32	Balanced diet, Malnutrition, nutrition deficiency diseases					
	33	Ill effects of junk foods, calorific and nutritive values of various foods					
	34	Fortification of food					
	35	<b>Introduction to food safety</b> , adulteration of foods, effects of artificial ripening, use of pesticides, genetically modified foods					
	36	Dietary supplements, nutraceuticals,					
	37	Food supplements– indications, benefits, Drug-Food Interactions					
IV	38	Introduction to Microbiology	LT	CB,PP,	QA,CT EX,RB	DP20115.5	1,3,4,5,6,7,8, 9
	39	Definition ,application of Epidemiology					
	40	Epidemiology of communicable diseases					
	41	Introduction to epidemiology, and its applications. Understanding of terms such as epidemic, pandemic, endemic.					
	42	Mode of transmission, outbreak, quarantine, isolation, incubation period, contact					



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	tracing, morbidity, mortality.				
43	Causative agents, epidemiology and clinical presentations and Role of Pharmacists in educating the public in prevention of the following communicablediseases: <b>Respiratory infections-</b> Chickenpox, measles				
44	Rubella, mumps				
45	Influenza (including Avian-Flu, H1N1, SARS, MERS, COVID-19)				
46	Diphtheria, whooping cough				
47	Meningococcal meningitis				
48	Acute respiratory infections				
49	Tuberculosis, Ebola				
50	<b>Intestinal infections –</b> Poliomyelitis				
51	Viral hepatitis				
52	Cholera				
53	Acute diarrheal diseases				
54	Typhoid				
55	Amebiasis, worm infestations				
56	Food poisoning				
57	<b>Arthropod-borne infections-</b> Dengue				
58	Malaria				
59	Filariasis				
60	Chikungunya				



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	61	<b>Surface infections –</b> Trachoma					
	62	Tetanus, leprosy					
	63	Introduction of STDs					
	64	Study of STDs					
	65	HIV/AIDS					
V	66	<b>National Health programs</b> Introduction to health systems	LT	CB,PP,	QA,CT EX,RB	DP20115.1	1,3,4,5,6,7,9
	67	All ongoing National Health programs in India <b>3</b> -programs objectives, functioning and outcome					
	68	<b>3</b> -programs objectives, functioning and outcome					
	69	<b>3</b> -programs objectives, functioning and outcome					
	70	<b>3</b> -programs objectives, functioning and outcome					
	71	<b>4</b> -programs objectives, functioning and outcome					
	72	Additional National Health programs					
	73	Role of pharmacists in National Health programs					
VI	74	<b>Pharmacoeconomics</b> Introduction, basic terminologies	LT	CB,PP,	QA,CT, EX, RB	DP20115.6	1,3,4,6,9
	75	Importance of pharmaco economics					

**TM-Teaching Method-** Lecture (LT).

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Class Tests (CT), Question Answers (QA), MABTE Examinations (EX), Rubrics (RB) , Course End Survey filled by students.

**COURSE DETAILS**

**PRACTICAL**

<b>Class</b>	F.Y. D. Pharmacy
<b>Course Code and Course Title</b>	Social Pharmacy (20055)
<b>Prerequisite/s</b>	Environmental Science and Biology
<b>Teaching Scheme: Practical</b>	09
<b>Total contact hours</b>	09
<b>Evaluation Scheme: SES-I, SES-II, SES-III, PM, FE</b>	10/10/80

<b>Course Objectives:</b> The course aims	
01	To study the National immunization programs
02	To study Reproductive and child health programs.
03	To study the Food and nutrition related health programs
04	To study the Health education and promotion
05	To study the General roles and responsibilities of the pharmacists in public health.
06	To study First Aid for various emergency conditions including basic life support and cardiopulmonary resuscitation

<b>Course Outcomes (COs):</b>	
DP20055.1	Discuss the role of Pharmacist in various health care programmes.
DP20055.2	Prepare the different promotional material in order to create the awareness among the public.
DP20055.3	Summarize the preventive measures in associated with spread of various diseases.
DP20055.4	Demonstrate first aid services in emergency situations.
DP20055.5	Describe various health hazards including microbial sources
DP20055.6	Explain health care issues associated with food and nutritional substances

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20055.1	3	-	1	2	2	2	2	-	3
DP20055.2	3	2	2	2	2	3	2	1	3
DP20055.3	3	-	2	1	2	3	2	1	2
DP20055.4	3	2	1	2	1	2	2	-	2
DP20055.5	3	-	1	-	1	2	2	1	2
DP20055.6	3	-	1	2	1	2	2	-	2
Total	18	4	8	9	9	14	12	3	14
Avg.	<b>3.00</b>	<b>2.00</b>	<b>1.33</b>	<b>1.80</b>	<b>1.50</b>	<b>2.33</b>	<b>2.00</b>	<b>1.00</b>	<b>2.33</b>



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	3.00	2.00	1.33	1.80	1.50	2.33	2.00	1.00	2.33
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**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
DP20055	3	-	1	2	2	2	2	-	3

Course	Course Outcomes					
DP20115	DP20115.1	DP20115.2	DP20115.3	DP20115.4	DP20115.5	DP20115.6
<b>Target</b>	<b>3.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>
<b>Target Level</b>	Students scoring above 40% marks					
<b>1</b>	≥ 50%					
<b>2</b>	≥ 55%					
<b>3</b>	≥ 60%					

**MODES FOR ASSESSMENT OF COURSE OUTCOMES-PRACTICAL**

Mode	CO	Assessment tool
SES-I	DP20055.1, DP20055.3, DP20055.5, DP20055.6	Practical exam
SES-II	DP20115.2, DP20115.3, DP20115.5	Practical exam
SES-III	DP20055.1, DP20055.3, DP20055.4, DP20055.5, DP20055.6	Practical exam
PM	DP20055.1, DP20055.2, DP20055.3, DP20055.4, DP20055.5	Day to Day assessment
FE	DP20115.1, DP20115.2, DP20115.3, DP20115.4, DP20115.5	Practical exam

**COURSE DETAILS-PRACTICAL**

<b>Expt. No</b>	<b>Title of Experiment</b>
1)	To study and understand the immunization schedule for infants and children.
2)	To understand reproductive health and child health programs.
3)	To understand family planning methods.
4)	A]-To study and understand oral health and hygiene. B]- To learn hand washing technique
5)	A]- To learn Cough and sneeze etiquettes B]- To learn how to wear and disposal masks.
6)	To learn and understand operating procedure to wear the PPE kit.
7)	To study on Menstrual hygiene.
8)	A]-To study different types of disinfectant and marketed preparation. B]- To study antiseptics and marketed products
9)	A]- To study fumigating agents and its marketed products. B]- To study antiviral agents and its marketed products
10)	To prepared chart/ Video or slides eflyer on Coronavirus about virus ,way of spreading ,precautions treatment etc.
11)	To prepared chart/ Video or slides eflyer on Tuberculosis. about virus ,way of spreading ,precautions treatment etc.
12)	To prepared chart/ Video or slides eflyer on Malaria. about virus ,way of spreading ,precautions treatment etc.
13)	To prepared chart/ Video or slideseflyer on typhoid about virus ,way of spreading ,precautions treatment etc.
14)	To study sexual transmitted disease and their transmission.
15)	A]-To study drinking water treatment bypotassium permanganate. B]- To learn the use water testing kit.
16)	A]-To learn calculation of bleaching powder to be used for wells/tanks. B] -To study the methods for determination of presence of chlorine in water.
17)	To prepared the nutrition chart for children and adults.



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18)	To learn about tobacco action plan running in India.
19)	To learn about basics of first aid.
20)	A]-To study and understand working of automated external defibrillator. B] To understand the basic life support techniques
21)	A]To perform hands on training on CPR. B] To study and understand hands on training about foreign body airway obstruction (FBAO)
22)	To perform hand on training on sudden cardiac arrest.
23)	To study microscopically examination of different micro –organism or microbial species. [Ready made slides]
24)	To study the emergency treatment for medical emergency cases.
25)	To study the role of pharmacist in disaster management.

**Text Books:**

<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Practical manual of Social Pharmacy	Dr.G.D.Gupta	Nirali	1 <sup>st</sup>	2021

**Content Delivery and assessment tools:**



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**COURSE DETAILS-PRACTICAL**

<b>Expt. No</b>	<b>Title of Experiment</b>	<b>TM Teaching Method</b>	<b>Mapping with CO</b>	<b>Mapping with PO</b>
1.	To study and understand the immunization schedule for infants and children.	LT	DP20055.1	1,3,4,5,9
2.	To understand reproductive health and child health programs.	LT	DP20055.2	1,3,4,5,9
3.	To understand family planning methods.	LT	DP20055.2	1,3,4,5,9
4.	A]-To study and understand oral health and hygiene. B]- To learn hand washing technique	LT	DP20055.1	1,3,4,5,9
5.	A]- To learn Cough and sneeze etiquettes B]- To learn how to wear and disposal masks.	LT	DP20055.1	1,3,4,5,9
6.	To learn and understand operating procedure to wear the PPE kit.	LT	DP20055.1	1,3,4,5,9
7.	To study on Menstrual hygiene.	LT	DP20055.1	1,3,4,5,9
8.	A]-To study different types of disinfectant and marketed preparation. B]- To study antiseptics and marketed products	LT	DP20055.1	1,3,4,5,9
9.	A]- To study fumigating agents and its marketed products. B]- To study antiviral agents and its marketed products	LT	DP20055.1	1,3,4,5,9



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10.	To prepared chart/ Video or slides eflyer on Coronavirus about virus ,way of spreading ,precautions treatment etc.	LT	DP20055.3 DP20055.5	1,3,4,5,9
11.	To prepared chart/ Video or slides eflyer on Tuberculosis. about virus ,way of spreading ,precautions treatment etc.	LT	DP20055.3 DP20055.5	1,3,4,5,9
12.	To prepared chart/ Video or slides eflyer on Malaria. about virus ,way of spreading ,precautions treatment etc.	LT	DP20055.3 DP20055.5	1,3,4,5,9
13.	To prepared chart/ Video or slideseflyer on typhoid about virus ,way of spreading ,precautions treatment etc.	LT	DP20055.3 DP20055.5	1,3,4,5,9
14.	To study sexual transmitted disease and their transmission.	LT	DP20055.3 DP20055.5	1,3,4,5,9
15.	A]-To study drinking water treatment by potassium permanganate. B]- To learn the use water testing kit.	LT	DP20055.6	1,3,4,5,9
16.	A]-To learn calculation of bleaching powder to be used for wells/tanks. B] -To study the methods for determination of presence of chlorine in water.	LT	DP20055.6	1,3,4,5,9
17.	To prepared the nutrition chart for children and adults.	LT	DP20055.6	1,3,4,5,9
18.	To learn about tobacco action plan running in India.	LT	DP20055.3	1,3,4,5,9



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19.	To learn about basics of first aid.	LT,DM	DP20055.4	1,3,4,5,9
20.	A]-To study and understand working of automated external defibrillator. B] To understand the basic life support techniques	LT	DP20055.4	1,3,4,5,9
21.	A]To perform hands on training on CPR. B] To study and understand hands on training about foreign body airway obstruction (FBAO)	LT,DM	DP20055.4	1,3,4,5,9
22.	To perform hand on training on sudden cardiac arrest.	LT,DM	DP20055.4	1,3,4,5,9
23.	To study microscopically examination of different micro –organism or microbial species. [Ready made slides]	LT,DM	DP20055.5	1,3,4,5,9
24.	To study the emergency treatment for medical emergency cases.	LT,DM	DP20055.4	1,3,4,5,9
25.	To study the role of pharmacist in disaster management.	LT	DP20055.4	1,3,4,5,9



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**TM-Teaching Method-** Lecture (LT), Demonstration (DM), Chart (C), Model (M)

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Question Answers (QA), Class Tests (CT), Sessional Examination (SE), Final Examinations (FE), Rubrics (RB) ,  
Course End Survey filled by students,

**COURSE DETAILS**

**THEORY**

<b>Class</b>	S.Y. D. Pharmacy
<b>Course Code and Course Title</b>	20221 Pharmacology
<b>Prerequisite/s</b>	Basic & preliminary knowledge of HAP is essential
<b>Teaching Scheme: Lecture/Tutorial</b>	03/01
<b>Evaluation Scheme: SES-I, SES-II, SES-III, FE</b>	20/80

**THEORY**

<b>Course Objectives:</b> The course aims:(What teacher want to do with course while teaching)	
01	General concepts of pharmacology including pharmacokinetics, pharmacodynamics, routes of administration, etc.
02	Pharmacological classification and indications of drugs
03	Dosage regimen, mechanisms of action, contraindications of drugs
04	Common adverse effects of drugs

<b>Course Outcomes (COs):</b>	
Upon successful completion of this course, the student will be able to:	
DP20221.1	Describe basic concepts of Pharmacology including Pharmacokinetics and Pharmacodynamics.
DP20221.2	Explain the various pharmacological classifications of drugs.
DP20221.3	Discuss the pharmacological actions of drugs.
DP20221.4	Summarize physiological role of hormones, autocooids & their antagonists.
DP20221.5	Describe basic principles of chemotherapy
DP20221.6	Apply knowledge of dosage regimen, adverse effects, indications and contraindications of drugs used in treatment of diseases

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20221.1	3	-	-	3	1	2	3	1	2
DP20221.2	1	-	-	3	-	2	2	2	2
DP20221.3	3	3	-	3	1	3	3	1	2
DP20221.4	2	-	-	3	-	2	3	-	2
DP20221.5	1	-	-	3	2	3	3	-	1
DP20221.6	3	-	-	3	1	3	3	2	2
Total	13	3	-	18	5	15	17	6	11
Avg.	<b>2.17</b>	<b>3.00</b>	-	<b>3.00</b>	<b>1.25</b>	<b>2.50</b>	<b>2.83</b>	<b>1.50</b>	<b>1.83</b>
<b>20221</b>	<b>2.17</b>	<b>3.00</b>	-	<b>3.00</b>	<b>1.25</b>	<b>2.50</b>	<b>2.83</b>	<b>1.50</b>	<b>1.83</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
20221	2.17	3.00	-	3.00	1.25	2.50	2.83	1.50	1.83

Course 20221	Course Outcomes					
	DP20221.1	DP20221.2	DP20221.3	DP20221.4	DP20221.5	DP20221.6
Target	2.0	2.0	2.0	2.0	2.0	2.0
Target Level	Students scoring above 40% marks					
1	≥ 50%					
2	≥ 55%					
3	≥ 60%					

**MODES FOR ASSESSMENT OF COURSE OUTCOMES-THEORY**

Mode	CO	Assessment tool
SES-I	DP20221.1, DP20221.2, DP20221.3, DP20221.6	Written test
SES-II	DP20221.2, DP20221.3, DP20221.6	Written test
SES-III	DP20221.2, DP20221.3, DP20221.4, DP20221.5, DP20221.6	Written test
FE	DP20221.1, DP20221.2, DP20221.3, DP20221.4, DP20221.5, DP20221.6	Written test

**COURSE DETAILS-THEORY**

<b>Unit 1</b>	Introduction and scope of Pharmacology, Various routes of drug administration - advantages and disadvantages, Drug absorption - definition, types, factors affecting drug absorption, Bioavailability and the factors affecting bioavailability, Drug distribution - definition, factors affecting drug distribution, Biotransformation of drugs - Definition, types of biotransformation reactions, factors influencing drug metabolisms, Excretion of drugs - Definition, routes of drug excretion, General mechanisms of drug action and factors modifying drug action	11 hrs
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<b>Unit 2</b>	Steps involved in neurohumoral transmission, Definition, classification, pharmacological actions, dose, indications, and contraindications of Cholinergic drugs, Anti-Cholinergic drugs, Adrenergic drugs, Anti-adrenergic drugs, Neuromuscular blocking agents, Drugs used in Myasthenia gravis, Local anaesthetic agents, Non-Steroidal Anti-Inflammatory drugs (NSAIDs).	12 hrs
<b>Unit 3</b>	Definition, classification, pharmacological actions, dose, indications and contraindications of Miotics, Mydriatics, Drugs used in Glaucoma.	02 hrs
<b>Unit 4</b>	Definition, classification, pharmacological actions, dose, indications, and contraindications of General anaesthetics, Hypnotics and sedatives, Anti-convulsant drugs, Anti-anxiety drugs Anti-depressant drugs, Anti-psychotics, Nootropic agents, Centrally acting muscle relaxants, Opioid analgesics.	09 hrs
<b>Unit 5</b>	Definition, classification, pharmacological actions, dose, indications, and contraindications of Anti-hypertensive drugs, Anti-anginal drugs, Anti-arrhythmic drugs, Drugs used in atherosclerosis and Congestive heart failure, Drug therapy for shock.	06 hrs
<b>Unit 6</b>	Definition, classification, pharmacological actions, dose, indications, and contraindications of Hematinic agents, Anti-coagulants, Anti-platelet agents, Thrombolytic drugs.	03 hrs
<b>Unit 7</b>	Definition, classification, pharmacological actions, dose, indications, and contraindications of Bronchodilators, Expectorants, Anti-tussive agents, Mucolytic agents.	02 hrs
<b>Unit 8</b>	Definition, classification, pharmacological actions, dose, indications, and contraindications of Anti-ulcer drugs, Anti-emetics, Laxatives and Purgatives, Anti-diarrheal drugs.	04 hrs
<b>Unit 9</b>	Definition, classification, pharmacological actions, dose, indications, and contraindications of Diuretics, Anti-diuretics.	02 hrs
<b>Unit 10</b>	Physiological and pathological role and clinical uses of Thyroid hormones, Anti-thyroid drugs, Parathormone, Calcitonin, Vitamin D, Insulin, Oral hypoglycemic agents, Estrogen, Progesterone,	07 hrs

	Oxytocin, Corticosteroids.	
<b>Unit 11</b>	Physiological role of Histamine, 5 HT and Prostaglandins, Classification, clinical uses, and adverse effects of antihistamines and 5 HT antagonists	03 hrs
<b>Unit 12</b>	Introduction, basic principles of chemotherapy of infections, infestations and neoplastic diseases, Classification, dose, indication and contraindications of drugs belonging to following classes: Penicillins, Cephalosporins, Aminoglycosides, Fluoroquinolones, Macrolides, Tetracyclines, Sulphonamides, Anti-tubercular drugs, Anti-fungal drugs, Anti-viral drugs, Anti-amoebic agents, Anthelmintics, Anti-malarial agents, Anti-neoplastic agents	12 hrs
<b>Unit 13</b>	Definition, types, and indications of biological agents with examples	02 hrs

