## School of Chemistry Faculty of Science University of the Punjab, Lahore Course Outline



BS Chemistry Semester-VI						
Program			Chem-363	Credit Hours	2	
Course T	itle	A Linit Processes and Raw Materials		Course Type	Major (Elective)	
	Course Introduction					
This course will help the students in assessing the Unit processes in Organic Industries. The students will learn about the basic raw materials and their applications in chemical industries. Industrial Unit processes: Introduction, agents, mechanism, general procedure and application of Nitration; Halogenation; Sulphonation; Esterification and Oxidation. Basic industrial raw materials: Origin/Source, Properties, Chemistry and industrial applications of Acetylene, propylene, Ethylene, BTX, Naphthalene, Butadiene and Styrene.						
Learning Outcomes						
<ul> <li>On the completion of the course:</li> <li>Students are expected to become familiarized with the concepts of general chemistry.</li> <li>This will enable them qualify for basic to moderate level jobs involving general knowledge of Chemistry.</li> <li>The obtained knowledge shall also enable the students to enter into various entrepreneurial activities involving general introduction to chemistry</li> <li>Students are able to understand the concept of GLP and GMP</li> </ul>						
		<b>Course Content</b>		Assig	nments/Read	dings
Week 1	Introduction, agents, mechanism, general Class Based learning/tests procedure and application of Nitration				t/tests	
Week 2	Introduction, agents, mechanism, general procedure Class Based learning/tests and application of nitration					g/tests
Week 3	Introduction, agents, mechanism, general procedure Class Based learning/tests and application of Sulphonation					
Week 4	Introduction, agents, mechanism, general procedure Class Based learning/tests and application of Sulphonation					
***		application of Sulphonation	i, general proced	ure Class B	ased learning	y/tests
Week 5		application of Sulphonation oduction, agents, mechanism application of Esterification	n, general proced		ased learning ased learning	, 
Week 5 Week 6	and Intro	oduction, agents, mechanisn	n, general proced	ure Class B		r/tests
Week 6 Week 7	and Intro and Intro and	oduction, agents, mechanism application of Esterification oduction, agents, mechanism application of Esterification oduction, agents, mechanism application of oxidation	n, general proced n, general proced n, general proced	ure Class B ure Class B ure Written	ased learning ased learning Assignment	;/tests ;/tests
Week 6	and Intro and Intro and Intro and	oduction, agents, mechanism application of Esterification oduction, agents, mechanism application of Esterification oduction, agents, mechanism	n, general proced n, general proced n, general proced	ure Class B ure Class B ure Written	ased learning ased learning	;/tests ;/tests

