ACA /DI/08
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Teaching Plan (Practical)

Academic Year: 2022-23
Semester: III[rd]

Sub: BP308P- Pharmaceutical Engineering Year: S.Y. B. Pharm (III[rd] SEM) Total Hrs Prescribed (NMU): 4 Hrs/Batch/Week

Sr. No.	Practical Details (NMU)	Alloted Hrs. (NMU)	Preparation/ Materials/ Resources	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date (Week/Month)
01	**Determination of radiation constant of brass, iron, unpainted and painted glass.**	04	1. Pharmaceutical Engineering practical manual by Sudhakara reddy and G V Chandrasekhar et al 2. Practical book of Pharmaceutical engineering by Dr. Neelesh Chaubey et al, Nirali publications	Determination of radiation constant of brass, iron, unpainted and painted glass.	Introduction to radiation constant of brass, iron, unpainted and painted glass. Explain procedure, note down observations and calculations and viva-voce.	04	3/8/22-Batch D 4/8/22-Batch A 5/8/22-Batch B 6/8/22-Batch C Aug 2022
02	**Steam distillation –To calculate the**	04	1. Pharmaceutical Engineering practical	Steam distillation –To calculate the efficiency of steam distillation.	Steam distillation- Introduction, procedure,	04	

	efficiency of steam distillation.		manual by Sudhakara reddy and S. J. Surana. et al 2.Practical book of Pharmaceutical engineering by Dr. Neelesh Chaubey et al, Nirali publications		calculations and viva-voce.	04	3/8/22-Batch D 4/8/22-Batch A 5/8/22-Batch B 6/8/22-Batch C Aug 2022
03	**To determine the overall heat transfer coefficient by heat exchanger.**	04	1.Pharmaceutical Engineering practical manual by Sudhakara reddy and S. J. Surana. Et al 2.Practical book of Pharmaceutical engineering by Dr. Neelesh Chaubey et al, Nirali publications	To determine the overall heat transfer coefficient by heat exchanger.	Introduction to heat exchangers, procedure, observations, calculations and viva-voce.	04	10/8/22-Batch D 11/8/22-Batch A 12/8/22-Batch B 13/8/22-Batch C Aug 2022
04	**Construction of drying curves (for calcium carbonate and starch.**	04	1. Pharmaceutical Engineering practical manual by Sudhakara reddy and S. J. Surana. etal 2.Practical book of Pharmaceutical engineering by Dr. Neelesh Chaubey et al, Nirali publications	Construction of drying curves (for calcium carbonate and starch.	Introduction of drying curves, procedure, observations, calculations and viva-voce.	04	17/8/22-Batch D 18/8/22-Batch A 19/8/22-Batch B 20/8/22-Batch C Aug 2022

05	**Determination of moisture content and loss on drying.**	04	1. Pharmaceutical Engineering practical manual by Sudhakara reddy and S. J. Surana. etal 2. Practical book of Pharmaceutical engineering by Dr. Neelesh Chaubey et al, Nirali publications	Determination of moisture content and loss on drying.	Introduction to moisture content and LOD, procedure, observations, calculations and viva-voce.	04	24/8/22-Batch D 25/8/22-Batch A 19/8/22-Batch B 27/8/22-Batch C Aug 2022
06	**Determination of humidity in air by using wet and dry bulb temperature and by dew point method.**	04	1. Pharmaceutical Engineering practical manual by Sudhakara reddy and S. J. Surana. etal 2. Practical book of Pharmaceutical engineering by Dr. Neelesh Chaubey et al, Nirali publications	Determination of humidity in air by using wet and dry bulb temperature and by dew point method.	Introduction to dew point method, procedure, observations, calculations and viva-voce.	04	7/9/22-Batch D 1/9/22-Batch A 16/9/22-Batch B 3/9/22-Batch C Sept 2022
07	**Demonstration of construction working and application of pharmaceutical machinery as rotary tablet machine,FBD,FEM,dehumidifier.**	04	1. Pharmaceutical Engineering practical manual by Sudhakara reddy and S. J. Surana et al 2.Practical book of Pharmaceutical engineering by Dr. Neelesh Chaubey et al,	Demonstration of construction working and application of pharmaceutical machinery as rotary tablet machine,FBD,FEM,dehumidifier.	Demonstration of construction working and application of pharmaceutical machinery as rotary tablet machine, FBD, FEM, dehumidifier and viva-voce.	04	14/9/22-Batch D 8/9/22-Batch A 2/9/22-Batch B 10/9/22-Batch C Sept 2022

			Nirali publications				
08	**Size analysis by sieving- To evaluate size distribution of tablet granulations- Construction of various size frequency curves including arithmetic and logarithmic probability plots.**	04	1. Pharmaceutical Engineering practical manual by Sudhakara reddy and S. J. Surana. etal 2.Practical book of Pharmaceutical engineering by Dr. Neelesh Chaubey et al, Nirali publications	Size analysis by sieving- To evaluate size distribution of tablet granulations- Construction of various size frequency curves including arithmetic and logarithmic probability plots.	Introduction to frequency curves including arithmetic and logarithmic probability plots, procedure, observations, calculations and viva-voce.	04	21/9/22-Batch D 15/9/22-Batch A 23/9/22-Batch B 17/9/22- Batch C Sept 2022
09	**Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball mill.**	04	1. Pharmaceutical Engineering practical manual by Sudhakara reddy and S. J. Surana. etal 2. Practical book of Pharmaceutical engineering by Dr. Neelesh Chaubey et al, Nirali publications	Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball mill.	Introduction, procedure, observations, calculations and viva-voce.	04	28/9/22-Batch D 29/9/22-Batch A 30/09/22-Batch B 24/9/22-Batch C Sept 2022

10	**Demonstration of colloid mill, planetary mixer, FBD, Freeze dryer and such other major equipment.**	04	1. Pharmaceutical Engineering practical manual by Sudhakara reddy and S. J. Surana. etal	Demonstration of colloid mill, planetary mixer, FBD, Freeze dryer and such other major equipment.	Demonstration of colloid mill, planetary mixer, FBD, Freeze dryer and such other major equipment and viva-voce.	04	12/10/22-Batch D 06/10/22- Batch A 7/10/22-Batch B 1/10/22- Batch C Oct 2022
11	**To study the various factor affecting on rate of filtration and evaporation (Surface area, concentration and Thickness/viscosity)**		1. Pharmaceutical Engineering practical manual by Sudhakara reddy and S. J. Surana. etal	To study the various factor affecting on rate of filtration and evaporation (Surface area, concentration and Thickness/viscosity)	Introduction, procedure, observations, calculations and viva-voce.	04	19/10/22-Batch D 20/10/22-Batch A 21/10/22-Batch B 8/10/22-Batch C Oct 2022
12	**To study the effect of time on the rate of crystallization.**		1. Pharmaceutical Engineering practical manual by Sudhakara reddy and S. J. Surana. Et al	To study the effect of time on rate of crystallization.	Introduction to crystallization, procedure, observations, calculations and viva-voce.	04	2/11/22-Batch D 3/11/22-Batch A 4/11/22-Batch B 5/11/22-Batch C Nov 2022

Subject In charge
Mrs. R.S.Sonawane

Academic In charge
Mr. T. D. Fegade

HOD
Mr. T.D.Fegade

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Teaching Plan (Theory)

Academic Year: 2022-23
Semester: VIIth (Odd)

Sub: IP-II (Th) **Year: Final. Y. B. Pharm (VII Sem)** **Total Hrs Prescribed (NMU & PCI): 4 Hrs/Week (45)**
Subject- Industrial Pharmacy-II (BP 702T)

Sr. No.	Topic Details (NMU)	Allotted Hrs. (NMU)	Preparation/ Materials/ Resources	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date (Week /Month)
01	**UNIT-I** **Pilot plant scale up techniques:** General considerations - including significance of personnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology	10	1. Industrial Pharmacy-II DR.K.P.Sampathkumar Dr. Debjit Bhowmik Rishabh Bhonot Goswami, Nirali prakashan	General considerations - including significance of personnel requirements	Introduction General considerations - including significance of personnel requirements	NA	NA
				Space requirements	space requirements	NA	NA
				Raw materials	Introduction raw materials	NA	NA