**Text Books:**

<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Pharmacology	Mrs.Shraddha Kale and Rajendra Kale	Nirali Publication (ER20)	1 <sup>st</sup> Edition	2022
02	Pharmacology	Dr.A.V.Yadav and Mrs.A.S.Dubal	Nirali Publication (ER20)	1 <sup>st</sup> Edition	2022
03	Pharmacology & Toxicology	Mrs. S.R.Kale	Nirali Publication	24 <sup>Th</sup>	2020
04	Pharmacology & Toxicology	Dr.A.V.Yadav	Nirali Publication	27 <sup>Th</sup>	2016

**Reference Books:**

<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Medical Pharmacology	K.D.Tripathi	Jaypee	8 <sup>Th</sup>	2019
02	Pharmacology and Therapeutics	R.S.Satoskar	Elsevier	24 <sup>th</sup>	2015
03	Essentials of Pharmacotherapeutics	F.S.K.Barar	S.Chand	7 <sup>th</sup>	2015
04	Illustrated Review Pharmacology	Karen Whalen	Lippincott	South Asian	
05	Pharmacology	Rang & Dell's	Elsevier	7 <sup>Th</sup>	2013

**Content Delivery and assessment tools:**



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Unit	Lect. No.	Lesson Plan	TM Teaching Method	TA Teaching Aid	AT	Mapping with Outcomes	
		Content Delivery				CO	PO
1	1	Branches of Pharmacology, Sources & nature of drug	LT	CB,PP, VF	QA,CT, SE,FE, CES	DP20221.1	1,4,5,6,7,8,9
	2	Classification of routes of drug administration Oral route, Sublingual route, Local application					
	3	Parenteral route, IV route, IM route, SC route					
	4	Drug Absorption- definition, types and factors affecting it					
	5	Bioavailability of drug and factors affecting it					
	6	Drug Distribution- definition and factors affecting it					
	7	Biotransformation of drug- definition, types and factors affecting it					
	8	Excretion of drug- definition and routes of drug excretion					
	9	General Mechanism of drug action					
	10	Factors modifying drug action					
	11						
2	12	Introduction of Nervous system Steps involved in neurohumoral transmission	LT	CB,PP, VF	QA,CT, SE,FE, CES	DP20221.1 DP20221.2 DP20221.3 DP20221.6	1,2,4,5,6,7,8,9
	13	Cholinergic receptor Definition, classification of parasympathomimetics					
	14	Pharmacological actions, dose, indications and contraindications of parasympathomimetics					
	15	Definition, classification, pharmacological actions, dose, indications and contraindications of parasympatholytics					
	16	Adrenergic receptor Definition, classification of sympathomimetics					
	17	Pharmacological actions, dose, indications and contraindications of sympathomimetics					
	18	<b>SYMPATHOLYTICS</b> Definition, classification, pharmacological actions, dose, indications and contraindications of sympatholytics					



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	19	<b>NEUROMUSCULAR BLOCKING AGENTS</b>					
	20	<b>DRUGS USED IN MYESTHENIA GRAVIS</b> – Definition, causes, symptoms & drug therapy					
	21	<b>LOCAL ANAESTHETICS</b> - Definition, classification, pharmacological actions, dose, indications and contraindications of local anaesthetics					
	22	<b>NSAID'S</b> - Introduction of Inflammation, definition, classification of NSAID's					
	23	Pharmacological actions, dose, indications and contraindications of NSAID's					
3	24	<b>DRUGS ACTING ON EYE</b> - Definition, classification- Mydriatics & Miotic	LT	CB,PP	QA,CT, SE,FE, CES	DP20221.2 DP20221.3 DP20221.6	1,2,4,5,6,7,8,9
	25	Drug therapy of glucoma					
4	26	<b>DRUGS ACTING ON CNS- GENERAL ANAESTHETICS</b> Introduction of General anesthesia	LT	CB,PP, VF	QA,CT, SE,FE, CES	DP20221.2 DP20221.3 DP20221.6	1,2,4,5,6,7,8,9
	27	Definition, classification, pharmacological actions, dose, indications and contraindications of general anaesthetics					
	28	<b>HYPNOTICS AND SEDATIVES</b> Sleep & its pattern Definition, classification, pharmacological actions, dose, indications and contraindications of hypnotics and sedatives					
	29	<b>EPILEPSY AND ANTIEPILEPTICS</b> Epilepsy–Definition & types					
	30	Definition, classification, pharmacological actions, dose, indications and contraindications of antiepileptics					
	31	<b>ANTI-ANXIETY DRUGS AND ANTI-DEPRESSANT DRUGS</b> Definition, classification, pharmacological actions, dose, indications and contraindications of drugs					
	32	<b>ANTI-PSYCHOTIC DRUGS AND NOOTROPIC AGENTS</b> Definition, classification, pharmacological actions, dose, indications and contraindications of drugs					
	33	<b>CENTRALLY ACTING MUSCLE RELAXANTS</b>					



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		Definition, classification, pharmacological actions, dose, indications and contraindications of drugs					
	34	<b>OPOID ANALGESICS-</b> Definition, classification, pharmacological actions, dose, indications and contraindications of drugs					
5	35	<b>DRUGS ACTING ON CARDIOVASCULAR SYSTEM</b> Definition, classification, pharmacological actions, dose, indications and contraindications of	LT	CB,PP, VF	QA,CT, SE,FE, CES	DP20221.2 DP20221.3 DP20221.6	1,2,4,5,6,7,8,9
	36	Anti-hypertensive Drugs					
	37	Anti-anginal drugs					
	38	Anti-arrhythmic drugs					
	39	Drugs used in CHF and atherosclerosis					
	40	Drug therapy of shock					
6	41	<b>DRUG ACTING ON BLOOD AND BLOOD FORMING AGENTS</b> Definition, classification, pharmacological actions, dose, indications and contraindications of Hematinic agents	LT	CB,PP	QA,CT, SE,FE, CES	DP20221.2 DP20221.3 DP20221.6	1,2,4,5,6,7,8,9
	42	Anti-coagulants					
	43	Anti-platelet agents Thrombolytic drugs					
7	44	Definition, classification, pharmacological actions, dose, indications and contraindications of Bronchodilator and Expectorant	LT	CB,PP, VF	QA,CT, SE,FE, CES	DP20221.2 DP20221.3 DP20221.6	1,2,4,5,6,7,8,9
	45	Antitussive and mucolytic agents					
8	46	<b>DRUGS ACTING ON DIGESTIVE SYSTEM</b> Definition, classification, pharmacological actions, dose, indications and contraindications of Anti-ulcer drugs	LT	CB,PP, VF	QA,CT, SE,FE, CES	DP20221.2 DP20221.3 DP20221.6	1,2,4,5,6,7,8,9
	47	Anti-emetics					
	48	Laxatives and Purgatives					
	49	Anti-diarrheal drugs					

9	50	<b>DRUGS ACTING ON KIDNEY</b> Definition, classification, pharmacological actions, dose, indications and contraindications of Diuretics	LT	CB,PP, VF	QA,CT, SE,FE, CES	DP20221.2 DP20221.3 DP20221.6	1,2,4,5,6,7,8,9
	51	Antidiuretics					
10	52	<b>HARMONE AND HARMONE ANTAGONIST</b> Physiological and Pathological role, clinical uses of Thyroid hormone and anti-thyroid drugs	LT	CB,PP	QA,CT, SE,FE, CES	DP20221.2 DP20221.3 DP20221.4 DP20221.6	1,2,4,5,6,7,8,9
	53	Parathyroid hormone					
	54	Calcitonin and Vitamin D					
	55	Insulin, Oral hypoglycemic agents					
	56						
	57	Estrogen & Progesterone					
	58	Corticosteroids & Oxytocin					
11	59	<b>AUTOCOID</b> Physiological role of Histamine, Serotonin and Prostaglandins	LT	CB,PP	QA,CT, SE,FE, CES	DP20221.2 DP20221.3 DP20221.4 DP20221.6	1,2,4,5,6,7,8,9
	60	Classification, clinical uses and adverse effects of Antihistamines					
	61	Classification, clinical uses and adverse effects of 5HT antagonists					
12	62	<b>CHEMOTHERAPEUTIC AGENTS</b> Introduction, Basic principles of chemotherapy	LT	CB,PP	QA,CT, SE,FE, CES	DP20221.2 DP20221.3 DP20221.5 DP20221.6	1,2,4,5,6,7,8,9
	63	Penicillins, Sulphonamides					
	64	Cephalosporins and Aminoglycosides					
	65	Fluroquinolones and Macrolides					
	66	Tetracyclines					
	67	Anti-tubercular drugs					
	68	Anti-fungal and Anthelmintics					
	69	Anti-viral and Anti-amoebic drugs					
	70	Anti-malarial agents					



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	71						
	72	Anti-neoplastic agents					
	73						
13	74	<b>BIOLOGICAL AGENTS</b> Definition and Types of Biological Agent	LT	CB,PP	QA,CT, SE,FE, CES	DP20221.1 DP20221.2 DP20221.3	1,2,4,5,6,7,8,9
	75	Indication and examples of biological agent					

**TM-Teaching Method-** Lecture (LT), Demonstration (DM), Chart (C), Model (M)

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Question Answers (QA), Class Tests (CT), Sessional Examination (SE), Final Examinations (FE), Rubrics (RB) ,  
Course End Survey filled by students,

**COURSE DETAILS**

<b>Class</b>	S.Y. D. Pharmacy
<b>Course Code and Course Title</b>	20056 Pharmacology
<b>Prerequisite/s</b>	Human Anatomy and Physiology – Practical
<b>Teaching Scheme: Practical</b>	02 Hours
<b>Total contact hours</b>	50
<b>Evaluation Scheme: SE/FE</b>	20/80

<b>Course Objectives:</b> The course aims:(What teacher want to do with course while teaching)	
01	To develop the skill of the pharmacist as a clinical, community and hospital pharmacist.
02	To study pharmacodynamics, pharmacokinetics and toxicology of the drug.
03	To develop the skill of pharmacist to able for counselling the patient, Identify the effect, adverse effect, contraindication of the drug in obstetrics, paediatrics and geriatrics.
04	To develop the skill of pharmacist to identify and decide the dose and route of administration of the drug.

<i>At the end of the course, students should be able to :</i>	
DP20056.1	Explain the basic concept of experimental pharmacology.
DP20056.2	Describe the various instruments used in experimental pharmacology.
DP20056.3	Demonstrate the effect of drug on isolated tissue /organs by using simulated experiments
DP20056.4	Illustrate the action of drug on experimental animal by using simulated experiments.
DP20056.5	Interpret the results through observation and graph.

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes								
	1	2	3	4	5	6	7	8	9
<b>DP20056.1</b>	3	3	-	-	2	3	2	3	-
<b>DP20056.2</b>	3	3	1	3	1	3	-	2	1
<b>DP20056.3</b>	3	3	1	3	3	3	-	3	2
<b>DP20056.4</b>	3	3	1	1	2	3	-	2	3
<b>DP20056.5</b>	3	3	-	-	-	3	-	1	1
Total	15	15	3	7	8	15	2	11	7
<b>Avg. of each PO</b>	<b>3.00</b>	<b>3.00</b>	<b>1.00</b>	<b>2.33</b>	<b>2.00</b>	<b>3.00</b>	<b>2.00</b>	<b>2.20</b>	<b>2.33</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
20056	3.00	3.00	1.00	2.33	2.00	3.00	2.00	2.20	2.33

Course 20056	Course Outcomes				
	DP20056.1	DP20056.2	DP20056.3	DP20056.4	DP20056.5
Target	3	2	2	2	2
2Target Level	Students scoring above 50% marks				
1	>50%				
2	>55%				
3	>60%				

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
Sessional-I	DP20056.1, DP20056.2, DP20056.3	Written test
Sessional-II	DP20056.1, DP20056.2, DP20056.3	Written test
Sessional-III	DP20056.1, DP20056.2, DP20056.3	Manual and Viva examination
Final	DP20056.1, DP20056.2, DP20056.3, DP20056.4, DP20056.5	Practical exam

Expt No	Title of Experiment	Planned week	CO	PO
1.	Introduction to Experimental pharmacology	1 <sup>st</sup>	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
2.	To study Laboratory animal 1.Rat, 2.Mice, 3.Ginea Pig, 4.Rabbit	2 <sup>nd</sup>	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
3.	Different routes of administration of drugs in animals.	3 <sup>rd</sup>	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
4.	To study the common instruments and equipment's used in experimental Pharmacology	4 <sup>th</sup>	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
5.	Types of preclinical Experiments In-Vivo, In vitro, Ex-vivo.	5 <sup>th</sup>	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
6.	Techniques of blood collection from animal experiments	6 <sup>th</sup>	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9

7.	Study of Local anaesthetics on rabbit eye	7 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
8.	Study of Mydriatic effect on rabbit eye	8 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
9.	Study of Miotic effect on rabbits eye	9 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
10	Effect of analgesics using Analgasiometer by Hot plate method	10 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
11	Effect of analgesics using Analgasiometer by tail flick method	11 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
12	To study the analgesic activity by writhing test	12 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
13	Screening of muscle relaxant using Rota-Rod apparatus	13 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
14	Screening of Anticonvulsant using electro convulsimeter	14 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
15	Screening of CNS Stimulants using Actophotometer	15 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
16	Screening of CNS Depressants using Actophotometer	16 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
17	Study of anxiolytic activity using elevated plus maze method	17 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
18	To study effect of acetylcholine on isolated heart	18 <sup>th</sup>	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
19	To study effect of Adrenaline on isolated heart	19 <sup>th</sup>	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
20	Effect of Acetylcholine on ciliary motility on frogs buccal cavity	20 <sup>th</sup>	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
21	Effect of Physostigmine on ciliary motility on frogs buccal cavity	21 <sup>th</sup>	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
22	Effect of Atropine on ciliary motility on frogs buccal cavity	22 <sup>th</sup>	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
23	Pyrogen testing by rabbit method.	23 <sup>th</sup>	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
24	Study of effect of Digoxin on isolated frog heart	24 <sup>th</sup>	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
25	Study of Antipsychotic activity by Cooks pole climbing Apparatus	25 <sup>th</sup>	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9

**Assessment Tools:** Laboratory Evaluation & assessment Rubric.

Expt. No	Title of Experiment	TM Teaching Method	Mapping with CO	Mapping with PO
1.	Introduction to Experimental pharmacology	LT,DM,	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
2.	To study Laboratory animal 1.Rat, 2.Mice, 3.Ginea Pig, 4.Rabbit	LT,DM	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
3.	Different routes of administration of drugs in animals.	LT,DM,	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
4.	To study the common instruments and equipment's used in experimental Pharmacology	LT,DM,	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
5.	Types of preclinical Experiments In-Vivo, In vitro, Ex-vivo.	LT,DM,	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
6.	Techniques of blood collection from animal experiments	LT	DP20056.1, DP20056.2	1, 2, 3, 4,5,6,7,8,9
7.	Study of Local anaesthetics on rabbit eye	LT,DM,	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
8.	Study of Mydriatic effect on rabbit eye	LT,DM,	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
9.	Study of Miotic effect on rabbits eye	LT,DM,	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
10.	Effect of analgesics using Analgesiometer by Hot plate method	LT,DM,	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
11.	Effect of analgesics using Analgesiometer by tail flick method	LT,DM	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
12.	To study the analgesic activity by writhing test	LT,DM	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
13.	Screening of muscle relaxant using Rota-Rod apparatus	LT,DM	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
14.	Screening of Anticonvulsant using electro convulsimeter	LT,DM	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
15.	Screening of CNS Stimulants using Actophotometer	LT,DM	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
16.	Screening of CNS Depressants using Actophotometer	LT,DM	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
17.	Study of anxiolytic activity using elevated plus maze method	LT,DM,	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
18.	To study effect of acetylcholine on isolated heart	LT,DM	DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
19.	To study effect of Adrenaline on isolated heart	LT,DM	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
20.	Effect of Acetylcholine on ciliary motility on frogs buccal cavity	LT,DM	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9

21.	Effect of Physostigmine on ciliary motility on frogs buccal cavity	LT,DM	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
22.	Effect of Atropine on ciliary motility on frogs buccal cavity	LT,DM	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
23.	Pyrogen testing by rabbit method.	LT,DM	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
24.	Study of effect of Digoxin on isolated frog heart	LT,DM	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9
25.	Study of Antipsychotic activity by Cooks pole climbing Apparatus	LT,DM	DP20056.3, DP20056.4, DP20056.5	1, 2, 3, 4,5,6,8,9

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Laboratory Manual for Pharmacology	Ms. Kajal Pansare Mr. Ganesh Sonawane. Dr. Vinod Bairagi	Brilliant Publication	1 St	2022
02	Pharmacology and Toxicology with Viva - Voce	U.D.Shivhare	VBD Publication	26 <sup>th</sup>	2018
03	Pharmacology and Toxicology: Practical Notebook	S.K.Pandey V.D.Sharma	CBS Publishers	1 <sup>st</sup>	2013
<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Essential of Medical Pharmacology	K.D.Tripathi	Jaypee Publisher	8 <sup>th</sup>	2018
03	Pharmacology and Therapeutics	R.S.Satoskar	Elsevier India	26th	2020
04	Principles of Pharmacology	H.L.Sharma K.K.Sharma	Paras Publication	2 <sup>nd</sup>	2012
02	Textbook of Pharmacology	F.S.K.Barar	Chand Publication	4 <sup>th</sup>	2000
<b>Other Books/E-material:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	MSBTE CD	-	-	-	-



**Self-Study Materials and References:**

1. Laboratory manuals

**Additional Comments:**

The E-books as well as some Journal/Conference papers and MSBTE CD are available in the Library.

**TM-Teaching Method-** Lecture (LT), Demonstration (DM), Chart (C), Model (M)

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Question Answers (QA), Class Tests (CT), Sessional Examination (SE), Final Examinations (FE), Rubrics (RB) , Course End Survey filled by students,

**COURSE DETAILS**

<b>Class</b>	D. Pharmacy 2 <sup>nd</sup> year
<b>Course Code and Course Title</b>	20222 Community Pharmacy and Management
<b>Prerequisite/s</b>	Basic & preliminary knowledge of Pharmaceutics, Human Anatomy and Physiology
<b>Teaching Scheme: Lecture/Tutorial</b>	03/01
<b>Evaluation Scheme: Theory Paper/SE</b>	80/20

<b>Course Objectives:</b> The course aims: (What teacher want to do with course while teaching)	
01	Establishing and running a community pharmacy and its legal requirements.
02	Professional aspects of handling and filling prescriptions.
03	Patient counselling on diseases, prescription and or non-prescription medicines.
04	Scope of performing basic health screening in community pharmacy settings.

<b>Course Outcomes (COs):</b>	
Upon successful completion of this course, the student will be able to:	
DP20222.1	Recognize the professional responsibilities of community pharmacist and relate the need of community pharmacy practice.
DP20222.2	Describe knowledge regarding basic aspects of prescription with its handling and dispensing of medications.
DP20222.3	Relate the importance of communication skill in professional development.
DP20222.4	Use of community pharmacy knowledge for the counselling of patient.
DP20222.5	Discuss the different health screening techniques and its interpretation.
DP20222.6	Explain the establishment, legal requirements and effective administration of a community pharmacy.

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20222.1	3	-	2	2	-	3	3	-	1
DP20222.2	3	-	2	3	2	3	2	-	2
DP20222.3	3	-	2	1	1	3	3	-	2
DP20222.4	3	2	2	3	1	3	3	-	3
DP20222.5	3	3	-	2	1	3	2	-	2
DP20222.6	3	3	2	2	2	3	2	-	3
Total	18	8	10	13	7	18	15	-	13
Avg.	<b>3.0</b>	<b>2.66</b>	<b>2.0</b>	<b>2.16</b>	<b>1.4</b>	<b>3.0</b>	<b>2.5</b>	-	<b>2.16</b>
20222	<b>3.0</b>	<b>2.66</b>	<b>2.0</b>	<b>2.16</b>	<b>1.4</b>	<b>3.0</b>	<b>2.5</b>	-	<b>2.16</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
20226	3.0	2.66	2.0	2.16	1.4	3.0	2.5	-	2.16

Course 20226	Course Outcomes				
	DP20226.1	DP20226.2	DP20226.3	DP20226.4	DP20226.5
<b>Target</b>	2	2	2	2	2
<b>Target Level</b>	Students scoring above 40% marks				
1	≥ 50%				
2	≥ 55%				
3	≥ 60%				

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	DP20222.1, DP20222.2	Written test
SES-II	DP20222.3, DP20222.4, DP20222.5	Written test
SES-III	DP20222.4, DP20222.6	Written test
FE	DP20222.1, DP20222.2, DP20222.3, DP20222.4, DP20222.5, DP20222.6	Written test

COURSE DETAILS	
UO20222CH1.1 UO20222CH1.2	<b>Community Pharmacy Practice</b> Definition, History Development of community pharmacy-International and Indian scenario
UO20222CH2.1 UO20222CH2.2 UO20222CH2.3	<b>Professional responsibilities of Community Pharmacist</b> Various responsibilities of Community Pharmacist Introduction to the concept of good pharmacy practice Standard operating procedures (SOPs)
UO20222CH3.1 UO20222CH3.2 UO20222CH3.3 UO20222CH3.4	<b>Prescription and Prescription handling</b> Definition, parts of prescription Legality of prescription, prescription handling. Labeling of dispensed medications (main label, ancillary label, pictogram) Brief instructions on medication usage, Dispensing process, Good dispensing practices Dispensing errors and strategies to minimize them.
UO20222CH4.1	<b>Communication skills</b> Definition, types of communication skills

UO20222CH4.2	Interactions with professionals and patients, Verbal communication skills (one-to-one, over the telephone)
UO20222CH4.3	Written communication skills, Body language
UO20222CH4.4	Patient interview techniques
UO20222CH5.1	<b>Patient Counseling</b> Definition and benefits of patient counseling, Stages of patient counseling- Introduction, Counseling content Counseling process, closing the counseling session
UO20222CH5.2	Barriers to effective counseling-Types and strategies to overcome barriers
UO20222CH5.3	Patient counseling points for chronic diseases/disorders Hypertension, diabetes, Asthma, Tuberculosis ,COPD, AIDS
UO20222CH5.4	Patient package inserts- Definition, importance and benefits
UO20222CH5.5	Scenarios of PPI use in India and other countries
UO20222CH5.6	Patient information leaflets-Definition and uses
UO20222CH6.1	<b>Medication Adherence</b> Definition, factors influencing non-adherence
UO20222CH6.2	Strategies to overcome non-adherence
UO20222CH7.1	<b>Health Screening Services in Community Services</b> Introduction, scope of health screening services Importance of health screening services
UO20222CH7.2	Importance of health screening services for routine monitoring of patients, early detection and referral of undiagnosed cases.
UO20222CH8.1	<b>Over The Counter (OTC) Medications</b> Definition, need and role of pharmacist in OTC medication dispensing OTC medications in India, Counseling for OTC products
UO20222CH8.2	Self-medication, Role of pharmacist in promoting the safe practices during self-medication
UO20222CH8.3	Responding to symptoms, minor ailments and advice for self-care in conditions such as- Pain management, Cough, Cold, Diarrhea, Constipation, Vomiting, Fever, Sore throat, Skin disorders.
UO20222CH8.4	Oral health (mouth ulcers, dental pain, gum swelling)
UO20222CH9.1	<b>Community Pharmacy Management</b> Legal requirements to setup a community pharmacy, Site selection requirements, Pharmacy designs and interiors, Vendor selection and ordering
UO20222CH9.2	Procurement, inventory control methods, Inventory management
UO20222CH9.3	Financial planning and management
UO20222CH9.4	Accountancy in community pharmacy-Day book, Cash book
UO20222CH9.5	Introduction to pharmacy operation software's -usefulness and availability
UO20222CH9.6	Customer relation management (CRM), Audits in Pharmacies, SOP of Pharmacy Management
UO20222CH9.7	Introduction to digital health, mHealth, Online pharmacies

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Modern Concepts in Community Pharmacy and Management	Sahare A.Y., Sonawane S.M., Panpaliya D.V.	S. Vikas and Company	1 <sup>st</sup>	2022
02	Community Pharmacy and Management	A.V. Yadav	Nirali Prakashan, Pune	1 <sup>st</sup>	2022
03	Community Pharmacy and Management	Dr. Ashok Hajare	Nirali Prakashan, Pune	1 <sup>st</sup>	2022
04	A Textbook of Community Pharmacy	Yadav, Mamta	Nikita Publication, Latur	1 <sup>st</sup>	2022

<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Drug Store Management	Dr. Mahesh D. Burande	Nirali Prakashan	3 <sup>rd</sup>	2015

**Content Delivery and assessment tools:**

Unit	Lect. No.	Lesson Plan	TM	TA	AT	Mapping with Outcomes	
		Content Delivery				CO	PO
I	1	<b>Introduction to Vision, Mission, PEOs and Course Outcomes</b> <b>Community Pharmacy Practice</b> Definition, History	LT	CB,PP	QA,CT, EX	DP20222.1	1,3,4,6, 7,9
	2	Development of community pharmacy-International and Indian scenarios					
II	3	<b>Professional responsibilities of Community Pharmacist</b>	LT	CB,PP	QA,CT, EX	DP20222.1	1,3,4,6, 7,9
	4	Introduction to the concept of good pharmacy practice					
	5	Standard operating procedures (SOPs)					
III	6	<b>Prescription and Prescription handling</b> Definition, parts of prescription	LT	CB,PP	QA,CT, EX	DP20222.2	1,3,4,5, 6,7,9
	7	Legality of prescription, prescription handling					
	8	Labelling of dispensed medications (main label, ancillary label, pictogram)					
	9	Brief instructions on medication usage.					
	10	Dispensing process					
	11	Good dispensing practices					
IV	12	Dispensing errors and strategies to minimize them	LT	CB,PP	QA,CT EX	DP20222.3	1,3,4,5, 6,7,9
	13	<b>Communication skills</b> Definition, types of communication skills					
	14	Interactions with professionals and patients					
	15	Verbal communication skills (one-to-one, over the telephone)					
	16	Written communication skills					
	17	Body language					
V	18	Patient interview techniques				DP20222.4	1,2,3,4, 5,6,7,9
	19	<b>Patient Counselling</b> Definition and benefits of patient counselling					
	20	Stages of patient counselling- Introduction, counselling content					
	21	Counselling process, closing the counselling session					
	22	Barriers to effective counseling-Types and strategies to overcome barriers					

	23	Patient counselling points for chronic diseases/disorders-Hypertension, diabetes					
	24	Patient counselling points for chronic diseases/disorders- Asthma, Tuberculosis					
	25	Patient counselling points for chronic diseases/disorders- COPD, AIDS					
	26	Patient package inserts- Definition, importance and benefits					
	27	Scenarios of PPI use in India and other countries					
	28	Patient information leaflets-Definition and uses					
VI	29	<b>Medication Adherence</b> Definition, factors influencing non-adherence				DP20222.4	1,2,3,4, 5,6,7,9
	30	Strategies to overcome non-adherence					
VII	31	<b>Health Screening Services in Community Services</b> Introduction, scope of health screening services				DP20222.5	1,2,4,5, 6,7,9
	32	Importance of health screening services for routine monitoring of patients, early detection and referral of undiagnosed cases					
	33	Importance of health screening services					
	34	Importance of health screening services					
	35	Importance of health screening services					
VIII	36	<b>Over The Counter (OTC) Medications</b> Definition, need and role of pharmacist in OTC medication dispensing	LT	CB,PP	QA,CT, EX	DP20222.4	1,2,3,4, 5,6,7,9
	37	OTC medications in India					
	38	Counseling for OTC products					
	39	Self-medication					
	40	Role of pharmacist in promoting the safe practices during self-medication					
	41	Responding to symptoms, minor ailments and advice for self-care in conditions such as- Pain management					
	42	Cough					
	43	Cold					
	44	Diarrhea					
	45	Constipation					

	46	Vomiting					
	47	Fever					
	48	Sore throat					
	49	Skin disorders					
	50	Oral health (mouth ulcers, dental pain, gum swelling)					
IX	51	<b>Community Pharmacy Management</b> Legal requirements to setup a community pharmacy	LT	CB,PP	QA,CT, EX	DP20222.6	1,2,3,4, 5,6,7,9
	52	Legal requirements to setup a community pharmacy					
	53	Site selection requirements					
	54	Site selection requirements					
	55	Pharmacy designs and interiors					
	56	Pharmacy designs and interiors					
	57	Vendor selection and ordering					
	58	Vendor selection and ordering					
	59	Procurement, inventory control methods					
	60	Procurement, inventory control methods					
	61	Inventory management					
	62	Financial planning and management					
	63	Financial planning and management					
	64	Accountancy in community pharmacy-Day book					
	65	Cash book					
	66	Introduction to pharmacy operation softwares-usefulness and availability					
	67	Introduction to pharmacy operation softwares-usefulness and availability					
	68	Customer relation management (CRM)					
	69	Customer relation management (CRM)					
	70	Audits in Pharmacies					
71	Audits in Pharmacies						

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	72	SOP of Pharmacy Management					
	73	SOP of Pharmacy Management					
	74	Introduction to digital health, mHealth					
	75	Online pharmacies					

**TM-Teaching Method-** Lecture (LT).

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP)

**AT- Assessment Tool** - Class Tests (CT), Question Answers (QA), MSBTE Examinations (EX), Course End Survey filled by students,

**COURSE DETAILS**

<b>Class</b>	F.Y. D. Pharmacy
<b>Course Code and Course Title</b>	<b>DP20057 Community Pharmacy and Management</b>
<b>Prerequisite/s</b>	Science,Pharmaceutics
<b>Teaching Scheme: Practical</b>	03 Hours
<b>Total contact hours</b>	75 Hours
<b>Evaluation Scheme: SES-I /SES-II/SES-III / MSBTE</b>	10/10/10/80

<b>Course Objectives:</b> The course aims:	
1.	Professional handling and filling prescriptions
2.	Patient counseling on diseases and minor ailments
3.	Patient counseling on prescription and / or non-prescription medicines
4.	Preparation of counseling materials such as patient information leaflets
5.	Performing basic health screening tests

<b>Course Outcomes (COs):</b>	
Upon successful completion of this course, the student will be able to:	
<b>DP20057.1</b>	Handle and fill prescriptions in a professional manner.
<b>DP20057.2</b>	Discuss and counsel patients on various diseases and minor ailments.
<b>DP20057.3</b>	Extend counselling to patients on prescription and non-prescription medicines.
<b>DP20057.4</b>	Prepare list of abbreviation, short form used and construct SOPs for various activities.
<b>DP20057.5</b>	Perform basic health screening tests.
<b>DP20057.6</b>	Design and prepare patient information leaflets.

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
<b>DP20057.1</b>	3	2	-	2	-	3	3	-	1
<b>DP20057.2</b>	3	-	2	3	-	3	2	-	3
<b>DP20057.3</b>	3	-	3	3	3	3	3	-	3
<b>DP20057.4</b>	3	-	-	-	-	3	-	-	-
<b>DP20057.5</b>	3	3	2	3	-	3	2	-	2
<b>DP20057.6</b>	3	2	-	2	-	3	-	-	1
Total	18	7	7	13	3	18	10	-	10
Avg.	<b>3.0</b>	<b>2.33</b>	<b>2.33</b>	<b>2.6</b>	<b>3.0</b>	<b>3.0</b>	<b>2.5</b>	-	<b>2.0</b>
<b>DP20057</b>	<b>3.0</b>	<b>2.33</b>	<b>2.33</b>	<b>2.6</b>	<b>3.0</b>	<b>3.0</b>	<b>2.5</b>	-	<b>2.0</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
DP20057	3.0	2.33	2.33	2.6	3.0	3.0	2.5	-	2.0

Course DP20051	Course outcome				
	DP20057.1	DP20057.2	DP20057.3	DP20057.4	DP20057.5
Target	2.0	2.0	2.0	2.0	2.0
Target Level	Students scoring above 40% marks				
1	>50%				
2	>55%				
3	>60%				

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	DP20057.1, DP20057.3	Practical sessional exam
SES-II		
SES-III		
MSBTE		

Expt.No.	Title of Experiment	CO	PO
1,2	To study the handling of prescriptions. To study various professional standards of prescription	DP20057.1	PrO20057.1 PrO20057.2 PrO20057.3
3,4	To study the different review techniques for prescription To understand concept of checking prescriptions for legal compliance	DP20057.1	PrO20057.4 PrO20057.5 PrO20057.6 PrO20057.7
5	To study the standards for completeness of prescription	DP20057.1	PrO20057.6 PrO20057.7

6,7	To study types of drug-drug interaction in the prescription with example. To identify drug-drug interaction in the prescription and follow up action with example.	DP20057.1	PrO20057.8 PrO20057.9 PrO20057.10 PrO20057.11 PrO20057.12
8,9	To study technique for preparation of dispensing labels and auxiliary labels for the tablet To study technique for preparation of dispensing labels and auxiliary labels for ointment.	DP20057.6	PrO20057.13 PrO20057.14 PrO20057.15 PrO20057.16
10,11	To study technique for preparation of dispensing labels and auxiliary labels for syrup. To study technique for preparation of dispensing labels and auxiliary labels for Injection.	DP20057.6	PrO20057.17 PrO20057.18 PrO20057.19 PrO20057.20
12	To study technique for preparation of dispensing labels and auxiliary labels for Inhalers.	DP20057.6	PrO20057.21 PrO20057.22
13	To find out blood pressure in various positions. [Before and After exercise]	DP20057.5	PrO20057.23 PrO20057.24 PrO20057.25
14	To find out blood glucose level by using capillary method.	DP20057.5	PrO20057.26 PrO20057.27 PrO20057.28
15	To find out lung function assessment using peak flow meter.	DP20057.5	PrO20057.29 PrO20057.30 PrO20057.31
16	To find out lung function assessment using incentive spirometer.	DP20057.5	PrO20057.32 PrO20057.33 PrO20057.34 PrO20057.35
17	To record capillary oxygen level by using pulse oxymeter.	DP20057.5	PrO20057.36 PrO20057.37
18	To measure and report Body Mass Index of underweight, overweight or obese person.	DP20057.5	PrO20057.38 PrO20057.39 PrO20057.40 PrO20057.41

19	To study, understand process of counselling to stimulated patients for type 2 diabetes mellitus using insulin pen.	DP20057.2 DP20057.3	PrO20057.26 PrO20057.42
20	To study patient counselling technique for the asthma using inhalers.	DP20057.2 DP20057.3	PrO20057.29 PrO20057.43
21	To study patient counselling technique for primary hypertension.	DP20057.2 DP20057.3	PrO20057.44 PrO20057.45 PrO20057.46
22	To study patient counselling technique for Hyperlipidemia	DP20057.2 DP20057.3	PrO20057.47 PrO20057.48
23	To study patient counselling technique for rheumatoid arthritis.	DP20057.2 DP20057.3	PrO20057.49 PrO20057.50
24	To study counselling of patient for GI disturbances [Nausea, vomiting, dyspepsia, diarrhea, constipation]	DP20057.2 DP20057.3	PrO20057.51 PrO20057.52
25	To study counselling of patient for upper respiratory infection.	DP20057.2 DP20057.3	PrO20057.51 PrO20057.52
26	To study counselling of patient for skin infection	DP20057.2 DP20057.3	PrO20057.51 PrO20057.52
27	To study counselling of patient for oral and dental disorders.	DP20057.2 DP20057.3	PrO20057.51 PrO20057.52
28	To study counselling to simulated patients for headache.	DP20057.2 DP20057.3	PrO20057.51 PrO20057.52
29	To study the process of appropriate handling of dummy dosage form with correct administration techniques [Oral liquid, cup/cap/dropper, eye drops, inhalers, nasal drop, insulin pen, nebulizers, different types of tablet, patches, enemas, suppositories]	DP20057.5	PrO20057.53 PrO20057.54 PrO20057.55 PrO20057.56
30	To study the use of different community pharmacy software's and digital health tools.	DP20057.5	PrO20057.57 PrO20057.58 PrO20057.59 PrO20057.60 PrO20057.61

**Assessment Tools:** Laboratory Evaluation & assessment Rubric.

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	A Laboratory Manual for Community pharmacy and management	Dr. Vijay D.Tambe, Ms. Supriya S.Shinde, Mr.YogeshR.Thombare, Ms. AkshadaS.Kale, Ms. Shalu N. Anap	Brilliant Publication	1 <sup>st</sup>	2022
02	A Practical Manual of Community Pharmacy and Management	Akanksha L.Patil, Dr. Md.Rageeb Md. Usman, MonaliD.Sonawane, Rahul P. Umbarkar	Pee Vee	-	2022

<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Drug Store Management	Dr.Mahesh D. Burande	Nirali Prakashan	3 rd	2015
02	Dispensing Pharmacy	R.M. Mehta	Vallabh Prakashan	6 <sup>th</sup>	2003