				Pilot plant scale up considerations for solids	Pilot plant scale up considerations for solids	NA	NA
				Pilot plant scale up considerations for Liquid	Pilot plant scale up considerations for Liquid	NA	NA
				Pilot plant scale up considerations for semi solids	Pilot plant scale up considerations for semi solids	NA	NA
				relevant documentation	relevant documentation	NA	NA
				SUPAC guidelines	SUPAC guidelines	NA	NA
				Introduction to platform technology	Introduction to platform technology	NA	NA
					Introduction to platform technology	NA	NA
02	**UNIT-II** **Technology development and transfer:** WHO guidelines for Technology Transfer(TT): Terminology, Technology transfer protocol, Quality risk	10	1. Industrial Pharmacy-II DR.K.P.Sampathkumar	WHO guidelines for Technology Transfer(TT)	Introduction WHO guidelines for Technology Transfer(TT)	NA	NA

	management, Transfer from & D to production (Process, packaging and cleaning), Granularity of TT Process (API excipients, finished products, packaging materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues		Dr. Debjit Bhowmik Rishabh Bhonot Goswami, Nirali prakashan	Terminology, Technology transfer protocol	Terminology, Technology transfer protocol	NA	NA
				Quality risk management, Transfer from & D to production (Process, packaging and cleaning)	Quality risk management, Transfer from & D to production (Process, packaging and cleaning)	NA	NA
				Granularity of TT Process (API excipients, finished products, packaging materials)	Granularity of TT Process (API excipients, finished products, packaging materials)	NA	NA
				Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer	Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer	NA	NA
				Approved	Approved regulatory	NA	NA

				regulatory bodies and agencies	bodies and agencies		
				Commercializati on - practical aspects and problems (case studies)	Commercialization - practical aspects and problems (case studies)	NA	NA
				TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI	TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI	NA	NA
				TT related documentation - confidentiality agreement	TT related documentation - confidentiality agreement	NA	NA
				licensing, MoUs, legal issues	licensing, MoUs, legal issues	NA	NA
03	**UNIT-III** **Regulatory affairs:** Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals **Regulatory requirements for drug approval:** Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Clinical Research	10	1. Industrial Pharmacy-II DR.K.P.Sampathkumar Dr. Debjit Bhowmik Rishabh Bhonot Goswami, Nirali prakashan	**Regulatory affairs:** Introduction, Historical overview of Regulatory Affairs, Regulatory authorities	**Regulatory affairs:** Introduction, Historical overview of Regulatory Affairs, Regulatory authorities	NA	NA
				, Role of Regulatory affairs department,	Regulatory authorities, Role of Regulatory affairs department	NA	NA

	Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies			Responsibility of Regulatory Affairs Professionals	Responsibility of Regulatory Affairs Professionals		
				Regulatory requirements for drug approval: Drug Development Teams	Introduction to regulatory requirements for drug approval ,Drug Development Teams	NA	NA
				Non-Clinical Drug Development, Drug metabolism and toxicology	Non-Clinical Drug Development, Pharmacology, Drug metabolism and toxicology	01	Aug 2022
				General considerations of Investigational New Drug (IND)Application, Investigator's Brochure (IB)	Investigational New Drug (IND)Application, Investigator's Brochure (IB)	01	Aug 2022
				New Drug Application (NDA), Clinical research / BE studies	New Drug Application (NDA) Clinical research / BE studies	01	Aug 2022
				Clinical Research Protocols	Clinical Research Protocols	01	Aug 2022

				Biostatistics in Pharmaceutical Product Development	Biostatistics in Pharmaceutical Product Development	01	Aug 2022
				Data Presentation for FDA Submissions,	Data Presentation for FDA Submissions,	01	Aug 2022
				Management of Clinical Studies	Management of Clinical Studies	01	Aug 2022
04	Unit –IV **Quality management systems:** Quality management & Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Out of Specifications (OOS), Change control, Introduction to ISO 9000 series of quality systems standards	08	1. Industrial Pharmacy-II DR.K.P.Sampath kumar Dr. Debjit Bhowmik Rishabh Bhonot Goswami, Nirali prakashan	Quality management & Certifications,	Quality management & Certifications	01	Aug 2022
				Concept of Quality, Total Quality Management	Concept of Quality, Total Quality Management	01	Sept 2022
				Quality by Design (QbD) Six Sigma concept	Quality by Design (QbD),Six Sigma concept,	01	Sept 2022

				Out of Specifications (OOS)	Out of Specifications (OOS)	02	Sept 2022
				Change control, Introduction to ISO 9000 series of quality systems standards	Change control, Introduction to ISO 9000 series of quality systems standards	02	Sept 2022
				ISO 14000,NABL,GLP	ISO 14000,NABL,GLP	01	Sept 2022
05	**Unit-V** **Indian Regulatory Requirements:** Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs.	07	1. Industrial Pharmacy-II DR.K.P.Sampathkumar Dr. Debjit Bhowmik Rishabh Bhonot Goswami, Nirali prakashan	Central Drug Standard Control Organization	Introduction Central Drug Standard Control Organization	01	Sept 2022
				State Licensing Authority	Various State Licensing Authority	01	Sept 2022
				Organization, Responsibilities,	Organization, Responsibilities of licensing authorities.	02	Oct 2022
				Certificate of Pharmaceutical Product (COPP)	Certificate of Pharmaceutical Product (COPP),Introduction to procedure of COPP	02	Oct 2022

				Regulatory requirements, Approval procedures for New Drugs.	Regulatory requirements, Approval procedures for New Drugs.	01	Oct 2022
Total Hrs.		**45**				**22**	

Note: 1) First two unit & three topics of third unit workload------- Mr.G.S.Patil
2) Third Units remaining topics & last two unit workload ------ Mrs. R.S.Sonawane

Subject In charge
Mrs. Rajeshwari S.Sonawane

Academic In charge
Mr.T.D.Fegade

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Teaching Plan (Theory)

Academic Year: 2021-22
Semester: II[nd] (Even Sem)

Sub: Pathophysiology (Th) Year:F. Y. B. Pharm (II Sem)Total Hrs Prescribed (NMU): 3 Hrs/Week (45)

Sr. No.	Topic Details (NMU)	Alloted Hrs. (NMU)	Preparation/ Materials/ Resources	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date (Week/Month)
01	**UNIT-I** **Basic Principle of Cell Injury and Adaptation**: Introduction, Definition, Homeostasis, Component and Types of Feedback System, Causes of Cell Injury, Pathogenesis (Cell membrane damage and mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis	10	1. Dr. C. M. Jangme, R. D. Wadulkar "Pathophysiology" 1st Edition, Nirali Prakashan, Pune, Jan 2018 2. Atish A. Salunkhe, Dr. Md. Rageeb Md. Usman, "Pathophysiology" 1st Edition, India, PV books, Oct. 2019 3. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010 4. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th	**Introduction of cell injury**	Definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury	01	April 2022
				Pathogenesis of Cell Injury	Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage	01	April 2022
				Morphology of cell injury, Adaptive changes	Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia.	01	April 2022
				Cell swelling, Intra cellular accumulation, Calcification	Definition Introduction of cell swelling, Intra cellular accumulation substances, Definition and theory of Calcification	01	April 2022
				Enzyme leakage and Cell Death Acidosis &Alkalosis, Electrolyte imbalance	Definition and theory Introduction Enzyme leakage, Cell Death Acidosis, Alkalosis and Electrolyte imbalance	01	April 2022
				Introduction, Clinical signs of inflammation	Introduction, theory of Clinical signs of inflammation	01	April 2022

	&Alkalosis, Electrolyte imbalance **Basic mechanism involved in the process of inflammation and repair:** Introduction, Clinical signs of inflammation, Different types of Inflammation ,Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of Atherosclerosis		edition; New York; McGraw-Hill; 2011.	**Different types of Inflammation Mechanism of Inflammation**	Details about Different types of Inflammation, Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation	02	April 2022
				Wound healing	Principles and theory of wound healing in the skin	01	April 2022
				Atherosclerosis	Introduction, Etiology, Pathophysiology, symptoms of Atherosclerosis	01	April 2022
02	**UNIT – II** **Cardiovascular System:** Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis). **Respiratory system:** Asthma, Chronic obstructive airways diseases. **Renal system:** Acute and chronic renal failure	10	1. Dr. C. M. Jangme, R. D. Wadulkar "Pathophysiology" 1st Edition, Nirali Prakashan, Pune, Jan 2018 2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010 3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis	**Hypertension**	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of Hypertension	01	April 2022
				Congestive heart failure	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of CHF	01	April 2022
				Ischemic heart disease	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of angina, myocardial infarction, arteriosclerosis	02	April 2022
				Asthma, Chronic obstructive airways diseases	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of Asthma, Chronic obstructive airways diseases	03	May 2022

			of Therapeutics; 12th edition; New York; McGraw-Hill; 2011	**Renal system**	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of Acute and chronic renal failure	03	May 2022
03	**UNIT – III** **Haematological Diseases:** Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalassemia, hereditary acquired anemia, hemophilia **Endocrine system:** Diabetes, thyroid diseases, disorders of sex hormones **Nervous system:** Epilepsy, Parkinson's disease, And stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease. **Gastrointestinal system:** Peptic Ulcer	10	1. Dr. C. M. Jangme, R. D. Wadulkar "Pathophysiology" 1st Edition, NiraliPrakashan, Pune, Jan 2018 2.Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010 3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011 4. Atish A. Salunkhe, Dr. Md. Rageeb Md. Usman, "Pathophysiology" 1st Edition, India, PV books, Oct. 2019	**Haematological Diseases**	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of Iron deficiency, megaloblastic anemia (Vit B12 and folic acid) sickle cell anemia, thalassemia, hereditary acquired anemia, hemophilia	03	May 2022
				Endocrine system	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of Diabetes And Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of thyroid diseases, disorders of sex hormones	03	May 2022
				Nervous system	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of Epilepsy, stroke.	01	May 2022
					Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of Epilepsy, Parkinson's disease, depression, schizophrenia and Introduction, Etiology, Alzheimer's disease.	02	May 2022
				Gastrointestinal system	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of Peptic Ulcer	01	May 2022