**COURSE DETAILS**

**THEORY**

<b>Class</b>	S.Y. D. Pharmacy
<b>Course Code and Course Title</b>	Biochemistry and Clinical pathology(20058)
<b>Prerequisite/s</b>	Basic & preliminary knowledge of Chemistry and human anatomy and physiology is essential
<b>Teaching Scheme: Lecture/Tutorial</b>	03
<b>Evaluation Scheme: SES-I, SES-II,SES-III, FE</b>	20/80

**THEORY**

<b>Course Objectives:</b> The course aims:(What teacher want to do with course while teaching)	
01	Structure and functions of biomolecules
02	Catalytic activity, diagnostic and therapeutic importance of enzymes
03	Metabolic pathways of biomolecules in health and illness(metabolic disorders)
04	Biochemical principles of organ function tests and their clinical significance
05	Qualitative and quantitative determination of biomolecules/metabolites in the biological sample
06	Clinical pathology of blood and urine

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20223.1	3	-	-	3	1	1	2	1	1
DP20223.2	3	-	-	2	3	1	2	3	-
DP20223.3	3	-	-	3	3	1	3	3	2
DP20223.4	3	-	-	3	3	1	3	3	3
DP20223.5	3	1	-	3	3	1	3	3	3
DP20223.6	3	-	1	3	3	1	3	3	3
Total	18	1	1	17	16	6	16	16	12
Avg.	<b>3.00</b>	<b>1.00</b>	<b>1.00</b>	<b>2.83</b>	<b>2.66</b>	<b>1.00</b>	<b>2.66</b>	<b>2.66</b>	<b>2.40</b>
<b>DP20223</b>	<b>3.00</b>	<b>1.00</b>	<b>1.00</b>	<b>2.83</b>	<b>2.66</b>	<b>1.00</b>	<b>2.66</b>	<b>2.66</b>	<b>2.40</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
<b>DP20223</b>	<b>3.00</b>	<b>1.00</b>	<b>1.00</b>	<b>2.83</b>	<b>2.66</b>	<b>1.00</b>	<b>2.66</b>	<b>2.66</b>	<b>2.40</b>

Course 2023	Course Outcomes					
	DP20223.1	DP20223.2	DP20223.3	DP20223.4	DP20223.5	DP20223.6
Target	3.0	2.0	2.0	2.0	2.0	2.0
Target Level	Students scoring above 40% marks					
1	≥ 50%					
2	≥ 55%					
3	≥ 60%					

**MODES FOR ASSESSMENT OF COURSE OUTCOMES-THEORY**

Mode	CO	Assessment tool
SES-I	DP20223.1	Written test
SES-II	DP20223.2, DP20223.3, DP20223.6	Written test
SES-III	DP20223.4, DP20223.5, DP20223.6	MCQ, Assignment, Open book test, Seminar
FE	DP20223.1, DP20223.2, DP20223.3, DP20223.4, DP20223.5, DP20223.6	Written test

<b>COURSE DETAILS-THEORY</b>		
<b>Unit 1</b>	<b>Introduction to biochemistry:</b> Scope of biochemistry in pharmacy; Cell and its biochemical organization.	02 hours
<b>Unit 2</b>	<b>Carbohydrates</b> <ul style="list-style-type: none"> <li>• Definition, classification with examples, chemical properties</li> <li>• Monosaccharides- Structure of glucose, fructose, and galactose</li> <li>• Disaccharides-structure of maltose, lactose, and sucrose</li> <li>• Polysaccharides-chemical nature of starch and glycogen</li> <li>• Qualitative tests and biological role of carbohydrates</li> </ul>	05 hours
<b>Unit 3</b>	<b>Proteins</b> <ul style="list-style-type: none"> <li>• Definition, classification of proteins based on composition and solubility with examples</li> <li>• Definition, classification of amino acids based on chemical nature and nutritional requirements with examples</li> <li>• Structure of proteins (four level so for organization of protein structure)</li> <li>• Qualitative tests and biological role of proteins and amino acids</li> <li>• Diseases related to malnutrition of proteins.</li> </ul>	05 hours
<b>Unit 4</b>	<b>Lipids</b> <ul style="list-style-type: none"> <li>• Definition, classification with examples</li> <li>• Structure and properties of triglycerides (oils and fats)</li> <li>• Fatty acid classification- Based on chemical and nutritional requirements with examples</li> <li>• Structure and functions of cholesterol in the body</li> <li>• Lipoproteins- types, composition and functions in the body Qualitative tests and functions of lipids</li> </ul>	05 hours
<b>Unit 5</b>	<b>Nucleic acids</b> <ul style="list-style-type: none"> <li>• Definition, purine and pyrimidine bases</li> </ul>	04 hours

	<ul style="list-style-type: none"> <li>• Components of nucleosides and nucleotides with examples</li> <li>• Structure of DNA(Watson and Crick model),RNA and their functions</li> </ul>	
<b>Unit 6</b>	<p><b>Enzymes</b></p> <ul style="list-style-type: none"> <li>• Definition, properties and IUB and MB classification</li> <li>• Factors affecting enzyme activity</li> <li>• Mechanism of action of enzymes, Enzyme inhibitors</li> <li>• Therapeutic and pharmaceutical importance of enzymes</li> </ul>	05 hours
<b>Unit 7</b>	<p><b>Vitamins</b></p> <ul style="list-style-type: none"> <li>• Definition and classification with examples.</li> <li>• Sources, chemical nature, functions, coenzyme form, recommended dietary requirements, deficiency diseases of fat- and water-soluble vitamins</li> </ul>	06 hours
<b>Unit 8</b>	<p><b>Metabolism(Studyofcycle/pathwayswithoutchemicalstructures)</b></p> <ul style="list-style-type: none"> <li>• Metabolism of Carbohydrates: Glycolysis, TCA cycle and glycogen metabolism, regulation of blood glucose level. Diseases related to abnormal metabolism of Carbohydrates</li> <li>• Metabolism of lipids: Lipolysis, <math>\beta</math>-oxidation of Fatty acid(Palmitic acid) ketogenesis and ketolysis. Diseases related to abnormal metabolism of lipids such as Ketoacidosis, Fatty liver ,Hypercholesterolemia</li> <li>• Metabolism of Amino acids (Proteins) :General reactions of amino acids and its significance–Transamination, deamination, Urea cycle and decarboxylation .Diseases related to abnormal metabolism of amino acids, Disorder of ammonia metabolism, phenyl ketonuria, alkaptonuria and Jaundice.</li> <li>• Biological oxidation: Electron transport chain and Oxidative phosphorylation</li> </ul>	20 hours
<b>Unit 9</b>	<p><b>Minerals:</b> Types, Functions, Deficiency diseases, recommended dietary requirements</p>	05 hours
<b>Unit 10</b>	<p><b>WaterandElectrolytes</b></p> <ul style="list-style-type: none"> <li>• Distribution, functions of water in the body</li> <li>• Water turn over and balance</li> </ul>	05 hours

	<ul style="list-style-type: none"> <li>• Electrolyte composition of the body fluids, Dietary intake of electrolyte and Electrolyte balance</li> <li>• Dehydration, causes of dehydration and oral rehydration therapy</li> </ul>	
<b>Unit 11</b>	<b>Introduction to Biotechnology</b>	01 hours
<b>Unit 12</b>	<b>Organ function tests</b> <ul style="list-style-type: none"> <li>• Functions of kidney and routinely performed tests to assess the functions of kidney and their clinical significances</li> <li>• Functions of liver and routinely performed tests to assess the functions of liver and their clinical significances</li> <li>• Lipid profile tests and its clinical significances</li> </ul>	06 hours
<b>Unit 13</b>	<b>Introduction to Pathology of Blood and Urine</b> <ul style="list-style-type: none"> <li>• Lymphocytes and Platelets, their role in health and disease</li> <li>• Erythrocytes-Abnormal cells and their significance</li> <li>• Normal and Abnormal constituents of Urine and their significance</li> </ul>	06 hours

**Content Delivery and assessment tools:**

Unit	Lect. No.	Lesson Plan	TM Teaching Method	TA Teaching Aid	AT	Mapping with Outcomes	
						CO	PO
		<b>Content Delivery</b>					
<b>I</b>	1	<b>Introduction to vision ,mission and course outcome</b> <b>Introductionto biochemistry</b> Scope of Biochemistry in pharmacy	LT	CB,PP	QA,CT,SE, FE,CES	DP20223.1	1,2,4,6,9
	2	Cell and its biochemical organization					
<b>II</b>	3	<b>Carbohydrates</b> Definition, classification with examples, chemical properties	LT	CB,PP	QA,CT,SE, FE,CES	DP20223.1	1,4,6,7,9
	4	Monosaccharide's-Structure of glucose, fructose and galactose					
	5	Disaccharides-Structure of maltose,lactose,andsucrose					
	6	Polysaccharides-Chemical nature of starch and glycogen					
	7	Qualitative tests and biological role of carbohydrates					
<b>III</b>	8	<b>Proteins</b> Definition, classification of proteins based on composition and solubility with examples	LT	CB,PP	QA,CT,SE, FE,CES	DP20223.1	1,4,6,7,9
	9	Definition, classification of amino acids based on chemical nature and nutritional requirements with examples					
	10	Structure of proteins(four levels of organization of protein structure)					
	11	Qualitative tests and biological role of proteins and amino acids					

	12	Diseases related to malnutrition of proteins.					
<b>IV</b>	13	<b>Lipids</b> Definition, Classification with examples, Structure and properties of triglycerides(oils and fats)					
	14	Fatty acid classification–Based on Chemical on and nutritional requirements with examples					
	15	Structure and functions of cholesterol in the body					
	16	Lipoproteins-types, composition and functions in the body					
	17	Qualitative tests and functions of lipids					
	<b>V</b>	18	<b>Nucleic acids</b> Definition, purine and pyrimidine bases				
19		Components of nucleosides and nucleotides with examples					
20		Structure of DNA(Watson and Crick model)					
21		Structure of RNA and their functions					
<b>VI</b>	22	<b>Enzymes</b> Definition, properties and IUB and MB classification	LT,M	CB,PP	QA,CT,SE, FE,CES	DP20223.2	1,4,6,7,9
	23	Factors affecting enzyme activity					
	24	Mechanism of action of enzymes					
	25	Enzyme inhibitors					
	26	Therapeutic and pharmaceutical importance of enzymes					
<b>VII</b>	27	<b>Vitamins</b> Definition and classification with examples	LT	CB,PP	QA,CT,SE, FE,CES	DP20223.2	1,4,6,7,9
	28	<b>Sources, chemical nature, Functions, coenzyme form, recommended dietary requirements, deficiency diseases of Vitamin A and D</b>					
	29	Vitamin E and K				DP20223.3	1,4,6,7,9
	30	Vitamin B1, B2 and B3					

	31	Vitamin B5, B9 and B12					
	32	Vitamin Choline, Biotin and Vit. C					
<b>VIII</b>	33	<b>Metabolism</b> <b>Metabolism of Carbohydrates:</b> Glycolysis	LT,C	CB,PP,VF	QA,CT,SE, FE,CES	DP20223.3 DP20223.6	1,4,6,7,9
	34	TCAcycle					
	35	Glycogen metabolism					
	36	Regulation of blood glucose level					
	37	Diseases related to abnormal metabolism of Carbohydrates					
	38	<b>Metabolism of lipids:</b> Lipolysis					
	39	$\beta$ -oxidation of Fatty acid(Palmiticacid) Ketogenesis					
	40	Ketolysis					
	41	Diseases related to abnormal metabolism of lipids such as Ketoacidosis					
	42	Fatty liver					
	43	Hypercholesterolemia					
	44	<b>Metabolism of Amino acids(Proteins):</b> General reactions of amino acids and its significance– Transamination					
	45	deamination					
	46	Urea cycle					
	47	decarboxylation					
	48	Diseases related to abnormal metabolism of amino acids					
	49	Disorders of ammonia metabolism					
	50	Phenylketonuria ,alkaptonuria and Jaundice.					
51	Biological oxidation: Electron transport chain						
52	Oxidative phosphorylation						

<b>IX</b>	53	<b>Minerals:</b> Introduction, Definition, Classification		CB,PP	QA,CT,SE, FE,CES	DP20223.3 DP20223.6	1,4,6,7,9
	54	<b>Functions, Deficiency diseases, Recommended dietary requirements</b> of Macro elements Calcium, Phosphorus					
	55	Magnesium, Sodium, Chlorine					
	56	Microelements Iron, Copper					
	57	Iodine, Zinc, Fluorine					
<b>X</b>	58	<b>Water and Electrolytes</b> Distribution and functions of water in the body	LT	CB,PP,VF	QA,CT,SE, FE,CES	DP20223.3	1,4,6,7,9
	59	Water turn over and balance					
	60	Electrolyte composition of the body fluids					
	61	Dietary Intake of electrolyte and Electrolyte balance					
	62	Dehydration, causes of dehydration and oral Rehydrationtherapy					
<b>XI</b>	63	<b>IntroductiontoBiotechnology</b>	LT	CB	QA,CT,SE, FE,CES	DP20223.1	1,4,6,7,8
<b>XII</b>	64	<b>Organ functiontests</b> Introduction and Functions of kidney	LT	CB,PP	QA,CT,SE, FE,CES	DP20223.4 DP20223.6	1,4,6,7,9
	65	Kidney Function Test and their clinical significances					
	66	Liver:- Introduction and types of Liver diseases					
	67	Functions of Liver					
	68	Liver Function Test					
	69	Lipid profile tests and its clinical significances					
<b>XIII</b>	70	<b>Introduction to Pathologyof Blood and Urine</b> Introduction	LT	CB,PP	QA,CT,SE, FE,CES	DP20223.5 DP20223.6	1,4,6,7,9
	71	Lymphocytes,their role in health and disease					
	72	Platelets, their role in health and disease					
	73	Erythrocytes-Abnormal cells and their significance					

	74	Normal constituents of Urine and their significance					
	75	Abnormal constituents of Urine and their significance					
	76*	<b>Guest lecture on Biotechnology</b>				DP20223.1	1,4,6,7,8

**THEORY**

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Biochemistry and Clinical Pathology	Dr.Kunal Das	Nirali Publication	1 <sup>st</sup>	2022
02	Biochemistry and Clinical Pathology	Dr.R.A.Ahirrao	Pee Vee Publication	1 <sup>st</sup>	2022
03	Biochemistry and Clinical Pathology	Dr.Abhishek Tiwari	Nirali Publication	1 <sup>st</sup>	2022
04	Biochemistry and Clinical Pathology	Amol J. Giri	Pee Vee Publication	1 <sup>st</sup>	2022
05	Biochemistry and Clinical Pathology	N.Murgesh	Satya Publishers	3 <sup>rd</sup>	2004

<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Biochemistry	Dr. Satyanarayan	Elsevier	4 <sup>th</sup>	2013



**TM-Teaching Method-** Lecture (LT), Demonstration (DM), Chart (C), Model (M)

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Question Answers (QA), Class Tests (CT), Sessional Examination (SE), Final Examinations (FE), Rubrics (RB) ,  
Course End Survey filled by students,

**COURSE DETAILS**

**PRACTICAL**

<b>Class</b>	S.Y. D. Pharmacy
<b>Course Code and Course Title</b>	20223 Biochemistry and Clinical pathology
<b>Prerequisite/s</b>	Basic & preliminary knowledge of Chemistry is essential
<b>Teaching Scheme: Practical</b>	02
<b>Total contact hours</b>	06
<b>Evaluation Scheme: SES-I, SES-II,SES-III, AS,FE</b>	10/10/10/80

<b>Course Objectives:</b> The course aims:(What teacher want to do with course while teaching)	
01	Qualitatively determine the biomolecules/metabolites in the given biological sample.
02	Qualitatively analysis of urine for normal and abnormal constituents of urine sample.
03	Determine the normal and abnormal constituents in blood /Serum.
04	Determine the normal and abnormal constituents in urine.
05	Study the hydrolysis of starch from acid and salivary amylase enzyme.

<b>Course Outcomes (COs):</b>	
Upon successful completion of this course, the student will be able to:	
DP20058.1	Explain basic concept of biomolecules as well as normal and abnormal constituent of blood and urine.
DP20058.2	Perform qualitative analysis of biomolecules and urine sample.
DP20058.3	Estimate various constituents of blood and urine sample.
DP20058.4	Determine hydrolysis of starch from acid and salivary amylase enzyme.
DP20058.5	Analyze clinical pathology of blood and urine.

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20058.1	3	2	-	3	3	1	3	3	3
DP20058.2	3	3	-	3	3	3	3	2	3
DP20058.3	3	3	1	3	3	1	3	3	3
DP20058.4	3	2	-	3	3	1	2	-	3
DP20058.5	3	3	-	3	3	2	3	3	3
Total	15	13	1	15	15	08	14	11	15
Avg.	<b>3.00</b>	<b>2.60</b>	<b>1.00</b>	<b>3.00</b>	<b>3.00</b>	<b>1.60</b>	<b>2.80</b>	<b>2.75</b>	<b>3.00</b>
<b>DP20058</b>	<b>3.00</b>	<b>2.60</b>	<b>1.00</b>	<b>3.00</b>	<b>3.00</b>	<b>1.60</b>	<b>2.80</b>	<b>2.75</b>	<b>3.00</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
<b>DP20058</b>	<b>3.00</b>	<b>2.60</b>	<b>1.00</b>	<b>3.00</b>	<b>3.00</b>	<b>1.60</b>	<b>2.80</b>	<b>2.75</b>	<b>3.00</b>

Course 20058	Course Outcomes				
	DP20058.1	DP20058.2	DP20058.3	DP20058.4	DP20058.5
<b>Target</b>	<b>3.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>
<b>Target Level</b>	Students scoring above 40% marks				
<b>1</b>	≥ 50%				
<b>2</b>	≥ 55%				
<b>3</b>	≥ 60%				

**MODES FOR ASSESSMENT OF COURSE OUTCOMES-PRACTICAL**

<b>Mode</b>	<b>CO</b>	<b>Assessment tool</b>
SES-I	DP20058.1, DP20058.2	Written Test, Performance
SES-II	DP20058.1, DP20058.2, DP20058.3, DP20058.5	Written Test, Performance
SES-III	DP20058.1, DP20058.3, DP20058.4, DP20058.5	Written Test, Performance
PM	DP20058.1, DP20058.2, DP20058.3, DP20058.4, DP20058.5	Day to Day assessment
FE	DP20058.1, DP20058.2, DP20058.3, DP20058.4, DP20058.5	Practical exam

**COURSE DETAILS-PRACTICAL**

<b>Expt. No</b>	<b>Title of Experiment</b>
1)	Introduction to Biochemistry and Clinical pathology Laboratory
2)	<b>Carbohydrates</b> To identify given sample of carbohydrate by qualitative tests.( Sucrose)
3)	To identify given sample of carbohydrate by qualitative tests. (Maltose)
4)	To identify given sample of carbohydrate by qualitative tests. (Lactose)
5)	To identify given sample of carbohydrate by qualitative tests. (Fructose)
6)	<b>Amino Acids</b> To identify given sample of amino acid by qualitative tests. (Cystein)
7)	To identify given sample of amino acid by qualitative tests. (Tryptophane)
8)	<b>Proteins</b> To identify given sample of Protein by qualitative tests(Albumine)
9)	To identify given sample of Protein by qualitative tests(Gelatin)
10)	<b>Lipids</b> To study physical and chemical properties of fats and oils.
11)	To conduct test on cholesterol to verify physical properties and chemical test

	<b>Urine</b>
12)	To detect normal constituents in given sample of urine by qualitative test
13)	To detect normal constituents in given sample of urine by qualitative test
14)	To detect abnormal constituents in given sample of urine by qualitative test
15)	To detect abnormal constituents in given sample of urine by qualitative test
16)	To estimate quantity of glucose in given sample of urine
17)	To estimate quantity of creatinine in given sample of urine
	<b>Blood</b>
18)	To estimate quantity of total cholesterol in given sample of blood plasma
19)	To estimate quantity of glucose in given sample of blood plasma
20)	To estimate quantity of Calcium in given sample of serum / blood
21)	To estimate quantity of Creatinine in given sample of serum / blood
22)	To estimate quantity of Urea in given sample of serum
23)	Study the hydrolysis of Starch from acid and salivary amylase enzyme.
24)	To identify given sample of carbohydrate by qualitative tests.
25)	To identify given sample of Protein by qualitative tests.