04	**Unit IV** **Inflammatory bowel diseases:** jaundice, hepatitis (A, B, C, D, E, F) alcoholic liver disease. **Disease of bones and joints:** Rheumatoid arthritis, osteoporosis and gout **Principles of cancer:** classification, etiology and pathogenesis of cancer	08	1. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010 2. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011	**Inflammatory bowel diseases**	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of jaundice, hepatitis (A, B, C, D, E, F) alcoholic liver disease.	03	May 2022
				Disease of bones and joints	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of Rheumatoid arthritis, osteoporosis and gout	03	May 2022
				Principles of cancer	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance cancer, Classification of Cancer	02	May 2022
05	**Unit V** **Infectious diseases:** Meningitis, Typhoid, Leprosy, Tuberculosis **Urinary tract infections** **Sexually transmitted diseases:** AIDS, Syphilis, Gonorrhea	07	1. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010 2. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011	**Infectious diseases**	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance Meningitis, Typhoid, Leprosy, Tuberculosis	03	June 2022
				Urinary tract infection	Introduction, Etiology, Classification Pathophysiology, symptoms, Clinical significance Urinary tract infections	01	June 2022
				Sexually transmitted diseases: AIDS, Syphilis, Gonorrhea	Introduction, Etiology, Pathophysiology, symptoms, Clinical significance of AIDS, Syphilis, Gonorrhea	03	June 2022
	Total Hrs.	**45**	**Total Hrs.**			**45**	

Subject In charge
Mrs. S.M. Valvi

Academic In charge
Mr. T.D. Fegade

HOD
Mr. M.A. Chaudhari

ACA /DI/09
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Teaching Plan (Practical)

Academic Year: 2021-2022
Semester: I[st](Odd)

Sub:Pharmaceutical Analysis (P) **Year: F.Y. B. Pharm (Sem- I)** **Total Hrs Prescribed (KBCNMU): 4Hrs/Batch/Week (45)**

Minimum 12 Experiments should be covered

Sr. No.	Practical Details (KBCNMU)	Allotted Hrs. (KBCNMU)	Preparation/ Materials/ Resources	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date (Week/Month)
01	**LimitTestofthefollowing** ❖ Chloride ❖ Sulphate ❖ Iron ❖ Arsenic	**4Hours/ Week**	1.Dr. Puspendrakumar, A Practical book of "Pharmaceutical Analysis", First edition, July 2015,Nirali prakashan, Pune. 2.Dr.S.B.Bari,Dr.L. V.Sonawane ,"Practical Handbook of Pharmaceutical Analysis", Third edition, Sep 2015,Nirali prakashan, Pune.	❖ Chloride	➢ Explain Test ➢ Preparation of Solutions ➢ Test ➢ Observation ➢ Result	04	16/12/2021 A Batch 17/12/2021 B Batch 18/12/2021 C Batch
				❖ Sulphate	➢ Explain Test ➢ Preparation of Solutions ➢ Test	04	23/12/2021 A Batch 17/12/2021 B Batch 18/12/2021 C Batch

					➢ Observation ➢ Result		
				❖ Iron	➢ Explain Test ➢ Preparation of Solutions ➢ Test ➢ Observation ➢ Result	04	30/12/2021 A Batch 24/12/2021 B Batch 31/12/2022 C Batch
				❖ Arsenic	➢ Explain Test ➢ Preparation of Solutions ➢ Test ➢ Observation ➢ Result	04	06/01/2022 A Batch 24/12/2021 B Batch 01/01/2022 C Batch
02	**Preparationandstandardizationof** ❖ Sodium hydroxide	**4Hours/ Week**	1.Dr. Puspendrakumar, A Practical book of "Pharmaceutical	❖ Sodium hydroxide	➢ Preparation of Solutions ➢ Reaction Explain	04	13/01/2022 A Batch 31/12/2022 B Batch 01/01/2022 C Batch

	❖ Sulphuric acid ❖ Potassium permanganate ❖ Hydrochloric Acid		Analysis", First edition, July 2015,Nirali prakashan, Pune. 2.Dr.S.B.Bari, Dr.L.V.Sonawane ,"Practical Handbook of Pharmaceutical Analysis", Third edition, Sep 2015,Nirali prakashan, Pune.		➢ Standardization Procedure ➢ Observation ➢ Calculation ➢ Result		
				❖ Sulphuricacid	➢ Preparation of Solutions ➢ Reaction Explain ➢ Standardisation Procedure ➢ Observation ➢ Calculation ➢ Result	04	*20/01/2022 A Batch* *07/01/2022 B Batch* *08/01/2022 C Batch*
				❖ Potassium permanganate	➢ Preparation of Solutions ➢ Reaction Explain ➢ Standardization Procedure	04	27/01/2022 A Batch 14/01/2022 B Batch 15/01/2022 C Batch

					➢ Observation ➢ Calculation ➢ Result		
				❖ Hydrochloric Acid	➢ Preparation of Solutions ➢ Reaction Explain ➢ Standardization Procedure ➢ Observation ➢ Calculation ➢ Result	04	10/02/2022 A Batch 21/02/2022 B Batch 22/01/2022 C Batch
03	**Determination of Normality by electro-analytical methods** ❖ Conductometric titration of strong acid against strong base ❖ Conductometrictit	**4Hours/ Week**	1.Dr. Puspendrakumar, A Practical book of "Pharmaceutical Analysis", First edition, July 2015,Nirali prakashan, Pune. 2.Dr.S.B.Bari,Dr.L. V.Sonawane ,"Practical	❖ Conductometric titration of strong acid against strong base	➢ Preparation of Solutions ➢ Reaction Explain ➢ Standardisation Procedure ➢ Observation ➢ Calculation	04	17/02/2022 A Batch 28/02/2022 B Batch 29/02/2022 C Batch

	ration of strong acid and weak acid against strong base		Handbook of Pharmaceutical Analysis", Third edition, Sep 2015,Nirali prakashan, Pune		➢ Result		
				❖ Conductometric titration of strong acid against strong base	➢ Preparation of Solutions ➢ Reaction Explain ➢ Standardisation Procedure ➢ Observation ➢ Calculation Result	04	24/02/2022 A Batch 11/02/2022 B Batch 11/02/2022 C Batch
04	**Assay of the following compounds along with Standardization of Titrant** ❖ Ferrous Sulphate ❖ Hydrogen peroxide by Permanganometry	**4Hours/ Week**	1.Dr. Puspendrakumar, A Practical book of "Pharmaceutical Analysis", First edition, July 2015,Nirali prakashan, Pune. 2.Dr.S.B.Bari, Dr.L.V.Sonawane ,"Practical	❖ Ferrous Sulphate	➢ Preparation of Solutions ➢ Reaction Explain ➢ Standardization Procedure For Titrant ➢ Assay Procedure ➢ Observation	04	03/03/2022 A Batch 18/02/2022 B Batch 12/02/2022 C Batch

			Handbook of Pharmaceutical Analysis", Third edition, Sep 2015,Nirali prakashan, Pune.		➢ Calculation ➢ Result		
				❖ Hydrogen peroxide by Permanganometry	➢ Preparation of Solutions ➢ Reaction Explain ➢ Standardisation Procedure For Titrant ➢ Assay Procedure ➢ Observation ➢ Calculation Result	04	03/03/2022 A Batch 25/02/2022 B Batch 26/02/2022 C Batch

Subject In charge
Mrs. S. M. Valvi

Academic In charge
Mr. T. D. Fegade

HOD
Dr. K. R. Patil

ACA /DI/08
Rev : 00
Date: 20.12.2017

Teaching Plan (Theory)

Academic Year: 2020-21
Semester: IV

Sub: BP 403 T Physical Pharmaceutics-II **Year: Second Year B. Pharm (SEM IV)** **Total Hrs Prescribed (NMU): 3 Hrs/Week (45)**

UNIT	Topic Details (NMU)	Allotted Hrs. (NMU)	Preparation/ Materials/ Resources/ References	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date (Week/ Month)
UNIT-I	**Colloidal dispersions**	07 Hours	1) Patric J Sinko, Yashveer Singh, Martins Physical Pharmacy and Pharmaceutical Sciences, Sixth Edition, Wolters Kluwer India Pvt Ltd, Gurgaon, 2011 2) Arun Bahl, B.S.Bahl, G.D.Tuli, Essentials of Physical Chemistry, Revised edition 2012, S.Chand & Company Ltd 3)) C.V.S. Subrahmanyam, Textbook of Physical Pharmaceutics, 11 repeint2012, Vallabh Prakashan, Delhi	Classification of dispersed systems & their general characteristics,	Understanding key concept of disperse system, types of colloidal dispersion.	01	Feb 2021
				size & shapes of colloidal particles,	Understand the size shape of colloidal partials	01	Feb 2021
				classification of colloids .	Lyophillic colloids, Lyophobic colloids, Association colloids	01	March 2021
				comparative account of general properties of colloids	Comparison of properties of colloidal sols.	01	March 2021
				Optical, kinetic properties.	Understanding the main optical properties of colloids. The Faraday – Tyndall effect, Electron Microscope, Light scattering, light scattering and micelle molecular weight. Understanding of Kinetic properties, Brownian motion, Diffusion, Osmotic pressure, Sedimentation, Viscosity.	01	March 2021
				Electrical properties.	Understanding Electro kinetic phenomena, Electro osmosis, electrophoresis, sedimentation potential, streaming potential.	01	March 2021

					Donnan membrane equilibrium,		
				Effect of electrolytes, coacervation, Effect of peptization& protective action.	Stability of colloidal system, Sensitization and protective colloidal action, Pharmaceutical application of colloids.	01	March 2021
UNIT-II	**Rheology Deformation of solids**	10 Hours	1) Patric J Sinko, Yashveer Singh, Martins Physical Pharmacy and Pharmaceutical Sciences, Sixth Edition, Wolters Kluwer India Pvt Ltd, Gurgaon, 2011 2) Arun Bahl, B.S.Bahl, G.D.Tuli, Essentials of Physical Chemistry, Revised edition 2012, S.Chand & Company Ltd 3)) C.V.S. Subrahmanyam, Textbook of Physical Pharmaceutics, 11 repeint2012, Vallabh Prakashan, Delhi	Newtonian systems, law of flow	Understanding and defining the following concept Newton's law of flow and its application.	01	March 2021
				kinematic viscosity, effect of temperature, non-Newtonian systems,	Explaining the Kinematic viscosity, Temperature dependence and the theory of viscosity.	01	March 2021
				Pseudoplastic flow	Discussion of Non Newtonian system, plastic flow	01	March 2021
				dilatant, plastic,	Discussion of Non Newtonian system, Pseudoplastic flow, Dilatent flow.	01	March 2021
				thixotropy, thixotropy in formulation,	Defining the concept of Thixotropy, measurement of Thixotropy, bulges and spurs, negative Thixotropy, Thixotropy in formulation.	01	March 2021
				determination of viscosity,	Explaining the practical determination of rheological properties and describe of viscometer.	01	March 2021
				capillary, falling Sphere Viscometer.	Principle working and application of capillary, falling Sphere Viscometer.	01	March 2021
				rotational viscometers	Principle working and application of rotational viscometers	01	March 2021
				Plastic and elastic deformation	Discussion of the differences between continuous or steady shear	01	March 2021

					rheometry and creep measurement in determine the consistency of viscoelastic material.		
				Heckel equation Stress, Strain, Elastic Modulus	Detail discussion of Heckel equation Stress, Strain, Elastic Modulus.	01	March 2021
UNIT-III	**Coarse dispersion**	10 Hours	1) Patric J Sinko, Yashveer Singh, Martins Physical Pharmacy and Pharmaceutical Sciences, Sixth Edition, Wolters Kluwer India Pvt Ltd, Gurgaon, 2011 2) Arun Bahl, B.S.Bahl, G.D.Tuli, Essentials of Physical Chemistry, Revised edition 2012, S.Chand & Company Ltd 3)) C.V.S. Subrahmanyam, Textbook of Physical Pharmaceutics, 11 repeint2012, Vallabh Prakashan, Delhi	Suspension,	Describing what pharmaceutical suspensions are and what roles they play in pharmaceutical sciences.	01	March 2021
				interfacial properties of suspended particles	Discussion of interfacial properties of suspended particles	01	March 2021
				settling in suspensions, formulation of flocculated and deflocculated suspensions	Discussion of theory of sedimentation, effect of Brownian movement, sedimentation of flocculated particles, sedimentation parameters, wetting of particles, controlled flocculation, flocculation in structured vehicle, rheological consideration, preparation of suspension, physical stability of suspension.	01	April 2021
				Emulsions and theories of emulsification	Defining the pharmaceutical emulsion, emulsifying agent, discussion of monomolecular adsorption, multimolecular adsorption, film formation, solid particle adsorption theories of emulsification.	01	April 2021
				micro emulsion and multiple emulsions	Difference between micro emulsion and multiple emulsions	01	April 2021
				Stability of	Explaining the concept of	01	April

				emulsions	instability of emulsions as flocculation and creaming, coalescence and breaking, miscellaneous physical and chemical changes, phase inversion.		2021
				preservation of emulsions	Discussion of preservation of emulsions	01	April 2021
				rheological properties of emulsions	Discussion of rheological properties of emulsions	01	April 2021
				emulsion Formulation by HLB method.	Discussion of HLB scale, HLB and RHLB value in the formulation of emulsion.	01	April 2021
						01	April 2021
UNIT-IV	**Micromeretics**	10 Hours	1) Patric J Sinko, Yashveer Singh, Martins Physical Pharmacy and Pharmaceutical Sciences, Sixth Edition, Wolters Kluwer India Pvt Ltd, Gurgaon, 2011 2) Arun Bahl, B.S.Bahl, G.D.Tuli, Essentials of Physical Chemistry, Revised edition 2012, S.Chand & Company Ltd 3)) C.V.S. Subrahmanyam, Textbook of Physical Pharmaceutics, 11 repeint2012, Vallabh Prakashan, Delhi	Particle size and distribution	Explaining the concept of particle size as it implies to the pharmaceutical sciences	01	April 2021
				mean particle size, number and weight distribution,	Explaining mean particle size, number and weight distribution	01	April 2021
				particle number	Discussion of particle number	01	April 2021
				methods for determining particle size by different methods	Explaining the Optical microscopy, sieving method.	01	April 2021
				Counting and separation method particle shape, specific surface.	Explaining the Anderson apparatus, Coulter counter.	01	April 2021
				methods for determining surface area	Discussion of methods for determining surface area.	01	April 2021
				permeability, adsorption	Explanation of Adsorption method and air permeability method.	01	May 2021
				derived properties of powders, porosity,	Discussion of derived properties of powders, porosity	01	May 2021

				packing arrangement, densities,	Discussion of packing arrangement	01	May 2021
				bulkiness & flow properties.	Discussion of bulkiness & flow properties.	01	May 2021
UNIT-V	**Drug stability**	10 Hours		Reaction kinetics: zero, pseudo-zero, first & second order units of basic rate constants	Defining rate , reaction order and Molecularity. Rate constants, half life, shelf life, zero, pseudo-zero, first & second order units of basic rate constants	01	May 2021
				determination of reaction order	Explaining the substitution method, graphical method, half life method.	01	May 2021
				Physical and chemical factors influencing the chemical degradation of pharmaceutical product	Discussion of Physical and chemical factors influencing the chemical degradation of pharmaceutical product	01	May 2021
				temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis,	Explaining the effect of temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis,	01	May 2021
				Simple numerical problems.	Solving Simple numerical problems.	01	May 2021
				Stabilization of medicinal agents against common reactions like hydrolysis & oxidation.	Discussion stability of pharmaceuticals including the decomposition and stabilization of medicinal agents.	01	May 2021
				Accelerated stability testing in expiration dating of pharmaceutical dosage forms	Details discussion of Accelerated stability testing in expiration dating of pharmaceutical dosage forms.	01	May 2021
				Photolytic	Details discussion of	01	May

				degradation and its prevention	Photolytic degradation and its prevention		2021
Total		45	**Total**			45	

Subject In charge
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ACA /DI/09
Rev : 00
Date: 20.12.2017

Teaching Plan (Practical)

Academic Year: 2020-21

Semester: III

Date of Preparation:-18/06/2020

Physical Pharmaceutics Pharmaceuticas –I (BP306P) **Year : Second Yr B. Pharm (III Sem)** **Total Hrs Prescribed (NMU): 4 Hrs**