**Content Delivery and assessment tools:**
**PRACTICAL**

Practical No.	Lesson Plan	TM Teaching Method	TA Teaching Aid	AT	Mapping with Outcomes	
	Content Delivery				CO	PO
1	Introduction to Biochemistry and Clinical pathology Laboratory	LT,DM	CB	QA,SE,AS,FE,RB	DP20058.1	1,2,3,4,7,9
2	<b>Carbohydrates</b> To identify given sample of carbohydrate by qualitative tests	LT,C	CB	QA,SE,AS,FE,RB	DP20058.1 DP20058.2	1,2,3,4,7,9
3	To identify given sample of carbohydrate by qualitative tests					
4	To identify given sample of carbohydrate by qualitative tests					
5	To identify given sample of carbohydrate by qualitative tests					
6	<b>Amino Acids</b> To identify given sample of amino acid by qualitative tests.	LT,C	CB	QA,SE,AS,FE,RB	DP20058.1 DP20058.2	1,2,3,4,7,9
7	To identify given sample of amino acid by qualitative tests.					
8	<b>Proteins</b> To identify given sample of Protein by qualitative tests.	LT,C	CB	QA,SE,AS,FE,RB	DP20058.1 DP20058.2	1,2,3,4,7,9
9	To identify given sample of Protein by qualitative tests.					
10	<b>Lipids</b> To study physical and chemical properties of fats and oils.	LT,C	CB	QA,SE,AS,FE,RB	DP20058.1 DP20058.2	1,2,3,4,7,9
11	To conduct test on cholesterol to					

	verify physical properties and chemical test					
<b>12</b>	<b>Urine</b> To detect normal constituents in given sample of urine by qualitative test	LT,C	CB	QA,SE,AS,FE,RB	DP20058.1 DP20058.2DP20058.3DP20058.5	1,2,3,4,7,9
<b>13</b>	To detect normal constituents in given sample of urine by qualitative test					
<b>14</b>	To detect abnormal constituents in given sample of urine by qualitative test					
<b>15</b>	To detect abnormal constituents in given sample of urine by qualitative test					
<b>16</b>	To estimate quantity of glucose in given sample of urine					
<b>17</b>	To estimate quantity of creatinine in given sample of urine					
<b>18</b>	<b>Blood</b> To estimate quantity of total cholesterol in given sample of blood plasma	LC,DM	CB	QA,SE,AS,FE,RB	DP20058.1 DP20058.3DP20058.5	1,2,3,4,7,9
<b>19</b>	To estimate quantity of glucose in given sample of blood plasma					
<b>20</b>	To estimate quantity of Calcium in given sample of serum / blood					
<b>21</b>	To estimate quantity of Creatinine in given sample of serum / blood					
<b>22</b>	To estimate quantity of Urea in given sample of serum					

<b>23</b>	Study the hydrolysis of Starch from acid and salivary amylase enzyme	LC	CB	QA,SE,AS,FE,RB	DP20058.4	1,2,3,4,7,9
<b>24</b>	To identify given sample of carbohydrate by qualitative tests.	LC,C	CB	QA,SE,AS,FE,RB	DP20058.1 DP20058.2	1,2,3,4,7,9
<b>25</b>	To identify given sample of Protein by qualitative tests.					
<b>26</b>	Visit to pathology lab	DM	-			1,2,3,4,7,9

**DETAILS-PRACTICAL**

<b>Expt. No</b>	<b>Title of Experiment</b>	<b>TM Teaching Method</b>	<b>Mapping with CO</b>	<b>Mapping with PO</b>
1.	Introduction to Biochemistry and Clinical pathology Laboratory	CB,DM	DP20058.1 DP20058.2	1,2,3,4,6,9
2.	<b>Carbohydrates</b> To identify given sample of carbohydrate by qualitative tests. ( Sucrose)	CB,C	DP20058.1 DP20058.2	1,2,3,4,6,9
3.	To identify given sample of carbohydrate by qualitative tests. (Maltose)	CB,C		
4.	To identify given sample of carbohydrate by qualitative tests. (Lactose)	CB,C		
5.	To identify given sample of carbohydrate by qualitative tests. (Fructose)	CB,C		
6.	<b>Amino Acids</b> To identify given sample of amino acid by qualitative tests. (Cystein)	CB,C	DP20058.1 DP20058.2	1,2,3,4,6,9
7.	To identify given sample of amino acid by qualitative tests. (Tryptophane)	CB,C		
8.	<b>Proteins</b>	CB,C		1,2,3,4,6,9

	To identify given sample of Protein by qualitative tests(Albumine)		DP20058.1 DP20058.2	
9.	To identify given sample of Protein by qualitative tests(Gelatin)	CB,C		
10.	<b>Lipids</b> To study physical and chemical properties of fats and oils.	CB,C		
11.	To conduct test on cholesterol to verify physical properties and chemical test	CB,C	DP20058.1 DP20058.2	1,2,3,4,6,9
12.	<b>Urine</b> To detect normal constituents in given sample of urine by qualitative test	CB,C		
13.	To detect normal constituents in given sample of urine by qualitative test	CB,C	DP20058.1 DP20058.2 DP20058.5	1,2,3,4,6,9
14.	To detect abnormal constituents in given sample of urine by qualitative test	CB,C		
15.	To detect abnormal constituents in given sample of urine by qualitative test	CB,C		
16.	To estimate quantity of glucose in given sample of urine	CB	DP20058.1 DP20058.3 DP20058.5	1,2,3,4,6,9
17.	To estimate quantity of creatinine in given sample of urine	CB		
18.	<b>Blood</b> To estimate quantity of total cholesterol in given sample of blood plasma	CB	DP20058.1 DP20058.3 DP20058.5	1,2,3,4,6,9
19.	To estimate quantity of glucose in given sample of blood plasma	CB		
20.	To estimate quantity of Calcium in given sample of serum / blood	CB		

21.	To estimate quantity of Creatinine in given sample of serum / blood	CB		
22.	To estimate quantity of Urea in given sample of serum	CB		
23.	Study the hydrolysis of Starch from acid and salivary amylase enzyme.	CB	DP20058.4	1,2,3,4,6,9
24.	To identify given sample of carbohydrate by qualitative tests.	CB,C	DP20058.1	1,2,3,4,6,9
25.	To identify given sample of Protein by qualitative tests.	CB,C	DP20058.2	
26.	Visit to pathology lab	DM	DP20058.1 DP20058.2 DP20058.5	1,2,3,4,6,9

**TM-Teaching Method-** Lecture (LT), Demonstration (DM), Chart (C), Model (M)

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Question Answers (QA), Class Tests (CT), Sessional Examination (SE), Final Examinations (FE), Rubrics (RB) , Course End Survey filled by students,

**PRACTICAL**

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Biochemistry & Clinical Pathology	Mrs.Namita S. Girhepunje Dr.Nitin G. Dumore	BrilliantPublication	1 <sup>st</sup>	2022
02	Biochemistry and Clinical Pathology	Mrs.Shradha R. Kale	Nirali Publication	1 <sup>st</sup>	2020
03	Biochemistry and Clinical Pathology	Dr.G.D.Gupta	S.Chand	1 <sup>st</sup>	2013

**COURSE DETAILS**

<b>Class</b>	S.Y. D. Pharmacy
<b>Course Code and Course Title</b>	<b>20224. Pharmacotherapeutics</b>
<b>Prerequisite/s</b>	Science/HAP
<b>Teaching Scheme: Lecture/Tutorial</b>	03/01
<b>Evaluation Scheme: SES-I/SES-II /SES-III/ MSBTE</b>	20/20/20/80

<b>Course Objectives: This course will discuss the following aspects of drug Substances derived from natural resources</b>	
01	Etiopathogenesis of selected common diseases and evidence.
02	Importance of individualized therapeutic plans based on diagnosis.
03	Basic methods for assessing the clinical outcomes of drug therapy.

<b>Course Outcomes (COs):</b>	
Upon successful completion of this course, the student will be able to:	
DP20224.1	Describe the scope and objectives of pharmacotherapeutics.
DP20224.2	Discuss rational used evidence based, essential medicine list with standard treatment guidelines.
DP20224.3	Define disease; discuss the etiopathogenesis of selected disease states.
DP20224.4	Explain the clinical manifestations of selected disease states.
DP20224.5	Summarize the various methods involved in the diagnosis of selected disease state.
DP20224.6	Develop the individualized pharmacological and non-pharmacological plans based on diagnosis

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20224.1	3	-	-	3	1	1	3	-	3
DP20224.2	3	-	3	3	2	1	2	-	3
DP20224.3	3	-	-	3	1	3	-	-	2
DP20224.4	3	-	-	3	1	2	-	-	3
DP20224.5	3	3	-	3	2	1	2	-	3
DP20224.6	3	1	-	3	1	1	2	1	3
Total	18	4	3	18	8	9	9	1	17
<b>Avg. of each PO</b>	<b>3.00</b>	<b>2.00</b>	<b>3.00</b>	<b>3.00</b>	<b>1.33</b>	<b>1.5</b>	<b>2.25</b>	<b>1.00</b>	<b>2.83</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
DP20224	3.00	2.00	3.00	3.00	1.33	1.5	2.25	1.00	2.83

Course DP20113	Course Outcomes					
	DP20224.1	DP20224.2	DP20224.3	DP20224.4	DP20224.5	DP20224.6
Target	2	2	2	2	2	2
Target Level	Students scoring above 40% marks					
1	>50%					
2	>55%					
3	>60%					

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	DP20224.1, DP20224.2, DP20224.3, DP20224.4, DP20224.5, DP20224.6	Written test, Assignment,
SES-II	DP20224.3, DP20224.4, DP20224.5, DP20224.6	Written test, Assignment,
SES-III	DP20224.3, DP20224.4, DP20224.5, DP20224.6	Written test, Assignment,
FE	DP20224.1, DP20224.2, DP20224.3, DP20224.4, DP20224.5, DP20224.6	Written test

<b>COURSE DETAILS</b>		
1	<b>Pharmacotherapeutics:</b> Introduction and scope of Pharmacotherapeutics Rational use of Medicines, Evidence Based Medicine, Essential Medicines List, Standard Treatment Guidelines (STGs)	08Hours
2A	Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Cardiovascular System:Hypertension, Angina pectoris, Myocardial infarction., Hyperlipidaemia, Congestive Heart Failure,	08 Hours
2B	Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Respiratory System: Asthma, COPD,	04 Hours
2C	Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Endocrine System: Diabetes, Hypothyroidism&Hypothyroidism	05 Hours
2D	Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Central Nervous System:Epilepsy, Parkinson's disease.Alzheimer's disease.Stroke, Migraine	8 Hours
2E	Definition, etiopathogenesis, and clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Gastro Intestinal Disorders:Gastro oesophageal reflux disease, peptic Ulcer Disease, Alcoholic liver disease.Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis)	8 Hours
2F	Definition, etiopathogenesis, and clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Hematological disorders:Iron deficiency anaemia, Megaloblastic anaemia.	4 Hours
2G	Definition, etiopathogenesis, and clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Infectious disorders:Tuberculosis, Pneumonia, Urinary tract infections, Hepatitis, Gonorrhoea and Syphilis.Malaria, HIV and Opportunistic infections.(SARS, CoV2)	12 Hours
2H	Definition, etiopathogenesis, and clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Musculoskeletal disorders: Rheumatoid arthritis.Osteoarthritis,	3 Hours
2I	Definition, etiopathogenesis, and clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Dermatology: Psoriasis, Scabies,Eczema	3 Hours
2J	Definition, etiopathogenesis, and clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Psychiatric Disorders:Depression,, Anxiety, Psychosis	4 Hours

2K	Definition, etiopathogenesis, and clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Ophthalmology: Conjunctivitis, Glaucoma,	2 Hours
2L	Definition, etiopathogenesis, and clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with antimicrobial resistance. antibiotic resistance	2 Hours
2M	Definition, etiopathogenesis, and clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with Women's Health: Polycystic Ovary Syndrome, Dysmenorrhea, Premenstrual Syndrome	4 Hours

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Pharmacotherapeutics	Shaju P	CBS Publisher	1 <sup>st</sup> edition	2022
02	Pharmacotherapeutics	Arun K. Mishra	Nirali Prakashan	1 <sup>st</sup> edition	2021

<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Pharmacotherapeutics	R.S. Satoskar	Popular Prakashan	19 <sup>th</sup> editions	2017

**Content Delivery and assessment tools:**

Chapter	Lect. No.	Lesson Plan	TM	TA	AT	Mapping with Outcomes	
		Content Delivery				CO	PO
1	1	Introduction, scope & objective of Pharmacotherapeutics.	LT	CB, PP	QA, CT	DP20224.1 DP20224.2	1,8,9
	2	To study the Rational use of Medicines.					
	3	To study Definition, Components, Objectives and Factors influencing EBM.					
	4	To study steps involved in applying EBM process to Pharmacotherapeutics decision making and merits of EBM					
	5	To know the definition, concept and history of essential medicines.					
	6	To know the national list, process of essential medicine of India.					
	7	To learn the definition, and different policy makers.					
	8	To learn the different steps involved in the STG manual.					
2A	9	<b>2. Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of the diseases associated Cardiovascular System:</b> Definition, etiopathogenesis, clinical manifestationsofHypertension.	LT	CB, PP	QA, CT	DP20224.3 DP20224.4 DP20224.5 DP20224.6	1,2,4,5,6,7,9
	10	Non pharmacological and pharmacologicalmanagement ofthe Hypertension					
	11	Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological managementofAngina.					
	12	definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological managementof Myocardial infarction.					

	14	Non pharmacological and pharmacological management of the Hyperlipidaemia.					
	15	Definition, etiopathogenesis, clinical manifestations of Congestive Heart Failure					
	16	Non pharmacological and pharmacological management of the Congestive Heart Failure					
2B	17	<b>Respiratory System</b> Definition, etiopathogenesis, clinical manifestations of Asthma					
	18	Non pharmacological and pharmacological management of the Asthma.					
	19	Definition, etiopathogenesis, clinical manifestations of COPD.	LT	CB, PP	QA, CT	DP20224.3 DP20224.4 DP20224.5 DP20224.6	1,2,4,5,6,7,9
	20	Non pharmacological and pharmacological management of the COPD					
2C	21	<b>Introduction to Endocrine System</b>	LT	CB, PP	QA, CT	DP20224.3	1,2,4,5,6,7,9
	22	Definition, etiopathogenesis, clinical manifestations of Diabetes.				DP20224.4	
	23	Non pharmacological and pharmacological management of the Diabetes				DP20224.5	
	24	Definition, etiopathogenesis, clinical manifestations of Hypothyroidism and Hypothyroidism				DP20224.6	
	25	Non pharmacological and pharmacological management of the Hypothyroidism and Hypothyroidism					
2D	26	<b>Central Nervous System</b> Definition, etiopathogenesis, clinical manifestations, Nonpharmacological and pharmacological management of the of Epilepsy.	LT	CB, PP	QA, CT	DP20224.3 DP20224.4 DP20224.5 DP20224.6	1,2,4,5,6,7,9
	27	Definition, etiopathogenesis, clinical manifestations, Nonpharmacological and pharmacological management of the Parkinson's disease.					
	28	Definition, etiopathogenesis, clinical manifestations of the Alzheimer's disease.					