Sr. No.	Topic Details (NMU)	Allotted Hrs. (NMU)	Preparation/ Materials/ Resources/ References	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date
1	Determination of the solubility of drug at room temperature	4 Hrs	Practical Physical Pharmacy by Dr. H. N. More and A. A. Hajare CAREER Publication, NashikSecond Edition Reprint August 2010 Experimental Physical Pharmacy by Dr. Derle D. V. ADHIRAJ PUBLICATIONS, Nashik, First Edition 2005 A Handbook of Practical Physical Pharmacy and Practical Physical Pharmaceutics by Dr. U. B. Hadkar, NIRALI PRAKASHAN, Pune,Nine Edition April 2016 Laboratory Manual of Physical Pharmacy by CVS Subrahmanyam, SG Vasantharaju,Delhi VALLABH PRAKASHAN, Second Edition Reprint 2013 Experimental Physical	To determine the solubility of Paracetamol phosphate buffer pH 5.8 at room temperature.	1) Preparation of phosphate buffer pH 5.8 2) Measuring the absorbance on UV spectroscopy of various concentrations of Paracetamol prepared by dilution method. 3) Plotting of Calibration curve. 4) Excess of drug is dissolved in solvent and shaken for overnight at same temperature. 5) Solubility was determined by UV spectroscopy.	04	Batch B,C.D,A. July 2020
2	Determination of pKa value by Half Neutralization/ Henderson Haselbalch equation.			To Determination of pKa value by Half Neutralization/ Henderson Haselbalch equation.	1) Preparation of 1 M Acetic acid and 1M Sodium Hydroxide 2) Perform the Conductometric titration of 1M Sodium Hydroxide with 1 M Acetic acid 3) Note down the pH of half titrated solution. 4) Determine the pKa	04	Batch B,C.D,A. July 2020
3	Determination of Partition co-efficient of benzoic acid in benzene and water.			To Determination of Partition co-efficient of benzoic acid in benzene and water	1) Preparation of 0.1 N NaOH and 0.01 N NaOH 2) Preparation of 4%w/v , 6%w/v , 10%w/v Benzoic Acid solution 3) Add the specific proportion of Benzoic acid solution and water and shake for 30 minutes. 4) Perform the titrations of aqueous and organic layer. 5) Calculate the normality and concentration of benzoic acid in aqueous and organic layer. 6) Calculate the partition coefficient.		Batch B,C.D,A. July 2020

4	Determination of Partition co-efficient of Iodine in CCl_4 and water.	4 Hrs	Pharmacy by Dr. Derle D. V. ADHIRAJ PUBLICATIONS, Nashik, First Edition 2005 A Handbook of Practical Physical Pharmacy and Practical Physical Pharmaceutics by Dr. U. B. Hadkar, NIRALI PRAKASHAN, Pune,Nine Edition April 2016	To Determination of Partition co-efficient of Iodine in CCl_4 and water	1) Preparation of 0.1 N Sodium Thiosulphate and 0.01 N Sodium Thiosulphate 2) Preparation of saturated solution of Iodine in CCl_4 3) Add the specific proportion of saturated solution of Iodine in CCl_4, $CCl_4$and water and shake for 30 minutes. 4) Perform the titrations of aqueous and organic layer. 5) Calculate the normality and concentration of Iodine in aqueous and organic layer. 6) Calculate the partition coefficient.	04	Batch B,C.D,A. July 2020
5	Determination of surface tension of given liquid by drop count method.& by drop weight method.	4 Hrs	Physical Pharmaceutics-I Experimental Lab Manual of by Dr. Jaypal Reddy Gangadi, , 2018 Edition, S. Vikas & Company Medical Publishar, Jalandhar 144008	To Determination of surface tension of given liquid by drop count and drop weight method.	Drop Count method 1) Determine the density of water, given unknown liquid sample by using specific gravity bottle. 2) Count the number of drops for water and given unknown liquid sample by using Stalagmometer. Drop Weight Method 1) Calculate the Surface Tension by using formula. 2) Collect the 20 drops of water and given unknown liquid. Weigh and find the weight. 3) Calculate the Surface Tension by using formula.	04	Batch B, C, D July 2020 Batch A Aug 2020
6	Determination of critical micelle concentration of surfactant.	4 Hrs		To Determination of critical micelle concentration of surfactant.	1) Preparation of 0.1 mg/ml to 1 mg/ml of SLS solutions by dilution method. 2) Determine the density for each concentration. 3) Determine number of drops for each sample by using Stalagmometer. 4) Calculate surface tension for each concentration. 5) From graphical study calculate the CMC of given surfactant.	04	Batch B,C.D,A. Aug 2020
7	Determination of %	4 Hrs		To Determination of %	1) Preparation of 0.1 N Nacl	04	

	composition of NaCl in a solution using phenol water system by CST method			composition of NaCl in a solution using	2) As per table Volume of Phenol, Volume of 0.1 N Nacl, Volume of water is added 3) Transition temperature is determined. 4) From graph the % composition of Nacl in a phenol water system by CST method is determined.		Batch B,C.D, Aug 2020 Batch A. Sep 2020
8	Determination of HLB number of a surfactant by saponifiction method.	4 Hrs		To Determination of HLB number of a surfactant by saponifiction method.	1) Preparation of 0.5N ethanolic KOH, 0.5 N HCl , 0.1 N NaOH 2) Determination of Saponification Number of Glyceryl monosterate. 3) Determination of Acid Number of Steraic acid Calculate HLB value by using formula.		Batch B,C.D Aug 2020 Batch A. Sep 2020
9	Determination of Freundlich and Langmuir constant using activated charcoal.	4 Hrs		To Determination of Freundlich and Langmuir constant using activated charcoal.	1) Preparation of 1 M CH_3COOH, 0.2M NaOH 2) Prepare the mixtures as per table. 7) Perform the titrations with 0.02M NaOH 3) Calculate the actual concentration of acetic acid before adsorption in flask 1 to 6 4) Calculate the actual concentration of acetic acid after adsorption in flask 1 to 6 5) Determine the substance amount of acetic acid adsorbed per gram of the charcoal in each flask. 6) Graphically calculate K and Amax	04	Batch B,C.D, A. Sep 2020
10	Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method.	4 Hrs		To Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method.	1) Add varying amount of Caffeine (0 to 1.4 gm) in different volumetric flask. 2) To each flask add 0.255 gm PABA 3) Shake the flask to reach equilibrium. 4) Determine the concentration of Benzoic acid by UV method. 5) Use the plot of molar concentration of PABA Vs Caffeine to determine complex.	04	Batch B,C.D, A. Sep 2020

11	Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method.	4 Hrs		To Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method.	1) Prepare 0.2 M NaOH solution, 0.0334 mole/lit glycine solution, 0.00945 moles/lit cupric ion solution 2) Dip the electrode in 75 ml glycine solution and add NaOH from burette. 3) Note down the change in pH 4) Dip the electrode in 75 ml glycine solution+Cupric ion solution and add NaOH from burette. 5) Note down the change in pH 6) Plot the graph of both the titrations as pH against equivalent base added. 7) From calculation determine the stability complex.	04	Batch B,C.D. Sep 2020 Batch A. Oct 2020

Subject In charge
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ACA /DI/09
Rev : 00
Date: 20.12.2017

Teaching Plan (Practical)

Academic Year: 2019-20
Semester: VII

Sub : Pharmaceutical Chemistry – VIII (Medicinal Chemistry - III) P 4.7.2 **Year : Final Year B. Pharm (VII Sem)**

Total Hrs Prescribed (NMU): 3 Hrs/Batch/Week (45)

Minimum 12 Experiments Should covered

Sr. No.	Practical Details (NMU)	Alloted Hrs. (NMU)	Preparation/ Materials/ Resources	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date (Week/Month)
01	Purification techniques of solvents/liquids by Fractional distillation and distillation under vacuum	03	1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Jul. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Submission of Product and Viva	Submission of product and viva		
02	Synthesis of benzil from benzoin*	03	1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Jul. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		

				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
03	Synthesis of hydantoin from benzil*		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Jul. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
04	Synthesis of Toluene –p-sulphonate from toluene –p-sulphonil chloride		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Jul. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Procurement of apparatus	Detail of procedure		

				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
05	Synthesis of Dichloramine –T From Toluene –p-sulphonate		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Jul. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
06	Synthesis of Chloramine – T from Dichloramine –T **		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Aug. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		

07	Preparation of Iso-Nicotinic acid (oxidation of picoline with potassium permanganate)*		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Aug. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
08	Synthesis of 2-Phenylindole* Cyclization reactions		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Aug. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		

				Submission of Product and Viva	Submission of product and viva		
09	Synthesis of Benzophenone**(Friedal craft acylation		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Aug. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
10	Synthesis of Acetoacetanilide*		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Sept. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
11	Synthesis of 1, 2, 4-triazole**		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Sept. 2019
				Procurement of	Detail of procedure		

			3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	apparatus			
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
12	Synthesis of Benzimidazole from o-phenylenediamine*		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Sept. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
13	synthesis of nbutylacetate from n-butanol and acetic acid (Esterification)	03	1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Sept. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		

				Submission of Product and Viva	Submission of product and viva		
14	Synthesis of PABA from p nitrobenzoic acid (Reduction reaction)	03	1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Oct. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
15	Synthesis of Phenytoin**	03	1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Oct. 2019
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		

Subject In charge
Mrs. N.A. Porwar

Academic In charge
Mr. T. D. Fegade

HOD
Mr. K. R. Patil

ACA /DI/08
Rev : 00
Date: 20.12.2017

Teaching Plan (Theory)

Academic Year: 2019-20

Semester:

Year: Third Year B. Pharm (V Sem.)