	29	Non pharmacological and pharmacological management of the Alzheimer's disease.					
	30	Definition, etiopathogenesis, clinical manifestations of the Stroke.	LT	CB, PP, VF	QA, CT	DP20111.4	
	31	Non pharmacological and pharmacological management of the Stroke					
	32	Definition, etiopathogenesis, clinical manifestations of the Migraine.					
	33	Non pharmacological and pharmacological management of the Migraine.					
2E	34	<b>Gastro Intestinal Disorders:</b> Definition, etiopathogenesis, clinical manifestations of the Gastro oesophageal reflux disease.	LT	CB, PP	QA, CT	DP20224.3  DP20224.4  DP20224.5  DP20224.6	1,2,4,5,6,7,9
	35	Non pharmacological and pharmacological management of the Gastro oesophageal reflux disease.					
	36	Definition, etiopathogenesis, clinical manifestations of the Peptic Ulcer Disease.					
	37	Non pharmacological and pharmacological management of the Peptic Ulcer Disease					
	38	Definition, etiopathogenesis, clinical manifestations of the Alcoholic liver disease.					
	39	Non pharmacological and pharmacological management of the Alcoholic liver disease.					
	40	Definition, etiopathogenesis, clinical manifestations of the Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis)					
	41	Non pharmacological and pharmacological management of the Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis)					
2F	42	<b>Haematological disorders:</b> Definition, etiopathogenesis, clinical manifestations of the Iron deficiency anaemia	LT	CB, PP	QA, CT	DP20224.3  DP20224.4  DP20224.5	1,2,4,5,6,7,9
	43	Non pharmacological and pharmacological management of the Iron deficiency anaemia					
	44	Definition, etiopathogenesis, clinical manifestations of the Megaloblastic					

		anaemia.				DP20224.6	
	45	Non pharmacological and pharmacological management of the Megaloblastic anaemia.					
2G	46	<b>Infectious diseases</b>	LT	CB, PP	QA, CT	DP20224.3 DP20224.4 DP20224.5 DP20224.6	1,2,4,5,6,7,9
		Definition, etiopathogenesis, clinical manifestations of the Tuberculosis.					
	47	Non pharmacological and pharmacological management of the Tuberculosis.					
	48	Definition, etiopathogenesis, clinical manifestations of the Pneumonia.					
	49	Non pharmacological and pharmacological management of the Pneumonia					
	50	Definition, etiopathogenesis, clinical manifestations of the Urinary tract infections					
	51	Non pharmacological and pharmacological management of the Urinary tract infections.					
	52	Definition, etiopathogenesis, clinical manifestations of the Hepatitis.					
	53	Non pharmacological and pharmacological management of the Hepatitis					
	54	Definition, etiopathogenesis, clinical manifestations, Nonpharmacological and pharmacological management of the Gonorrhoea and Syphilis.					
	55	Definition, etiopathogenesis, clinical manifestations, Nonpharmacological and pharmacological management of the Malaria.					
56	Definition, etiopathogenesis, clinical manifestations, Nonpharmacological and pharmacological management of the HIV and Opportunistic infections.						
57	Definition, etiopathogenesis, clinical manifestations, Nonpharmacological and pharmacological management of the Viral Infections (SARS, CoV2)						
2H	58	<b>Musculoskeletal disorders:</b> Definition, etiopathogenesis, clinical manifestations of the Rheumatoid arthritis.	LT	CB, PP	QA, CT	DP20224.3 DP20224.4 DP20224.5	1,2,4,5,6,7,9

	59	Non pharmacological and pharmacological management of the Rheumatoid arthritis.				DP20224.6	
	60	Definition, etiopathogenesis, clinical manifestations, Non pharmacological and pharmacological management of the Osteoarthritis.					
	61	<b>Dermatology:</b> Definition, etiopathogenesis, clinical manifestations, Non pharmacological and pharmacological management of the Psoriasis.	LT	CB, PP	QA, CT	DP20224.3 DP20224.4 DP20224.5 DP20224.6,	1,2,4,5,6,7,9
	62	Definition, etiopathogenesis, clinical manifestations, Non pharmacological and pharmacological management of the Scabies.					
	63	Definition, etiopathogenesis, clinical manifestations, Non pharmacological and pharmacological management of the Eczema					
2J	64	<b>Psychiatric Disorders:</b> Definition, etiopathogenesis, clinical manifestations of Depression	LT	CB, PP	QA, CT	DP20224.3 DP20224.4 DP20224.5 DP20224.6	1,2,4,5,6,7,9
	65	Non pharmacological and pharmacological management of the Depression.					
	66	Definition, etiopathogenesis, clinical manifestations Non pharmacological and pharmacological management of the Anxiety.					
	67	Definition, etiopathogenesis, clinical manifestations, Non pharmacological and pharmacological management of the Psychosis.					
2K	68	<b>Ophthalmology:</b> Definition, etiopathogenesis, clinical manifestations, Non pharmacological and pharmacological management of the Conjunctivitis(bacterial and viral).				DP20224.3 DP20224.4 DP20224.5 DP20224.6	1,2,4,5,6,7,9
	69	Definition, etiopathogenesis, clinical manifestations, Non pharmacological and pharmacological management of the Glaucoma.					
2L	70	<b>Anti-microbial Resistance:</b> Causes, mechanism, prevention of antimicrobial resistance.	LT	CB, PP	QA, CT	DP20224.3 DP20224.4 DP20224.5 DP20224.6	1,2,4,5,6,7,9
	71	Impact of resistance in human medicine & environment, spread of antibiotic resistance.					



2M	72	<b>Women's Health:</b> Definition, etiopathogenesis, clinical manifestations of, Non pharmacological and pharmacological management of the Polycystic Ovary Syndrome	LT	CB, PP, VF	QA, CT	DP20224.3 DP20224.4 DP20224.5 DP20224.6	1,9
	73	Definition, etiopathogenesis, clinical manifestations of, Non pharmacological and pharmacological management of the Dysmenorrhea.					
	74	Definition, etiopathogenesis, clinical manifestations of Premenstrual Syndrome.					
	75	Non pharmacological and pharmacological management of the Premenstrual Syndrome.					

**TM-Teaching Method-** Lecture (LT).

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Class Tests (CT), Question Answers (QA), MSBT Examinations (EX), Rubrics (RB) , Course End Survey filled by students,

**COURSE DETAILS**

<b>Class</b>	S.Y. D. Pharmacy
<b>Course Code and Course Title</b>	20059 Pharmacotherapeutics
<b>Prerequisite/s</b>	Science/HAP
<b>Teaching Scheme: Practical</b>	01 Hours
<b>Total contact hours</b>	25 Hours
<b>Evaluation Scheme: SES-I/SES-II /SES-III/ MSBTE</b>	10/10/10/80

<b>Course Objectives: This course will discuss the following aspects of drug Substances derived from natural resources</b>	
01	How to prepare a SOAP (Subjective, Objective, Assessment and Plan) note for clinical cases of selected common diseases
02	Patient counselling techniques/methods for common disease conditions

<b>Course Outcomes (COs):</b> Upon successful completion of this course, the student will be able to:	
DP20059.1	Explain the SOAP (Subjective, Objective, Assessment and Plan) notes for the given clinical cases of selected common diseases.
DP20059.2	Counsel the patients about the disease conditions, uses of drugs, methods of handling and administration of drugs, life-style modifications and monitoring Parameters.
DP20059.3	Prepare individualized therapeutic plans based on diagnosis of disease.
DP20059.4	Discuss the therapeutic approach to management of selected diseases.
DP20059.5	Conduct planned experiments and prepares laboratory report in a standard format.

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20059.1	3	3	3	3	3	2	2	1	3
DP20059.2	3	-	3	3	2	3	3	2	3
DP20059.3	3	3	-	3	3	2	2	3	3
DP20059.4	3	1	1	3	2	1	2	1	3
DP20059.5	3	-	3	3	2	1	3	-	3
Total	15	7.0	10	15	12	9.0	12	7	15
<b>Avg. of each PO</b>	<b>3.00</b>	<b>2.33</b>	<b>2.50</b>	<b>3.00</b>	<b>2.40</b>	<b>1.80</b>	<b>2.40</b>	<b>1.75</b>	<b>3.00</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
DP20224	3.00	2.33	2.50	3.00	2.40	1.80	2.40	1.75	3.00

Course	Course Outcomes				
	DP20059.1	DP20059.2	DP20059.3	DP20059.4	DP20059.5
DP20059					
<b>Target</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Target Level</b>	Students scoring above 40% marks				
<b>1</b>	>50%				
<b>2</b>	>55%				
<b>3</b>	>60%				

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	DP20059.1, DP20059.3, DP20059.4	Written test, , Manual
SES-II	DP20059.1, DP20059.2, DP20059.3, DP20059.4, DP20059.5	Written test, Manual
SES-III	DP20059.2, DP20059.3, DP20059.4, DP20059.5	Written test, Manual
MSBTE	DP20059.1, DP20059.2, DP20059.3, DP20059.4, DP20059.5	Written test, Manual

<b>COURSE DETAILS- PRACTICAL</b>	
<b>Expt. No</b>	<b>Title of Experiment</b>
1	Introduction to preparation and discussion of SOAP (Subjective, Assessment and Plan )
2	To study and understand SOAP of Hypertension.
3	To study and understand SOAP of Angina Pectoris.
4	To study and understand SOAP of Myocardial Infarction.
5	To study and understand SOAP of Hyperlipidemia.
6	To study and understand SOAP of Rheumatoid Arthritis.
7	To study and understand SOAP of Asthma.
8	To study and understand SOAP of COPD.
9	To study and understand SOAP of Diabetes Mellitus.
10	To study and understand SOAP of Epilepsy disorders.
11	To study and understand SOAP of Cerebrovascular Accident.(stroke)
12	To study and understand SOAP of Depression.
13	To study and understand SOAP of Tuberculosis.
14	To study and understand SOAP of Anaemia.
15	To study and understand SOAP of viral infection.

16	To study and understand SOAP of Dermatological condition
17	<b>Case Study 01 Acute Sinusitis</b> To study and understand clinical case scenarios and disease condition, medications, life-style modification, monitoring parameters etc.
18	<b>Case Study 02 Cancer</b> To study and understand clinical case scenarios and disease condition, medications, life-style modification, monitoring parameters etc.
19	<b>Case Study 03 Migraine</b> To study and understand clinical case scenarios and disease condition, medications, life-style modification, monitoring parameters etc.
20	<b>Case Study 04 Acute Kidney Failure</b> To study and understand clinical case scenarios and disease condition, medications, life-style modification, monitoring parameters etc.
21	<b>Case Study 05 Parkinson's Disease</b> To study and understand clinical case scenarios and disease condition, medications, life-style modification, monitoring parameters etc.
22	<b>Case Study No. 01</b> To study and understand dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions.
23	<b>Case Study No. 02</b> To study and understand dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions.
24	<b>Case Study No. 03</b> To study and understand dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions.
25	<b>Case Study No. 04</b> To study and understand dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions.

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Practical Manual of PHARMACOTHERAPEUTICS	Dr. Abhishek Sharma Dr. Hashim Khan	Nirali Prakashan	1 <sup>st</sup> edition	2022
02	Practical Manual of PHARMACOTHERAPEUTICS	Dr. G.D. Gupta Dr. Shailesh Sharma	Nirali Prakashan	1 <sup>st</sup> edition	2022

<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Pharmacotherapeutics for Advanced Practice	Virginia Poole Arcangelo, Andrew M. Peterson,	LWW	2021 editions	2021

**Content Delivery and assessment tools:**

<b>Expt. No</b>	<b>Title of Experiment</b>	<b>Planned week</b>	<b>Mapping with CO</b>	<b>Mapping with PO</b>
1.	Introduction to preparation and discussion of SOAP (Subjective, Assessment and Plan )	1 <sup>st</sup>	DP20059.1	1,2,3,4,5,6,7,8,9
2.	To study and understand SOAP of Hypertension.	2 <sup>nd</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
3.	To study and understand SOAP of Angina Pectoris.	3 <sup>rd</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
4.	To study and understand SOAP of Myocardial Infarction.	4 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
5.	To study and understand SOAP of Hyperlipidemia.	5 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
6.	To study and understand SOAP of Rheumatoid Arthritis.	6 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
7.	To study and understand SOAP of Asthma.	7 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
8.	To study and understand SOAP of COPD.	8 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9

9.	To study and understand SOAP of Diabetes Mellitus.	9 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
10.	To study and understand SOAP of Epilepsy disorders.	10 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
11.	To study and understand SOAP of Cerebrovascular Accident.(stroke)	11 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
12.	To study and understand SOAP of Depression.	12 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
13.	To study and understand SOAP of Tuberculosis.	13 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
14.	To study and understand SOAP of Anaemia.	14 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
15.	To study and understand SOAP of viral infection.	15 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
16.	To study and understand SOAP of Dermatological condition	16 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
17.	<b>Case Study 01 Acute Sinusitis</b>	17 <sup>th</sup>	DP20059.2	1,2,3,4,5,6,7,8,9

	To study and understand clinical case scenarios and disease condition, medications, life-style modification, monitoring parameters etc.		DP20059.3 DP20059.4 DP20059.5	
18.	<b>Case Study 02 Cancer</b> To study and understand clinical case scenarios and disease condition, medications, life-style modification, monitoring parameters etc.	18 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
19.	<b>Case Study 03 Migraine</b> To study and understand clinical case scenarios and disease condition, medications, life-style modification, monitoring parameters etc.	19 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
20.	<b>Case Study 04 Acute Kidney Failure</b> To study and understand clinical case scenarios and disease condition, medications, life-style modification, monitoring parameters etc.	20 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
21.	<b>Case Study 05 Parkinson's Disease</b> To study and understand clinical case scenarios and disease condition, medications, life-style modification, monitoring parameters etc.	21 <sup>st</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
22.	<b>Case Study No. 01</b> To study and understand dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions.	22 <sup>nd</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
23.	<b>Case Study No. 02</b> To study and understand dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions.	23 <sup>rd</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
24.	<b>Case Study No. 03</b> To study and understand dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions.	24 <sup>th</sup>	DP20059.2 DP20059.3 DP20059.4 DP20059.5	1,2,3,4,5,6,7,8,9
25.	<b>Case Study No. 04</b>	25 <sup>th</sup>	DP20059.2	1,2,3,4,5,6,7,8,9



## ANNASAHEB DANGE COLLEGE OF B. PHARMACY, ASHTA [D.Pharm]

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	To study and understand dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions.		DP20059.3 DP20059.4 DP20059.5	
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**TM-Teaching Method-** Lecture (LT).

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)**AT- Assessment Tool** - Class Tests (CT), Question Answers (QA), MSBT Examinations (EX), Rubrics (RB) , Course End Survey filled by students



**COURSE DETAILS**

**THEORY**

<b>Class</b>	S.Y. D. Pharmacy
<b>Course Code and Course Title</b>	<b>20225</b> Hospital and Clinical Pharmacy
<b>Prerequisite/s</b>	Basic & preliminary knowledge of Pharmaceutics, HAP, Pharmacology is essential
<b>Teaching Scheme: Lecture/Tutorial</b>	03/01
<b>Evaluation Scheme: SES-I, SES-II, SES-III, FE</b>	20/80

**THEORY**

<b>Course Objectives:</b> The course aims:(What teacher want to do with course while teaching)	
01	Explain basic concepts of hospital, hospital pharmacy& its administration.
02	Explain management of supply chain, inventory control & drug distribution and compounding of drugs in hospital
03	Describe application of Computer in hospital
04	Elaborate concept of clinical pharmacy and its importance in health care services.

**Course Outcomes (COs):**

Upon successful completion of this course, the student will be able to:

DP20225.1	Explain basic concepts of hospital, hospital pharmacy& its administration.
DP20225.2	Explain management of supply chain, inventory control & drug distribution and compounding of drugs in hospital
DP20225.3	Describe application of Computer in hospital
DP20225.4	Elaborate concept of clinical pharmacy and its importance in health care services.
DP20225.5	Interpret common laboratory reports for management of drug therapy.
DP20225.6	Identify, monitor & report drug related problems

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes								
	1	2	3	4	5	6	7	8	9
DP20225.1	3	1	-	3	1	1	3	-	3
DP20225.2	3	3	-	3	3	-	3	2	3
DP20225.3	3	3	-	-	1	1	-	-	3
DP20225.4	3	3	3	3	3	2	3	2	3
DP20225.5	3	3	-	3	2	1	3	-	3
DP20225.6	3	2	-	3	2	1	3	-	3
Total	18	15	3	15	12	6	15	4	18
<b>Avg. of each PO</b>	<b>3</b>	<b>2.5</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1.2</b>	<b>3</b>	<b>2</b>	<b>3</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
<b>DP20225</b>	<b>3</b>	<b>2.5</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>1.2</b>	<b>3</b>	<b>2</b>	<b>3</b>

Course DP20225	Course Outcomes					
	DP20225.1	DP20225.2	DP20225.3	DP20225.4	DP20225.5	DP20225.6
<b>Target</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Target Level</b>	Students scoring above 40% marks					
<b>1</b>	≥ 50%					
<b>2</b>	≥ 55%					
<b>3</b>	≥ 60%					

**MODES FOR ASSESSMENT OF COURSE OUTCOMES-THEORY**

Mode	CO	Assessment tool
SES-I	DP20225.1, DP20225.2	Written test
SES-II	DP20225.2, DP20225.3, DP20225.4	Written test
SES-III	DP20225.5, DP20225.6	Written test
FE	DP20225.1, DP20225.2, DP20225.3, DP20225.4 DP20225.5, DP20225.6	Written test

<b>COURSE DETAILS-THEORY</b>		
<b>UNIT</b>	<b>Topic</b>	<b>Hours</b>
<b>UNIT I</b>	<b>HOSPITALS:</b> Definition, scope, national and international scenario, Organizational structure Professional responsibilities, Qualification and experience requirements, job specifications, work load requirements and inter professional relationships Good Pharmacy Practice (GPP) in hospital, Hospital Pharmacy Standards (FIP Basel Statements, AHSP) Introduction to NAQS guidelines and NABH Accreditation and Role of Pharmacists.	(06Hrs)
<b>UNIT II</b>	<b>DIFFERENT COMMITTEES IN THE HOSPITAL</b> Pharmacy and Therapeutics Committee -Objectives, Composition, and functions Hospital Formulary - Definition, procedure for development and use of hospital formulary Infection Control Committee – Role of Pharmacist in preventing Antimicrobial Resistance	(04Hrs)
<b>UNIT III</b>	<b>SUPPLY CHAIN AND INVENTORY CONTROL</b> Preparation of Drug lists - High Risk drugs, Emergency drugs Schedule H1 drugs, NDPS drugs, reserved Antibiotics Procedures of Drug Purchases – Drug selection, short term, long term Tender/e-tender process, quotations Inventory control techniques: Economic Order Quantity Reorder Quantity Level, Inventory Turnover etc. Inventory Management of Central Drug Store – Storage conditions, Methods of storage Distribution, Maintaining Cold Chain, Devices used for cold storage (Refrigerator, ILR, Walk-in-Cold rooms) FEFO, FIFO methods, Expiry drug removal and handling, and disposal. Disposal of Narcotics, cytotoxic drugs, Documentation - purchase and inventory	(14Hrs)
<b>UNIT IV</b>	<b>.DRUG DISTRIBUTION</b> Manufacturing of liquid orals and external bulk concentrate Drug distribution (in- patients and out - patients) – Definition, advantages and disadvantages of individual prescription order method, Floor Stock Method, Unit Dose Drug Distribution Method, Drug Basket Method. Distribution of drugs to ICCU/ICU/NICU/Emergency wards Automated drug dispensing systems and devices Distribution of Narcotic and Psychotropic substances and their storage	(07hrs)
<b>UNIT V</b>	<b>COMPOUNDING IN HOSPITALS</b> Bulk compounding IV admixture services and incompatibilities Total parenteral nutrition	(04Hrs)
<b>UNIT VI</b>	<b>RADIO PHARMACEUTICALS</b> Storage, dispensing and disposal of radiopharmaceuticals	(02Hrs)
<b>UNIT VII</b>	Application of computers in Hospital Pharmacy Practice, Electronic health records, Software used in hospital pharmacy.	(02Hrs)
<b>UNIT VIII</b>	<b>CLINICAL PHARMACY:</b> Definition, scope, and development - in India and other countries Technical definitions, common terminologies used in clinical settings and their significance such as Pediatrics, Geriatric, Anti-natal Care, Post-natal Care, etc. Daily activities of clinical pharmacists: Definition, goal, and procedure of	(12Hrs)