Sub: Medicinal Chemistry - II BP501T

Total Hrs. Prescribed (NMU): 3 Hrs/Week (45)

Sr. No.	Topic Details (NMU)	Allotted Hrs. (NMU)	Preparation/ Materials/ Resources	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date (Week/Month)
	UNIT I						
01	**Antihistaminics agents** H1 antagonist Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines cuccinate, Clemastine fumarate, Diphenylphyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Buclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*, Phenidamine tartarate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium H2 antagonist Cimetidine*, Famotidine,	05	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. . Structure-activity relationship, Pharmacokinetics (Metabolism) and Therapeutic uses-Foye's Principles of Medicinal Chemistry, 3. Synthesis of Drugs Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 4. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical chemistry.	Introduction, Classification of histamine and Classification of H1 antagonist	Introduce of histamine, Classify H1 receptor antagonist drug in detail with structure	1	Jul. 2019
				Mechanism of action, SAR, Metabolism of H1 antagonist	Explain mode of action of drugs with said drugs in the syllabus, Draw basic structure and explain role of different functional group and their activity and its Metabolism	1	Jul. 2019
				Therapeutic uses, Synthesis of H1 antagonist drugs	Explain their pharmacological uses. Synthesis of drugs given in syllabus. Assignment I	2	Jul. 2019
				Introduction and explain in detail about H2 antagonist	Structure, Mechanism of action, SAR, Metabolism and synthesis of H2 antagonist	1	Jul. 2019

	Ranitidine. Gastric proton pump inhibitors : omeprazole, lansoprazole, Rabeprazole, Pantoprazole,			Introduction and explain in detail about Gastric proton pump inhibitors	Structure, Mechanism of action, SAR, Metabolism of Gastric proton pump inhibitors	1	Jul. 2019
02	**Anti-neoplastic agents:** **Alkylating agents:** Meclorethamine*, Cyclophosphamide, Melphalan Chlorambucil, Busulfan, Thiotepa **Antimetabolites:** Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate*, Azathioprine **Antibiotics:** Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin **Plant products:** Etoposide, Vinblastin sulphate, Vincristin sulphate **Miscellaneous:** Cisplatin, Mitotane.	05	1. Introduction, Classification and Mechanism of action- AshutoshKar, New Age International Publishers, 2. Structure-activity relationship, Pharmacokinetics (Metabolism) and Therapeutic uses-Foye's Principles of Medicinal Chemistry, 3. Synthesis of Drugs Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 4. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical chemistry.	Introduction, Classification, Mechanism of action	Introduce and Classify it on the basis of mode of action and chemical wise. Explain its mode of action.	02	Jul. 2019
				SAR, ADME and Uses	Draw the structure with functional group active for different activity and their absorption, Distribution, Metabolism and Excretion also their therapeutic uses.	02	Jul. 2019
				Synthesis of Drugs	Synthesis of different drug with their mechanism of action Assignment II	02	Jul. 2019
UNIT II							

03	**Anti-anginal**: **Vasodilators:** Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrite*, Dipyridamole. **Calcium channel blockers:** Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.	02	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical	Introduction and Classification	Introduce of diuretics and Classification of drugs on the basis of MOA, Duration of action and Chemical basis	01	Jul. 2019
				Mechanism of action SAR nd Synthesis and uses	Explain mode of action of drugs with said drugs, SAR and Synthesis of said drug in the syllabus. Assignment III	03	Jul. 2019
04	**Diuretics:** Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide. Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Loop diuretics: Furosemide*, Bumetanide, Ethacrynic acid. Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride. Osmotic Diuretics: Mannitol	04	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical 3. Medicinal Chemistry, AshutoshKar 4. Textbook of Pharmaceutical Chemistry by Harkishansing&Kapoor 5. Pandya, Introduction of Chemistry	Introduction and Classification	Introduce of diuretics and Classification of drugs on the basis of MOA, Duration of action and Chemical basis Assignment IV	02	Aug. 2019
				Mechanism of action	Explain mode of action of drugs with said drugs in the syllabus.	01	Aug. 2019
				SAR	Draw basic structure and explain role of different functional group and their activity	01	Aug. 2019
				ADME, Therapeutic Uses	Discuss details about absorption, Distribution, Metabolism and Excretion of drugs, Explain their pharmacological uses. Assignment V	02	Aug. 2019
05	**Anti-hypertensive Agents**: Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril	04	1. Ashutosh Kar, New Age International Publishers and Textbook of Medicinal Chemistry, MalleshappaN.Noolvi /	Introduction, Classification	Introduce and Classification of its drugs.	02	Aug. 2019

	hydrochloride, Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide,Minoxidil, Reserpine, Hydralazine hydrochloride		Anurekha Jain / HarunM.Patel 2. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 3. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical	Mechanism of action, SAR, Pharmacokinetics (Metabolism)	Explain mode of action of drugs with said drugs in the syllabus, Draw basic structure and explain role of different functional group and their activity, Discuss details about absorption, Distribution, Metabolism and Excretion of drugs	01	Aug. 2019
				Therapeutic uses, Synthesis of drugs	Explain their pharmacological uses. Synthesis of drugs given in NMU syllabus. Assignment VI	02	Aug. 2019
	UNIT III						
06	**Anti-arrhythmic Drugs**: Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcainide hydrochloride, Amiodarone, Sotalol.	06	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical 3. Medicinal Chemistry, AshutoshKar 4. Textbook of Pharmaceutical Chemistry by Harkishansing&Kapoor 5. Pandya, Introduction of Chemistry 6. Website information	Introduction	Introduction of pain and its causes	01	Aug. 2019
				Classification and Mechanism of action	Classify the drug with their line of action and then mode of action of drug.	01	Aug. 2019
				SAR	Structure of all category with different functional group give its numbering and nomenclature and its activity relationship,	01	Aug. 2019
				ADME	Details about its absorption, Distribution, Metabolism and Excretion.	01	Aug. 2019
				Therapeutic uses, Synthesis of drugs	Give detail introduction, reason, type, pattern of splitting with examples. Assignment VII	02	Sept 2019
07		02	1. Principle of Medicinal	Introduction	Introduction non steroid drugs	01	Sept 2019

	Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol		Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook of organic medicinal and pharmaceutical 3. Medicinal Chemistry, AshutoshKar 4. Textbook of Pharmaceutical Chemistry by Harkishan sing & Kapoor 5. Pandya, Introduction of Chemistry 6. Website information 7. Presentation and videos	Classification and Mechanism of action	Classify the drug with their line of action and then mode of action of drug.	02	Sept 2019
				SAR and ADME	Structure of all category with different functional group give its numbering and nomenclature and its activity relationship, Details about its absorption, Distribution, Metabolism and Excretion.	02	Sept 2019
				Therapeutic uses, Synthesis of drugs	Give detail introduction, reason, type, pattern of splitting with examples.	01	Sept 2019
08	**Coagulant & Anticoagulants**: Menadione, Acetomenadione, Warfarin*, Anisindione, clopidogrel	01	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook of organic medicinal and pharmaceutical	Introduction In detail	Classification and Mechanism of action , SAR, ADME Therapeutic uses, Synthesis of drugs	01	Sept 2019
09	**Drugs used in Congestive Heart Failure:** Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.	01	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook of organic medicinal and pharmaceutical	Introduction In detail	Mechanism of action , SAR, ADME and Therapeutic uses	01	Sept 2019
	UNIT IV						
10	**Drugs acting on Endocrine system** Nomenclature, Stereochemistry and metabolism of steroids	02	1. Principle of Medicinal	Introduction In detail about Endocrine system	Nomenclature, Stereochemistry and metabolism of steroids	02	Sept 2019

11	**Sex hormones**: Testosterone, Nandralone, Progestrones, Oestriol, Oestradiol, Oestrione, Diethyl stilbestrol	02	Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook of organic medicinal and pharmaceutical 3. Medicinal Chemistry, Ashutosh Kar 4. Textbook of Pharmaceutical Chemistry by Harkishan sing & Kapoor 5. Pandya, Introduction of Chemistry 6. Website information 7. Presentation and videos	Introduction In detail about Sex hormones	Types of Sex Hormone, biosynthesis, structure, nomenclature, classification MOA, SAR, ADME and therapeutic uses Assignment VIII	03	Sept 2019
12	**Drugs for erectile dysfunction:** Sildenafil, Tadalafil.	01		Introduction In detail about erectile dysfunction	Defination, MOA, Structure, ADME and therapeutic uses	01	Sept 2019
13	**Oral contraceptives:** Mifepristone, Norgestril, Levonorgestrol	01		Introduction In detail about Oral contraceptives	Defination, MOA, Structure, ADME and therapeutic uses	01	Oct. 2019
14	**Corticosteroids:** Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone	01		Introduction In detail about Corticosteroids:	Defination, Classification, MOA, Structure, ADME and therapeutic uses	01	Oct. 2019
15	**Thyroid and antithyroid drugs**: L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole	01		Introduction In detail about Thyroid and antithyroid drugs	Defination, Classification, MOA, Structure, ADME and therapeutic uses	01	Oct. 2019
	UNIT V						
16	**Antidiabetic agents:** Insulin and its preparations Sulfonyl ureas: Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride. Biguanides: Metformin. Thiazolidinediones: Pioglitazone, Rosiglitazone. Meglitinides: Repaglinide, Nateglinide. Glucosidase inhibitors: Acrabose,	03	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical 3. Medicinal Chemistry, AshutoshKar 4. Textbook of Pharmaceutical	Introduction Classification and Mechanism of action	Introduction, Classify the drug with their line of action and then mode of action of drug.	01	Oct. 2019
				SAR , ADME	Structure of all category with different functional group give its numbering and nomenclature and its activity relationship Details about its absorption, Distribution, Metabolism and Excretion.	01	Oct. 2019