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	Ward round participation, Treatment Chart Review, Adverse drug reaction monitoring. Drug information and poisons information, Medication history Patient counseling, Inter-professional collaboration <b>PHARMACEUTICAL CARE:</b> Definition, classification of drug related problems. Principles and procedure to provide pharmaceutical care Medication Therapy Management, Home Medication Review	
<b>UNIT IX</b>	<b>Clinical laboratory tests used in the evaluation of disease</b> states - significance and interpretation of test results Hematological, Liver function, Renal function, Thyroid function tests Tests associated with cardiac disorders, Fluid and electrolyte balance Pulmonary Function Tests	(10Hrs)
<b>UNIT X</b>	<b>POISONING:</b> Types of poisoning: Poison Clinical manifestations and Antidotes Drugs and Poison Information Centre and their services – Definition, Requirements, Information resources with examples, Information resources advantages and disadvantages	(06Hrs)
<b>UNIT XI</b>	<b>PHARMACOVIGILANCE</b> Definition, aim and scope , Overview of Pharmacovigilance	(02 Hrs)
<b>UNIT XII</b>	<b>MEDICATION ERRORS:</b> Definition, types, consequences, and strategies to minimize medication errors, LASA drugs and Tallman lettering as per ISMP Drug Interactions: Definition, types, Clinical significance of drug interactions	(06Hrs)

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Hospital and Clinical Pharmacy	Dr. A. V. Yadav Dr.B.V. Yadav	Nirali Publication	1 <sup>St</sup>	2022
02	Hospital and Clinical Pharmacy	Mr. D. S. Londhi Mr. P. Golani Dr. Md. Rageeb Md. Usman Dr. A. Mahajan	Pee Vee Publication	1 <sup>St</sup>	2022
03	Dispensing Pharmacy	R M Mehta	Vallabh Prakashan	6 <sup>th</sup>	2017
04	Practical Hospital and clinical Pharmacy	Dr. A R Paradkar S.B. Gokhale	Nirali Publication	6 <sup>th</sup>	2016
05	Hospital and Clinical Pharmacy	Dr.A.R.Paradkar	Nirali Publication	19 <sup>th</sup>	2015
06	Professional Pharmacy	N.K Jain S N Sharma	Vallabh Prakashan	7 <sup>th</sup>	2014

**Content Delivery and assessment tools:**

Unit	Lect. No.	Lesson Plan	TM Teaching Method	TA Teaching Aid	AT	Mapping with Outcomes	
		Content Delivery				CO	PO
	1	<b>Discussion regarding Vision, mission &amp; PEOs of Institute HOSPITALS:</b> Definition, scope, national and international scenario	LT	CB,PP,	QA, SE, FE	DP20225.1 DP20225.2	1, 2, 4,5,6,7 8,9
	2	Organizational structure					
	3	Professional responsibilities, Qualification and experience requirements, job specifications, work load requirements and inter professional relationships					
	4	Good Pharmacy Practice (GPP) in hospital					
	5	Hospital Pharmacy Standards (FIP Basel Statements, AHSP)					
	6	Introduction to NAQS guidelines and NABH Accreditation and Role of Pharmacists					
	7	<b>DIFFERENT COMMITTEES IN THE HOSPITAL</b> Pharmacy and Therapeutics Committee -Objectives, Composition, and functions	LT	CB,PP,	QA, SE,FE	DP20225.1 DP20225.2	1, 2, 4,5,6,7 8,9
	8	Hospital Formulary - Definition, procedure for development					
	9	Use of hospital formulary					
	10	Infection Control Committee – Role of Pharmacist in preventing Antimicrobial Resistance					
	11	<b>SUPPLY CHAIN AND INVENTORY CONTROL</b> Preparation of Drug lists - High Risk drugs, Emergency drugs	LT	CB,PP,	QA, SE, FE	DP20225.1 DP20225.2	1, 2, 4,5,6,7 8,9
	12	Schedule H1 drugs, NDPS drugs,					
	13	Reserved Antibiotics					

14	Procedures of Drug Purchases – Drug selection, short term, long term					
15	Tender/e-tender process, quotations					
16	Inventory control techniques: Economic Order Quantity					
17	Reorder Quantity Level, Inventory Turnover etc.					
18	Inventory Management of Central Drug Store – Storage conditions, Methods of storage					
19	Distribution, Maintaining Cold Chain,					
20	Devices used for cold storage (Refrigerator, ILR, Walk-in-Cold rooms)					
21	FEFO, FIFO methods					
22	Expiry drug removal and handling, and disposal.					
23	Disposal of Narcotics, cytotoxic drugs					
24	Documentation - purchase and inventory					
25	<b>DRUG DISTRIBUTION</b> Manufacturing of liquid orals and external bulk concentrate Drug distribution (in- patients and out - patients) – Definition, advantages and disadvantages of individual prescription order method,	LT	CB,PP,	QA, SE,FE	DP20225.1 DP20225.2	1, 2, 4,5,6,7 8,9
26	Floor Stock Method, Unit Dose Drug Distribution Method, Drug Basket Method					
27	Distribution of drugs to ICCU/ICU					
28	Distribution of drugs to NICU/Emergency wards					
29	Automated drug dispensing systems and devices					
30	Distribution of Narcotic and Psychotropic substances					
31	Storage of Narcotic and Psychotropic substances					

32	<b>COMPOUNDING IN HOSPITALS</b> Bulk compounding	LT	CB,PP,	QA, SE, FE	DP20225.1 DP20225.2	1, 2, 4,5,6,7 8,9
33	IV admixture services					
34	Incompatibilities					
35	Total parenteral nutrition					
36	<b>RADIO PHARMACEUTICALS</b> Storage, dispensing	LT	CB,PP,	QA, SE, FE	DP20225.1 DP20225.2	1, 2, 4,5,6,7 8,9
37	Disposal of radiopharmaceuticals					
38	Application of computers in Hospital Pharmacy Practice,	LT	CB,PP,	QA, SE, FE	DP20225.3	1, 2, 5,6,9
39	Electronic health records, Software used in hospital pharmacy.					
40	<b>CLINICAL PHARMACY:</b> Definition, scope, and development - in India and other countries	LT	CB,PP,	QA, SE, FE	DP20225.4	1, 2, 3,4,5,6 7,8,9
41	Technical definitions, common terminologies used in clinical settings and their significance such as Pediatrics, Geriatric, Anti-natal Care, Post-natal Care, etc.					
42	Technical definitions, common terminologies used in clinical settings and their significance Anti-natal Care, Post-natal Care, etc.					
43	Daily activities of clinical pharmacists: Definition, goal, and procedure of Ward round participation					
44	Treatment Chart Review					

45	Adverse drug reaction monitoring. Drug information and poisons information					
46	Medication history & Patient counseling					
47	Inter-professional collaboration					
48	<b>PHARMACEUTICAL CARE:</b> Definition, classification of drug related problems					
49	Principles and procedure to provide pharmaceutical care					
50	Medication Therapy Management					
51	Home Medication Review					
52	<b>Clinical laboratory tests used in the evaluation of disease states - significance and interpretation of test results</b> Hematological,	LT	CB,PP,	QA, SE,FE	DP20225.5	1, 2, 4,5,6 7,9
53	Liver function,					
54	Renal function,					
55	Thyroid function tests					
56	Tests associated with cardiac disorders					
57	Tests associated with cardiac disorders					
58	Fluid and electrolyte balance					
59	Fluid and electrolyte balance					
60	Pulmonary Function Tests					

61	Pulmonary Function Tests					
62	<b>POISONING:</b> Types of poisoning:	LT	CB,PP,	QA, SE, FE,	DP20225.6	1, 2, 4,5,6 7,9
63	Poison Clinical manifestations and Antidotes					
64	Drugs and Poison Information Centre– Definition, Requirements					
65	Drugs and Poison Information Centre services					
66	Information resources with examples,					
67	Information resources advantages and disadvantages					
68	<b>PHARMACOVIGILANCE</b> Definition, aim and scope	LT	CB,PP,	QA, SE,FE,	DP20225.6	1, 2, 4,5,6 7,9
69	Overview of Pharmacovigilance					
70	<b>MEDICATION ERRORS:</b> Definition, types,	LT	CB,PP,	QA, SE, FE	DP20225.6	1, 2, 4,5,6 7,9
71	consequences to minimize medication errors,					
72	strategies to minimize medication errors					
73	LASA drugs and Tallman lettering as per ISMP					
74	Drug Interactions: Definition, types					
75	Clinical significance of drug interactions					

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Question Answers (QA), Class Tests (CT), Sessional Examination (SE), Final Examinations (FE), Rubrics (RB) , Course End Survey filled by students,



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**PRACTICAL**

<b>Class</b>	S.Y. D. Pharmacy
<b>Course Code and Course Title</b>	20060 Hospital and Clinical Pharmacy
<b>Prerequisite/s</b>	Basic & preliminary knowledge of Pharmaceutics, HAP, Pharmacology is essential
<b>Teaching Scheme:</b>	Practical
<b>Total contact hours</b>	03
<b>Evaluation Scheme: SES-I, SES-II, SES-III, PM, FE</b>	20/80

**PRACTICAL**

<b>Course Objectives:</b> The course aims:	
01	Hospital and Hospital Pharmacy organization and set-ups
02	Basics of hospital pharmacy services including the procurement, supply chain, storage of medicines and medical supplies
03	Basics of clinical pharmacy including introduction to comprehensive pharmaceutical care services
04	Basic interpretations of common laboratory results used in clinical diagnosis towards optimizing the drug therapy

<b>Course Outcomes (COs):</b> Upon successful completion of this course, the student will be able to:	
DP20060.1	Explain the drug information services
DP20060.2	Illustrate the handling of drug information queries
DP20060.3	Interpret the common laboratory reports
DP20060.4	Report suspected adverse drug reactions using standard procedures
DP20060.5	Demonstrate the handling of various medical/surgical aids and devices
DP20060.6	Interpret and report the drug-drug interactions in common diseases for optimizing the drug therapy

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20060.1	3	3	3	3	3	3	3	-	3
DP20060.2	3	3	3	3	3	3	3	-	3
DP20060.3	3	3	3	3	3	2	3	1	3
DP20060.4	3	3	3	3	2	3	3	-	3
DP20060.5	3	3	3	3	1	2	3	2	3
DP20060.6	3	3	3	3	1	3	3	-	3
Total	18	18	18	18	13	16	18	-	18
Avg.	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>2.16</b>	<b>2.66</b>	<b>3.00</b>	<b>1.5</b>	<b>3.00</b>
<b>DP20060</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>2.16</b>	<b>2.66</b>	<b>3.00</b>	<b>1.5</b>	<b>3.00</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
<b>DP20060</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>3.00</b>	<b>2.16</b>	<b>2.66</b>	<b>3.00</b>	<b>1.5</b>	<b>3.00</b>

Course DP20060	Course Outcomes					
	DP20060.1	DP20060.2	DP20060.3	DP20060.4	DP20060.5	DP20060.6
<b>Target</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Target Level</b>	Students scoring above 40% marks					
<b>1</b>	≥ 50%					
<b>2</b>	≥ 55%					
<b>3</b>	≥ 60%					

**MODES FOR ASSESSMENT OF COURSE OUTCOMES-PRACTICAL**

Mode	CO	Assessment tool
SES-I	DP20060.1, DP20060.2, DP20060.3, DP20060.4, DP20060.5	Practical exam
SES-II	DP20060.1, DP20060.2, DP20060.3, DP20060.4, DP20060.5	Practical exam
SES-III	DP20060.1, DP20060.2, DP20060.3, DP20060.4, DP20060.5, DP20060.6	Practical exam
PM	DP20060.1, DP20060.2, DP20060.3, DP20060.4, DP20060.5, DP20060.6	Day to Day assessment
FE	DP20060.1, DP20060.2, DP20060.3, DP20060.4, DP20060.5, DP20060.6	Practical exam

**COURSE DETAILS-PRACTICAL**

Expt. No	Title of Experiment
1)	To study and understand Systematic approach to drug information queries using primary / secondary / tertiary resources of information Case Study: 01
2)	To study and understand Systematic approach to drug information queries using primary / secondary / tertiary resources of information Case Study: 02
3)	To study and understand Interpretation of laboratory reports to optimize the drug therapy in a given clinical case. Case Study: 01
4)	To study and understand Interpretation of laboratory reports to optimize the drug therapy in a given clinical case. Case Study: 02
5)	To study and understand Filling up IPC's ADR Reporting Form and perform causality assessments using various scales Case Study: 01
6)	To study and understand Filling up IPC's ADR Reporting Form and perform causality assessments using various scales Case Study: 02.
7)	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application /administration of Orthopedic Aids such as knee cap, cervical collar.
8)	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application /administration of Orthopedic Aids Such as, LS belts, abdominal belt
9)	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application /administration of Orthopedic Aids Such as walker, walking sticks
10)	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application /administration of Different types of bandages such as sterile gauze, cotton, crepe bandages, etc
11)	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application /administration of Needles, syringes
12)	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application of IV set
13)	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application of RYLE's tube.
14)	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application of catheters, urine bag, urine pots.
15)	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application of colostomy bags.
16)	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application of oxygen masks.
17)	To study and understand Case studies on drug-drug interactions Case Study: 01
18)	To study and understand Case studies on drug-drug interactions Case Study: 02
19)	To study and understand Wound dressing (simulated cases and role play
20)	To study and understand Wound dressing (simulated cases and role play
21)	To study and understand Intradermal Injection simulator technique using mannequins
22)	To study and understand Subcutaneous Injection technique using mannequins
23)	To study and understand Intravenous and Intramuscular Injection technique using mannequins



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24)	To study and understand vaccination technique using mannequins
25)	To study and understand Use of Hospital Pharmacy Software and various digital health tools

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	A laboratory Manual For Hospital & Clinical Pharmacy	Mrs. Deepali B. Jagatap Dr. Rajeshri S. Chavan	Brilliant Publication	1 <sup>st</sup>	2022
02	Dispensing Pharmacy	R M Mehta	Vallabh Prakashan	6 <sup>th</sup>	2017
03	Practical Hospital and clinical Pharmacy	Dr. A R Paradkar S.B. Gokhale	Nirali Publication	6 <sup>th</sup>	2016
04	Hospital and Clinical Pharmacy	Dr. A. V. Yadav B.V. Yadav	Nirali Publication	29 <sup>th</sup>	2016
05	Hospital and Clinical Pharmacy	Dr. A.R. Paradkar	Nirali Publication	19 <sup>th</sup>	2015
06	Professional Pharmacy	N.K Jain S N Sharma	Vallabh Prakashan	7 <sup>th</sup>	2014

**Content Delivery and assessment tools:**



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**COURSE DETAILS-PRACTICAL**

<b>Expt. No</b>	<b>Title of Experiment</b>	<b>TM Teaching Method</b>	<b>Mapping with CO</b>	<b>Mapping with PO</b>
1.	To study and understand Systematic approach to drug information queries using primary / secondary / tertiary resources of information Case Study: 01	LT, DM	DP20060.1 DP20060.2	1,2,3,4,5,6,7,9
2.	To study and understand Systematic approach to drug information queries using primary / secondary / tertiary resources of information Case Study: 02	LT, DM	DP20060.1 DP20060.2	1,2,3,4,5,6,7,9
3.	To study and understand Interpretation of laboratory reports to optimize the drug therapy in a given clinical case. Case Study: 01	LT, DM	DP20060.3	1,2,3,4,5,6,7,8,9
4.	To study and understand Interpretation of laboratory reports to optimize the drug therapy in a given clinical case. Case Study: 02	LT, DM	DP20060.3	1,2,3,4,5,6,7,8,9
5.	To study and understand Filling up IPC's ADR Reporting Form and perform causality assessments using various scales Case Study: 01	LT, DM	DP20060.4	1,2,3,4,5,6,7,9
6.	To study and understand Filling up IPC's ADR Reporting Form and perform causality assessments using various scales Case Study: 02.	LT, DM	DP20060.4	1,2,3,4,5,6,7,9
7.	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application /administration of Orthopedic Aids such as knee cap, cervical collar.	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
8.	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application /administration of Orthopedic Aids Such as, LS belts, abdominal belt	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
9.	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application /administration of Orthopedic Aids Such as walker, walking sticks	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
10.	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application /administration of Different types of bandages such as sterile gauze, cotton, crepe bandages, etc	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9



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11.	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application /administration of Needles, syringes	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
12.	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application of IV set	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
13.	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application of RYLE's tube.	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
14.	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application of catheters, urine bag, urine pots.	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
15.	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application of colostomy bags.	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
16.	To study and understand demonstration / simulated / hands-on experience on the identification, types, use / application of oxygen masks.	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
17.	To study and understand Case studies on drug-drug interactions Case Study: 01	LT, DM	DP20060.6	1,2,3,4,5,6,7,9
18.	To study and understand Case studies on drug-drug interactions Case Study: 02	LT, DM	DP20060.6	1,2,3,4,5,6,7,9
19.	To study and understand Wound dressing (simulated cases and role play	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
20.	To study and understand Wound dressing (simulated cases and role play	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
21.	To study and understand Intradermal Injection simulator technique using mannequins	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
22.	To study and understand Subcutaneous Injection technique using mannequins	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
23.	To study and understand Intravenous and Intramuscular Injection technique using mannequins	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
24.	To study and understand vaccination technique using mannequins	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9



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25.	To study and understand Use of Hospital Pharmacy Software and various digital health tools	LT, DM	DP20060.5	1,2,3,4,5,6,7,8,9
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**TM-Teaching Method-** Lecture (LT), Demonstration (DM), Chart (C), Model (M)

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP), Video Films (VF)

**AT- Assessment Tool** - Question Answers (QA), Class Tests (CT), Sessional Examination (SE), Final Examinations (FE), Rubrics (RB) ,  
Course End Survey filled by students,

**COURSE DETAILS**

<b>Class</b>	D. Pharmacy 2 <sup>nd</sup> year
<b>Course Code and Course Title</b>	<b>20226 Pharmacy Law and Ethics</b>
<b>Prerequisite/s</b>	Basic & preliminary knowledge of Pharmacy is essential
<b>Teaching Scheme: Lecture/Tutorial</b>	03/01
<b>Evaluation Scheme: Theory Paper/SE</b>	80/20

<b>Course Objectives:</b> The course aims: (What teacher want to do with course while teaching)	
01	To introduce pharmaceutical jurisprudence, different pharmaceutical acts with their objectives.
02	To focus on codes of pharmaceutical ethics during the pharmaceutical practice.
03	To emphasise on authoritative bodies, their constitution and functions.
04	To familiarise with various schedules, definitions, offences penalties as per the laws.