	Voglibose.		Chemistry by Harkishansing&Kapoor 5. Pandya, Introduction of Chemistry 6. Website information 7. Presentation and videos			
				Therapeutic uses, Synthesis of drugs	Give detail introduction, reason, type, pattern of splitting with examples. Assignment IX	02	Oct. 2019
17	**Local Anesthetics:** SAR of Local anesthetics **Benzoic Acid derivatives**; Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine. **Amino Benzoic acid derivatives**: Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate. **Lidocaine/Anilide derivatives**: Lignocaine, Mepivacaine, Prilocaine, Etidocaine. **Miscellaneous**: Phenacaine, Diperodon, Dibucaine.*	04	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical 3. Medicinal Chemistry, AshutoshKar 4. Textbook of Pharmaceutical Chemistry by Harkishansing&Kapoor 5. Pandya, Introduction of Chemistry 6. Website information 7. Presentation and videos	Introduction Classification and Mechanism of action	Introduction, Classify the drug with their line of action and then mode of action of drug.	02	Oct. 2019
				SAR , ADME	Structure of all category with different functional group give its numbering and nomenclature and its activity relationship Details about its absorption, Distribution, Metabolism and Excretion.	01	Oct. 2019
				Therapeutic uses, Synthesis of drugs	Give detail introduction, reason, type, pattern of splitting with examples. Assignment X	02	Oct. 2019
	Total Hrs.	**45**		**Total Hrs.**		**55**	

Subject In charge
Mrs. N.A.Porwar

Academic In charge
Mr. T. D. Fegade

HOD
Mr. K. R. Patil

ACA /DI/08
Rev : 00
Date: 20.12.2017

Teaching Plan (Theory)

Academic Year: 2018-19
Semester: VII

Sub: Pharmaceutical Chemistry – VIII (Medicinal Chemistry - III) T 4.7.1 Year: Final Year B. Pharm (VII Sem.)

Total Hrs. Prescribed (NMU): 3 Hrs/Week (45)

Sr. No.	Topic Details (NMU)	Allotted Hrs. (NMU)	Preparation/ Materials/ Resources	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date (Week/Month)
01	**Sedatives and hypnotics** Classification, Chemical nomenclature, structure including stereochemistry, generic names, chemistry, physicochemical properties, SAR. Metabolism, molecular mechanism of action, and synthesis of Mephobarbital, Phenobarbital, Pentobarbital, Secobarbital, Diazepam, Nitrazepam*. Oxazepam. Alprazolam. Midazolam, Cholorodiazepoxide, Chloral hydrate, Gluthethimde*, Zolpidem, Zopiclone	04	1. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical chemistry 2. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 3. Structure-activity relationship, Pharmacokinetics (Metabolism) and Therapeutic uses- Foye's Principles of Medicinal Chemistry, 4. International Publishers And Textbook of Medicinal Chemistry, MalleshappaN.Noolvi / Anurekha Jain / HarunM.Patel	Introduction	Introduction of Sedative and hypnotics	01	June. 2018
				Classification and Mechanism of action	Classify the drug with their line of action and then mode of action of drug.	01	June. 2018
				SAR, ADME and Uses	Draw the structure with functional group active for different activity and their absorption, Distribution, Metabolism and Excretion also their therapeutic uses.	01	June. 2018
				Synthesis of Drugs	Synthesis of different drug with their mechanism of action	01	June. 2018
02	**Anticonsulvants** Classification, Chemical nomenclature, structure including stereochemistry, generic names, chemistry, physicochemical properties, SAR. Metabolism, molecular mechanism of action, and	05	1. Introduction, Classification and Mechanism of action- AshutoshKar, New Age International Publishers, 2. Structure-activity relationship, Pharmacokinetics (Metabolism)	Introduction, Classification, Mechanism of action	Introduce and Classify it on the basis of mode of action and chemical structure. Types of seizures. Explain its mode of action.	03	June. 2018

	synthesis of Phenobarbital, chlordizepoxide, diazepam, clonazepam*, phenytoin, trimethadione, paramethadione, ethosuximide*, phenosuximide, primidone, sodium valproate, carbamazepine*, progabide, lamotrigine, vigbatrin		and Therapeutic uses-Foye's Principles of Medicinal Chemistry, 3. Synthesis of Drugs Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 4. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical chemistry.	SAR, ADME and Uses	Draw the structure with functional group active for different activity and their absorption, Distribution, Metabolism and Excretion also their therapeutic uses.	01	July. 2018
				Synthesis of Drugs	Synthesis of different drug with their mechanism of action	01	July. 2018
03	**Antipyschotics** Classification, Chemical nomenclature, structure including stereochemistry, generic names, chemistry, physicochemical properties, SAR. Metabolism, molecular mechanism of action, and synthesis of chlorpromazine*, triflupromazine, thioridazine, fluphenazine, chlorprothixene, loxapine, clozapine, haloperidol*,droperiodol, risperidone*, pimozide, molindone)	05	1.Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook oforganic medicinal and pharmaceutical 3. Medicinal Chemistry, AshutoshKar 4. Textbook of Pharmaceutical Chemistry by Harkishansing & Kapoor 5. Pandya, Introduction of Chemistry	Introduction, Classification, Mechanism of action	Introduce and Classify it on the basis of chemical structure. Explain its mode of action.	03	July. 2018
				SAR, ADME and Uses	Draw the structure with functional group active for different activity and their absorption, Distribution, Metabolism and Excretion also their therapeutic uses.	01	July. 2018
				Synthesis of Drugs	Synthesis of different drug with their mechanism of action	01	July. 2018
Total Hrs.		**45**	**Total Hrs.**			**45**	

Sr. No.	Topic Details (NMU)	Allotted Hrs. (NMU)	Preparation/ Materials/ Resources	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date (Week/Month)
04	**Antidepressants** Classification, Chemical nomenclature, structure including stereochemistry, generic names, chemistry, physicochemical properties, SAR. Metabolism, molecular mechanism of action, and synthesis of Imipramine, chlorimipramine, amitryptyline, nortriptyline, doxepine*, fluoxetine*, paroxetine, trazodone, iproniazid, pargline, isocarboxazide, tranylcypromine)	04	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook of organic medicinal and pharmaceutical 3. Medicinal Chemistry, Ashutosh Kar 4. Textbook of Pharmaceutical Chemistry by Harkishansing & Kapoor 5. Pandya, Introduction of Chemistry	Introduction and Classification	Introduce of depression and Classification of drugs on the basis of chemical structure	01	July. 2018
				Mechanism of action and SAR	Explain mode of action of drugs with said drugs in the syllabus. Draw basic structure and explain role of different functional group and their activity	01	July. 2018
				ADME, Therapeutic Uses	Discuss details about absorption, Distribution, Metabolism and Excretion of drugs, Explain their pharmacological uses.	01	July. 2018
				Synthesis of Drugs	Synthesis of different drug with their mechanism of action	01	July 2018
05	**Antiparkinsons** Classification, Chemical nomenclature, structure including stereochemistry, generic names, chemistry, physicochemical properties, SAR. Metabolism, molecular mechanism of action, and synthesis of Carbidopa*, levodopa, selegiline, amantadine, bromocriptine, benzotropine*, procyclidine,	04	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook of organic medicinal and pharmaceutical 3. Ashutosh Kar, New Age International Publishers And Textbook of Medicinal Chemistry, Malleshappa N. Noolvi / Anurekha Jain / Harun M. Patel	Introduction, Classification	Introduction of parkinsonism, Classification of its drugs.	01	July. 2018
				Mechanism of action, SAR, Pharmacokinetics (Metabolism)	Explain mode of action of drugs with said drugs in the syllabus, Draw basic structure and explain role of different functional group and their activity, Discuss details about absorption, Distribution, Metabolism and Excretion of drugs	02	Aug. 2018
				Therapeutic uses, Synthesis of drugs	Explain their pharmacological uses. Synthesis of drugs given in NMU syllabus.	01	Aug. 2018

	trihexyphenidyl. orphenadrine						
06	**General Anesthetics** Classification, Chemical nomenclature, structure including stereochemistry, generic names, chemistry, Metabolism, molecular mechanism of action, and synthesis of Ketamine hydrochloride, Diazepam	02	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Ashutosh Kar, New Age International Publishers And Textbook of Medicinal Chemistry, Malleshappa N. Noolvi / Anurekha Jain / Harun M. Patel	Introduction	Introduction of anaesthesia and its stages	01	Aug. 2018
				Classification and Mechanism of action Therapeutic uses, Synthesis of drug	Classify the drug and then mode of action of drug. Explain their pharmacological uses. Synthesis of drugs	01	Aug. 2018
07	**Local Anesthetics** Classification, Chemical nomenclature, structure including stereochemistry, generic names, chemistry, Metabolism, molecular mechanism of action, and synthesis of a. Amino esters – procaine, tetracaine, benzocaine b. Amino amides – lidocaine*, mepivacaine, bupivacaine c. Amino ethers – pramoxine d. Alcohols – Benzyl alcohol, eugenol	03	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook of organic medicinal and pharmaceutical 3. Ashutosh Kar, New Age International Publishers And Textbook of Medicinal Chemistry, Malleshappa N. Noolvi / Anurekha Jain / Harun M. Patel	Introduction Classification and Mechanism of action	Introduction of local anaesthetic drugs,Classify the drug with their line of action and then mode of action of drug.	01	Aug. 2018
				SAR and ADME	Structure of all category with different functional group give its numbering and nomenclature and its activity relationship, Details about its absorption, Distribution, Metabolism and Excretion.	01	Aug. 2018
				Therapeutic uses, Synthesis of drugs	Give detail introduction, reason, type, pattern of splitting with examples.	01	Aug. 2018
08	**Drugs for Alzheimer's Diseases** Classification, Chemical nomenclature, structure including stereochemistry, generic names, chemistry, Metabolism, molecular mechanism of action, Pharmacological, Psychological, Care giving treatment including Aricept, Exelon, Namenda, Donepezil, Galantamine, Rivastagmine , Tacrine, Memantine and other	04	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook of organic medicinal and pharmaceutical 3. Medicinal Chemistry, Ashutosh Kar 4. Textbook of Pharmaceutical Chemistry by Harkishansing & Kapoor	Introduction	Introduction of Alzheimer, Pharmacological and Psychological Care giving treatment including Aricept, Exelon, Namenda	02	Aug. 2018
				Classification, Mechanism of action and Therapeutic uses	Classify the drug with their line of action and then mode of action of drug and its therapeutic uses.	02	Aug. 2018 Sept. 2018

	drugs		5. Pandya, Introduction of Chemistry 6. Website information 7. Presentation and videos				
09	**Antiviral agents including HIV** Classification, Chemical nomenclature, structure including stereochemistry, generic names, chemistry, Metabolism, molecular mechanism of action, and synthesis of Indoxuridine*, amantadine*,acyclovir, ganciclovir and ribavirin, HIV agents –both nonnucleosides like nevirapine & delaviridine and nucleosides like AZT and protease inhibitors like indinavir, saqvunavir, ritonavir (only highlights of structure). Combination therapy	06	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook of organic medicinal and pharmaceutical 3. Ashutosh Kar, New Age International Publishers And Textbook of Medicinal Chemistry, Malleshappa N. Noolvi / Anurekha Jain / Harun M. Patel 4. Pandya, Introduction of Chemistry	Introduction and Classification	Introduce of Virus and its stages of replication cycle Classification of drugs on the basis of chemical structure and its site of action in the cycle	02	Sept. 2018
				Mechanism of action and SAR	Explain mode of action of drugs with said drugs in the syllabus. Draw basic structure and explain role of different functional group and their activity	01	Sept. 2018
				ADME	Discuss details about absorption, Distribution, Metabolism and Excretion of drugs	01	Sept. 2018
				Therapeutic uses, Synthesis of drugs and Newer treatment	Explain their pharmacological uses. Synthesis of drugs given in NMU syllabus. Combination therapy and the drugs used in it	02	Sept. 2018
10	**Vitamins and Related Compounds** Water soluble & lipid soluble	06	1. M.E. Wolf: Burger`s Medicinal Chemistry, John Wiley and Sons, New York. 2. W.O. Foye: Principles of Medicinal Chemistry, Lea & Febiger, Philadelphia. 3. Goodman Gilman`s: The Pharmacological basis of Therapeutics by Alfred Goodman Gilman.	Introduction	Fat-soluble vitamin and Water soluble vitamin	02	Sept. 2018
				Introduction, Chemistry by its structure, synthesis, deficiency, daily intake and sources from which it can be produced	Thiamine, riboflavin, niacin, pantothenic acid, vitamin-B_6,	02	Oct. 2018

	vitamins		4. R.F. Doerge: Wilson & Gisvold's Text Book of Organic and Pharmaceutical Chemistry, J. Lippincott Co., Philadelphia. 5. D. Lednicer, L.A. Mitschlar, Organic Chemistry of Drug Synthesis, John Wiley and Sons, New York. 6. www.pubmed.com 7. www.google.com	Introduction, Chemistry by its structure, synthesis, deficiency, daily intake and sources from which it can be produced	Biotin, cobalamin, folic acid, ascorbic acid, vitamin-A, D, E, K.	02	Oct. 2018
11	**CNS Stimulant** Classification, Chemical nomenclature, structure including stereochemistry, generic names, chemistry, Metabolism, molecular mechanism of action, and synthesis of Caffeine, theophylline, Pentoxifyllin, amphetamine*, Dextroamphetamine, methamphetamine, methyphenidate, doxapram, alitrine, phenteramine*	02	1. Principle of Medicinal Chemistry (Volume I & II) by Kadam, Mahadik and Bothara 2. Wilson and Gisvold's. Textbook of organic medicinal and pharmaceutical 3. Ashutosh Kar, New Age International Publishers And Textbook of Medicinal Chemistry, Malleshappa N. Noolvi / Anurekha Jain / Harun M. Patel	Introduction and Clasasification	Introduction of CNS stimulant and its classification	*01*	*Oct. 2018*
				Mechanism of action, therapeutic uses, and synthesis of drug	Mode of action of drug. Explain their pharmacological uses. Synthesis of drugs	01	Oct. 2018
Total Hrs.		**45**	**Total Hrs.**			**45**	

Subject In charge
Mrs. N.A. Porwar

Academic In charge
Mr. T. D. Fegade

HOD
Mr. K. R. Patil

ACA /DI/09
Rev : 00
Date: 20.12.2017

Teaching Plan (Practical)

Academic Year: 2018-19
Semester: VII

Sub : Pharmaceutical Chemistry – VIII (Medicinal Chemistry - III) P 4.7.3 **Year : Final Year B. Pharm (VII Sem)**
Total Hrs Prescribed (NMU): 3 Hrs/Batch/Week (45)

Minimum 12 Experiments Should covered

Sr. No.	Practical Details (NMU)	Alloted Hrs. (NMU)	Preparation/ Materials/ Resources	Title / Objective for Lesson Plan	Procedure / Steps / Activities	Req. Hrs.	Date (Week/Month)
01	Purification techniques of solvents/liquids by Fractional distillation and distillation under vacuum	03	1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Dec. 2017
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Submission of Product and Viva	Submission of product and viva		
02	Synthesis of benzil from benzoin*	03	1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Dec. 2017
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		

			Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
03	Synthesis of hydantoin from benzil*		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Jan. 2018
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
04	Synthesis of Toluene –p-sulphonate from toluene –p-sulphonil chloride		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Jan. 2018
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Procurement of apparatus	Detail of procedure		

				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
05	Synthesis of Dichloramine –T From Toluene –p-sulphonate		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Jan. 2018
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
06	Synthesis of Chloramine – T from Dichloramine –T **		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Feb. 2018
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		

07	Preparation of Iso-Nicotinic acid (oxidation of picoline with potassium permanganate)*		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Feb. 2018
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
08	Synthesis of 2-Phenylindole* Cyclization reactions		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Feb. 2018
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		

09	Synthesis of Benzophenone**(Friedal craft acylation		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Feb. 2018
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
10	Synthesis of Acetoacetanilide*		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Mar. 2018
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
11	Synthesis of 1, 2, 4-triazole**		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of	Separation of product		

			Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Product			
				Submission of Product and Viva	Submission of product and viva		
12	Synthesis of Benzimidazole from o-phenylenediamine*		1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
13	synthesis of nbutylacetate from n-butanol and acetic acid (Esterification)	03	1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		

14	Synthesis of PABA from p nitrobenzoic acid (Reduction reaction)	03	1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Mar. 2018
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		
15	Synthesis of Phenytoin**	03	1. Text Book of Practical Organic Chemistry - A.I. Vogel 2. Practical Organic Chemistry - Mann and Saunders 3. Organic Synthesis Special techniques V. K. Ahluwalia, Renu Aggrawal, Nerosa publishing house 4. Merk Index	Introduction of Aim objective and procedure	Introduce the main aim of practical and their reported method with reference	3	Mar. 2018
				Procurement of apparatus	Detail of procedure		
				Charge and Monitor of reaction	Reaction charge (weighing and mixing), Monitor of reaction		
				Separation of Product	Separation of product		
				Submission of Product and Viva	Submission of product and viva		

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