<b>Course Outcomes (COs):</b>	
Upon successful completion of this course, the student will be able to:	
DP20226.1	Summarize historical development of pharmaceutical laws in India.
DP20226.2	Describe the acts, rules, and ethical guidelines regulating the pharmacy profession in India.
DP20226.3	Explain regulatory authorities and agencies governing practice of Pharmacy Profession.
DP20226.4	Interpret various pharmacy allied legislation and fundamentals of patent laws in perspective of pharmacy.
DP20226.5	Apply the knowledge of pharmaceutical Laws in the pharmacy Profession.

**MAPPING OF COURSE OUTCOMES TO PROGRAM OUTCOMES:**

Course Outcomes	Programme Outcomes								
	1	2	3	4	5	6	7	8	9
DP20226.1	3	-	-	2	-	1	-	-	1
DP20226.2	3	-	-	2	3	1	3	-	1
DP20226.3	3	-	-	-	3	1	3	-	1
DP20226.4	3	-	2	-	-	1	3	2	1
DP20226.5	3	-	-	-	2	1	2	-	2
Total	15	-	2	4	8	5	11	2	6
Avg.	3	-	2	2	2.66	1	2.75	2	1.2
<b>20226</b>	<b>3</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>2.66</b>	<b>1</b>	<b>2.75</b>	<b>2</b>	<b>1.2</b>

**COURSE SKILL ACQUISITION MATRIX:**

Course	Programme Outcome								
	1	2	3	4	5	6	7	8	9
20226	3	-	2	2	2.66	1	2.75	2	1.2

Course 20226	Course Outcomes				
	DP20226.1	DP20226.2	DP20226.3	DP20226.4	DP20226.5
<b>Target</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Target Level</b>	Students scoring above 40% marks				
<b>1</b>	≥ 50%				
<b>2</b>	≥ 55%				
<b>3</b>	≥ 60%				

**MODES FOR ASSESSMENT OF COURSE OUTCOMES**

Mode	CO	Assessment tool
SES-I	DP20226.1, DP20226.2, DP20226.5	Written test, Assignment
SES-II	DP20226.2, DP20226.3, DP20226.5	Written test, Assignment
SES-III	DP20226.4, DP20226.5	Written test, Assignment
FE	DP20226.1, DP20226.2, DP20226.3, DP20226.4	Written test

COURSE DETAILS		
<b>Chapter 1</b>	<b>Pharmaceutical legislation in India</b>	02Hours
UO20226CH1.1	General Principles of Laws, History	
UO20226CH1.2	Scope and objectives, Acts related to Drugs and Pharmacy Profession	
<b>Chapter 2</b>	<b>Pharmacy act- 1948</b>	05Hours
UO20226CH2.1	Give objectives and definitions related to the act	
UO20226CH2.2	Explain E.R., approval of institution, withdrawal of approval,	
UO20226CH2.3	Qualification granted outside territorial, Central register of pharmacy, Registration of pharmacist, preparation of 1st and subsequent reg. Application for registration, fees, Removal of name, restoration of names, offences and penalties.	
UO20226CH2.4	Pharmacy Practice Regulations 2015	
<b>Chapter 3</b>	<b>Drugs and Cosmetics Act 1940 and Rules 1945</b>	
UO20226CH3.1	Recall objectives, definition and schedules of the act.	

UO20226CH3.2	Explain composition and functions of DTAB, DCC and CDL.	
UO20226CH3.3	Enlist qualification, powers and duties of government analysts and drug Inspectors	
UO20226CH3.4	Describe provisions relating to drugs, sale of drugs, wholesale retail licenses, labeling and packing of drugs other than homeopathic medicines, sale of ayurvedic, unani and homeopathic drugs, provisions relating to cosmetics, Sale of cosmetics, labeling of cosmetics and packaging.	23Hours
UO20226CH3.5	Describe provisions relating to manufacture of drugs, Manufacture of drugs for test, examination and analysis, provisions relating to import of drugs.	
UO20226CH3.6	Discuss Schedule – schedule C and C1, G, H, H1, K, P, X, M,N	
<b>Chapter 4</b>	<b>Narcotic substances and psychotropic substances act and rules- 1985</b>	02Hours
UO20226CH4.1	Recall objectives, definition of the act, authorities of officers	
UO20226CH4.2	Explain power of central and state government, Offences & penalties.	
<b>Chapter 5</b>	<b>Drug and magic remedies Act 1954</b>	02Hours
UO20226CH5.1	Recall objectives, definition of the act,	
UO20226CH5.2	Discuss classes of Prohibited and exempted advertisements, Relate offences and penalties	
<b>Chapter 6</b>	<b>Prevention of Cruelty to Animals Act-1960</b>	02Hours
UO20226CH6.1	Objectives, Definitions, CPCSEA - brief overview, Institutional Animal Ethics Committee, Breeding and Stocking of Animals	
UO20226CH6.2	Performance of Experiments, Transfer and Acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties.	
<b>Chapter 7</b>	<b>Poisons act- 1919</b>	02Hours
UO20226CH7.1	Recall objectives, definition of the act,	
UO20226CH7.2	Explain provision for possession, possession for sale, sale of poison, Import, penalties.	
<b>Chapter 8</b>	<b>FSSAI (Food Safety and Standards Authority of India) Act 2006 and Rules</b>	02Hours
UO20226CH8.1	Discuss in brief overview and aspects related to Manufacture	
UO20226CH8.2	Explain in brief overview and aspects related to storage, sale, and labeling of Food Supplements	
<b>Chapter 9</b>	<b>National Pharmaceutical Pricing Authority: Drugs Price Control Order (DPCO) – 2013</b>	05Hours
UO20226CH9.1	Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations	

UO20226CH9.2	Retail price and ceiling price of scheduled formulations	
UO20226CH9.3	Pharmaceutical Policy 2002: Introduction & objectives	
UO20226CH9.4	Features of Pharmaceutical Policy 2002, National List of Essential Medicines (NLEM)	
<b>Chapter 10</b>	<b>Pharmaceutical ethics</b>	
UO20226CH10.1	Define Ethics and Laws. Explain the steps involved in ethical problem solving.	05Hours
UO20226CH10.2	Explain Pharmaceutical code of ethics, pharmacist's relation to his job, and Pharmacist's relation to his medical profession.	
UO20226CH10.3	Reproduce Pharmacist's oath	
<b>Chapter 11</b>	<b>Medical termination of pregnancy act 1971 and rules 1975</b>	
UO20226CH11.1	Recall objectives, definition of the act.	02Hours
UO20226CH11.2	Relate circumstances under which pregnancy can be terminated	
UO20226CH11.3	Describe experience/ training, place approved, Maintenance of admission register, offences and penalties. Amendments: Medical Termination of Pregnancy Act 2021 & its features	
<b>Chapter 12</b>	<b>Role of all the government pharma regulator bodies</b>	
UO20226CH12.1	Discuss the functions of various pharma regulator bodies like Central Drugs Standards Control Organization (CDSCO), Indian Pharmacopoeia Commission (IPC)	01Hours
<b>Chapter 13</b>	<b>Good Regulatory practices</b>	
UO20226CH13.1	In community pharmacy: Retail sale and wholesale sale	03Hours
UO20226CH13.2	Good Regulatory practices: In Hospital pharmacy, Pharma Manufacturing	
UO20226CH13.3	Good Regulatory practices in import, export of drugs and medical devices	
<b>Chapter 14</b>	<b>Introduction to BCS system</b> of classification, ANDA	
UO20226CH14.1	BCS system of classification, ANDA NDA, New Drug development	07Hours
UO20226CH14.2	Basic concepts of Clinical Trials	
UO20226CH14.3	New Drugs and Clinical Trials Rules, 2019	
UO20226CH14.4	Brand v/s Generic, Trade name concept	
UO20226CH14.5	Introduction to Patent Law and Intellectual Property Rights Emergency Use Authorization	
<b>Chapter 15</b>	<b>Blood bank</b>	02Hours

UO20226CH15.1	Basic requirements, Blood bank functions	
<b>Chapter 16</b>	<b>Clinical Establishment Act 2010 and Rules</b>	02Hours
UO20226CH16.1	Introduction , Aspects related to Pharmacy	
<b>Chapter 17</b>	<b>Biomedical Waste Management Rules 2016</b>	02Hours
UO20226CH17.1	Aspects related to pharma manufacture to disposal of pharma / medical waste at homes, pharmacies, and hospitals	
<b>Chapter 18</b>	<b>Bioethics</b>	02Hours
UO20226CH18.1	Basic concepts, history and principles, Brief overview of ICMR 's	
UO20226CH18.2	National Ethical Guidelines for Biomedical and Health Research involving human participants	
<b>Chapter 19</b>	<b>Introduction to the Consumer Protection Act 1986</b>	01Hours
UO20226CH19.1	Objective, definitions, consumer Protection Council	
<b>Chapter 20</b>	<b>Introduction to the Disaster Management Act 2005</b>	01Hours
UO20226CH20.1	Disaster, Disaster management, various agencies, offences and penalties.	
<b>Chapter 21</b>	<b>Medical Devices</b>	02Hours
UO20226CH21.1	Categorization, basic aspects related to manufacture and sale	

<b>Text Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Pharmacy Laws and Ethics	Dr. B.S. Kuchekar	Nirali prakashan	1 <sup>st</sup>	2022
02	Pharmacy Laws and Ethics	Shalini Sharma	PV publication	1 <sup>st</sup>	2022
03	Forensic Pharmacy	Dr. B.S. Kuchekar	Nirali prakashan	23 <sup>th</sup>	2019
04	Textbook of Forensic Pharmacy	Guru Prasad Mohanta	CBS publication	2 <sup>nd</sup>	2018
05	Pharmaceutical Jurisprudence	Dr. B.S. Kuchekar	Nirali prakashan	19 <sup>th</sup>	2009
06	A text book of Forensic Pharmacy	N.K. Jain	Vallabh prakashan	6 <sup>th</sup>	2003



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<b>Reference Books:</b>					
<b>Sr. No</b>	<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Year of Edition</b>
01	Forensic Pharmacy	C. K. Kokate and S. B. Gokhale	Pharma Book Syndicate, Hyderabad	1 <sup>st</sup>	2006

**Content Delivery and assessment tools:**



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Unit	Lect. No.	Lesson Plan	TM	TA	AT	Mapping with Outcomes	
		Content Delivery				CO	PO
I	1	<b>Pharmaceutical legislation in India</b> General Principles of Laws, History	LT	CB,PP	QA,CT, EX	DP20226.1	1,4,6,9
	2	Scope and objectives, Acts related to Drugs and Pharmacy Profession					
II	3	<b>Pharmacy act- 1948</b> Introduction, objectives, definitions,	LT	CB,PP	QA,CT, EX	DP20226.2	1,4,5,6, 7, 9
	4	PCI ( members, functions, power)					
	5	Education Regulations, State and Joint state pharmacy councils					
	6	Registration of Pharmacists, Offences and Penalties					
	7	Pharmacy Practice Regulations 2015					
III	8	<b>Drugs and Cosmetics Act 1940 and Rules 1945</b> and New Amendments: Introduction, Objectives	LT	CB,PP	QA,CT EX	DP20226.2	1,4,5,6, 7, 9
	9	Definitions under Drugs and Cosmetics Act 1940					
	10	Legal definitions of schedules to the Act and Rules					
	11	Administrative bodies, DTAB, DCC					
	12	Central Drug Laboratory					
	13	government analysts					
	14	Inspectors, powers, duties of inspectors,					
	15	licensing authorities , Provisions relating to sale of drugs					
	16	Condition of licenses to be satisfy for issuing license					
	17	General conditions of a license for sale of drugs					
	18	Cancellation and suspension of a license					
	19	Offences and penalties					
	20	Sale of Ayurvedic, Unani, Homoeopathic medicines					
	21	Drugs prohibited for manufacture and sale in India					
	22	Provision related to Manufacture of drugs for sale					
23	Conditions for grant of license license in from 25and 25-F and Conditions						

		of liscence of the same					
	24	Conditions of license for manufacture of drugs C,C1 but not X and medical devices					
	25	loan license					
	26	repacking liscence					
	27	Manufacture of drugs for test, examination and analysis and Classes of drugs and cosmetics prohibited from import					
	28	condition of to be satisfied before a liscence in form no 10 and 10 A, condition of liscences of the same					
	29	schedule C and C1, G, H, H1,K					
	30	schedule P,M, N, X					
IV	31	<b>Narcotic substances and psychotropic substances act and rules-1985:</b> objectives, definitions, Authorities and officers	LT	CB,PP	QA,CT, EX	DP20226.2	1,4,5,6, 7, 9
	32	Power of central govt. Powers of state govt. Offences & penalties					
V	33	<b>Drug and magic remedies Act-</b> Objectives, definition, Prohibited advertisement	LT	CB,PP	QA,CT, EX	DP20226.2	1,4,5,6, 7, 9
	34	Classes of exempted advertisements, Offences and penalties					
VI	35	<b>Prevention of Cruelty to Animals Act-1960</b> Objectives, Definitions, CPCSEA - brief overview, Institutional Animal Ethics Committee, Breeding and Stocking of Animals	LT	CB,PP	QA,CT, EX	DP20226.3	1,5,7,9
	36	Performance of Experiments, Transfer and Acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties.					
VII	37	<b>Poisons act- 1919</b> Introduction, object, possession, Possession for sale	LT	CB,PP	QA,CT, EX	DP20226.2	1,4,5,6, 7, 9
	38	sale of poison, offences & penalties, list of poison					
VIII	39	<b>FSSAI (Food Safety and Standards Authority of India) Act and Rules:</b> brief overview and aspects related to Manufacture	LT	CB,PP	QA,CT, EX	DP20226.3	1,5,7,9
	40	Brief overview and aspects related to storage, sale, and labeling of Food Supplements					

IX	41	<b>National Pharmaceutical Pricing Authority: Drugs Price Control Order (DPCO) – 2013:</b> Objectives, Definitions	LT	CB,PP,	QA,CT, EX	DP20226.3	1,5,7,9
	42	Sale prices of bulk drugs, Retail price of formulations					
	43	Retail price and ceiling price of scheduled formulations					
	44	Pharmaceutical Policy 2002: Introduction & objectives					
	45	Features of Pharmaceutical Policy 2002, National List of Essential Medicines (NLEM)					
X	46	<b>Code of Pharmaceutical ethics</b> Definition, ethical principles	LT	CB,PP	QA,CT, EX	DP20226.2	1,4,5,6, 7, 9
	47	Ethical problem solving					
	48	Professional conduct relation to his job & trade					
	49	Pharmacist's relation to medical profession					
	50	Pharmacist's relation to his profession & Pharmacist's oath					
XI	51	<b>Medical Termination of Pregnancy Act and Rules 1971</b> Objectives, definitions, circumstances under which pregnancy can be terminated, Experience/ training, place approved, offences and penalties	LT	CB,PP	QA,CT, EX	DP20226.2	1,4,5,6, 7, 9
	52	Amendments: Medical Termination of Pregnancy Act 2021 & its features					
XII	53	<b>Role of all the government pharma regulator bodies</b> – Central Drugs Standards Control Organization (CDSCO), Indian Pharmacopoeia Commission (IPC)	LT	CB,PP	QA,CT, EX	DP20226.3	1,5,7,9
XIII	54	<b>Good Regulatory practices:</b> In community pharmacy: Retail sale and wholesale sale	LT	CB,PP	QA,CT, EX	DP20226.3	1,5,7,9
	55	Good Regulatory practices: In Hospital pharmacy, Pharma Manufacturing					
	56	Good Regulatory practices in import, export of drugs and medical devices					
XIV	57	<b>Introduction to BCS system</b> of classification, ANDA	LT	CB,PP	QA,CT, EX	DP20226.4	1,3,6,7, 8,9
	58	NDA, New Drug development.					
	59	Basic concepts of Clinical Trials					
	60	New Drugs and Clinical Trials Rules, 2019					
	61	Brand v/s Generic, Trade name concept					

	62	Introduction to Patent Law and Intellectual Property Rights					
	63	Emergency Use Authorization					
XV	64	<b>Blood bank</b> – basic requirements	LT	CB,PP	QA,CT, EX	DP20226.4	1,3,6,7, 8,9
	65	Blood bank functions					
XVI	66	<b>Clinical Establishment Act and Rules</b> – Introduction	LT	CB,PP	QA,CT, EX	DP20226.4	1,3,6,7, 8,9
	67	Aspects related to Pharmacy					
XVII	68	<b>Biomedical Waste Management Rules 2016:</b> Basic aspects	LT	CB,PP	QA,CT, EX	DP20226.4	1,3,6,7, 8,9
	69	aspects related to pharma manufacture to disposal of pharma/ medical waste at homes, pharmacies, and hospitals					
XVIII	70	<b>Bioethics</b> - Basic concepts, history and principles, Brief overview of ICMR's	LT	CB,PP	QA,CT, EX	DP20226.4	1,3,6,7, 8,9
	71	National Ethical Guidelines for Biomedical and Health Research involving human participants					
XIX	72	<b>Introduction to the Consumer Protection Act</b>	LT	CB,PP	QA,CT, EX	DP20226.4	1,3,6,7, 8,9
XX	73	<b>Introduction to the Disaster Management Act</b>	LT	CB,PP	QA,CT, EX	DP20226.4	1,3,6,7, 8,9
XXI	74	<b>Medical Devices</b> – Categorization	LT	CB,PP	QA,CT, EX	DP20226.4	1,3,6,7, 8,9
	75	basic aspects related to manufacture and sale					

**TM-Teaching Method-** Lecture (LT).

**TA-Teaching Aids** -Chalk Board (CB), Power Point Presentation (PP)

**AT- Assessment Tool** - Class Tests (CT), Question Answers (QA), MSBTE Examinations (EX), Course End Survey filled by students,