			Krishna Prakashan Meo	lia (P) Ltd., Ed-15 (2006).
C	o. New York.		-	Г.Austin McGraw Hill Book dia (P) Ltd., Ed-15 (2006).
5. Ir	ndustrial chemistry		Krishna Prakashan Meo	lia (P) Ltd., Ed-15 (2006).
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		Teaching I	earning Strategies	
1 T	ectures	Teaching I	earning Strategies	
	ectures	Teaching I	earning Strategies	
2. G	roup Discussion	Teaching I	earning Strategies	
2. G 3. L	roup Discussion aboratory work		Learning Strategies	
2. G 3. L	roup Discussion		Learning Strategies	
2. G 3. L	roup Discussion aboratory work eminar/ Workshop	)		lendar
2. G 3. L <b>4.</b> S	roup Discussion aboratory work eminar/ Workshop Assig	gnments: Types	earning Strategies and Number with Ca	lendar
2. G 3. L 4. S	aboratory work eminar/ Workshop Assig	gnments: Types		lendar
2. G 3. L 4. S	roup Discussion aboratory work eminar/ Workshop Assig	gnments: Types		lendar
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2. G 3. L 4. S	aboratory work eminar/ Workshop Assig	o gnments: Types		lendar
2. G 3. L 4. S	aboratory work eminar/ Workshop Assig	o gnments: Types A	and Number with Ca ssessment	lendar Details
2. G 3. L 4. S	Froup Discussion aboratory work eminar/ Workshop Assig .Written 7 <sup>th</sup> week 2. Quiz 15 <sup>th</sup> week Elements	gnments: Types A Weightage	and Number with Ca ssessment	Details
2. G 3. L 4. S	Froup Discussion aboratory work eminar/ Workshop Assig Written 7 <sup>th</sup> week 2. Quiz 15 <sup>th</sup> week Elements Midterm	o gnments: Types A	and Number with Ca ssessment Written Assessment	
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2. G 3. L 4. S	Froup Discussion aboratory work eminar/ Workshop Assig Written 7 <sup>th</sup> week 2. Quiz 15 <sup>th</sup> week Elements Midterm	gnments: Types A Weightage	and Number with Ca ssessment Written Assessment	<b>Details</b> t at the mid-point of the
2. G 3. L 4. S 1 2 Sr. No. 1.	aboratory work eminar/ Workshop Assig Written 7 <sup>th</sup> week 2. Quiz 15 <sup>th</sup> week Elements Midterm Assessment	and a state of the second	and Number with Ca ssessment Written Assessment semester. Continuous assessr	<b>Details</b> t at the mid-point of the
2. G 3. L 4. S 1 2 Sr. No. 1.	Formative	and a state of the second	and Number with Ca ssessment Written Assessment semester. Continuous assessr participation, assign	<b>Details</b> t at the mid-point of the nent includes: Classroom ments, presentations, viva
2. G 3. L 4. S 1 2 5 <b>Sr. No.</b> 1.	Formative	and a state of the second	and Number with Ca ssessment Written Assessment semester. Continuous assessr participation, assign voce, attitude and b	<b>Details</b> t at the mid-point of the nent includes: Classroom ments, presentations, viva ehavior, hands-on-activities,
2. G 3. L 4. S 1 2 5 <b>Sr. No.</b> 1.	Formative	and a state of the second	and Number with Ca ssessment Written Assessment semester. Continuous assessr participation, assign voce, attitude and b short tests, project	<b>Details</b> t at the mid-point of the ment includes: Classroom ments, presentations, viva ehavior, hands-on-activities, cts, practical, reflections,
2. G 3. L 4. S 1 2 5 <b>Sr. No.</b> 1.	Formative	and a state of the second	and Number with Ca ssessment Written Assessment semester. Continuous assessr participation, assign voce, attitude and b	<b>Details</b> t at the mid-point of the ment includes: Classroom ments, presentations, viva ehavior, hands-on-activities, cts, practical, reflections,
2. G 3. L 4. S 12 Sr. No. 1. 2.	Formative Assessment Elements Assessment	A Weightage 35% 25%	and Number with Ca ssessment Written Assessment semester. Continuous assessr participation, assign voce, attitude and b short tests, projec readings, quizzes etc	<b>Details</b> t at the mid-point of the nent includes: Classroom ments, presentations, viva ehavior, hands-on-activities, cts, practical, reflections,
2. G 3. L 4. S 1 2 Sr. No. 1.	roup Discussion aboratory work eminar/ Workshop Assig Written 7 <sup>th</sup> week 2. Quiz 15 <sup>th</sup> week Elements Midterm Assessment Formative Assessment Final	and a state of the second	and Number with Ca ssessment Written Assessment semester. Continuous assessr participation, assign voce, attitude and b short tests, project readings, quizzes etc Written Examination	<b>Details</b> t at the mid-point of the ment includes: Classroom ments, presentations, viva ehavior, hands-on-activities, cts, practical, reflections,
2. G 3. L 4. S 12 Sr. No. 1. 2.	Formative Assessment Elements Assessment	A Weightage 35% 25%	and Number with Ca ssessment Written Assessment semester. Continuous assessr participation, assign voce, attitude and b short tests, projec readings, quizzes etc Written Examination It is mostly in the for	<b>Details</b> t at the mid-point of the ment includes: Classroom ments, presentations, viva ehavior, hands-on-activities, ets, practical, reflections, m at the end of the semester. rm of a test, but owing to the
2. G 3. L 4. S 12 Sr. No. 1. 2.	roup Discussion aboratory work eminar/ Workshop Assig Written 7 <sup>th</sup> week 2. Quiz 15 <sup>th</sup> week Elements Midterm Assessment Formative Assessment Final	A Weightage 35% 25%	and Number with Ca ssessment Written Assessment semester. Continuous assessr participation, assign voce, attitude and b short tests, projec readings, quizzes etc Written Examination It is mostly in the for	<b>Details</b> t at the mid-point of the nent includes: Classroom ments, presentations, viva ehavior, hands-on-activities, cts, practical, reflections,
2. G 3. L 4. S 1 2 Sr. No. 1. 2.	roup Discussion aboratory work eminar/ Workshop Assig Written 7 <sup>th</sup> week 2. Quiz 15 <sup>th</sup> week Elements Midterm Assessment Formative Assessment Final	A Weightage 35% 25%	and Number with Ca ssessment Written Assessment semester. Continuous assess participation, assign voce, attitude and b short tests, projec readings, quizzes etc Written Examination It is mostly in the for nature of the course	<b>Details</b> t at the mid-point of the ment includes: Classroom ments, presentations, viva ehavior, hands-on-activities, cts, practical, reflections,  n at the end of the semester. rm of a test, but owing to the the teacher may assess their
2. G 3. L 4. S 1 2 Sr. No. 1. 2.	roup Discussion aboratory work eminar/ Workshop Assig Written 7 <sup>th</sup> week 2. Quiz 15 <sup>th</sup> week Elements Midterm Assessment Formative Assessment Final	A Weightage 35% 25%	and Number with Ca ssessment Written Assessment semester. Continuous assessr participation, assign voce, attitude and b short tests, project readings, quizzes etc Written Examination It is mostly in the for nature of the course students based on te	<b>Details</b> t at the mid-point of the ment includes: Classroom ments, presentations, viva ehavior, hands-on-activities, ets, practical, reflections, m at the end of the semester. rm of a test, but owing to the

Semester-VI							
Program	ne B	S Chemistry	Course Code	Chem- 364	Credit Hour	1	
Course Ti	tle Applie	d Chemistry Lab	Cou	ırse Type	Major (Ele	ctive)	
	Course Introduction						
		l increase the worki	ng skills of stuc	lents regar	ding water testin	g labs	
and cosmet Spectropho	ic industries.						
	•	$KMnO_4$ , $K_2Cr_2O_7$ and	d CoCl <sub>2</sub> ( $\lambda_{max}$ an	d Beer's la	w verification)		
Preparation	Determination of the of KMnO <sub>4</sub> , $K_2Cr_2O_7$ and $CoCl_2$ ( $\lambda_{max}$ and Beer's law verification) Preparations:						
Preparation Titrations:	s of Cold Cre	eam, Vanishing Crea	ım, Cream Sham	poo			
	the %age Pi	urity of Impure Na	Cl. Determine th	he Carbon:	ate and Non-carl	bonate	
Alkali in w	•	and of impute the				onate	
		Learni	ng Outcomes				
	pletion of the						
	-	ted to become famil em qualify for basic		-	0	У	
	ledge of cher	1 1	to moderate leve	er jobs mvo	iving general		
	-	vledge shall also ena	ble the students t	o enter into	various		
	-	ivities involving ger			try		
• Stude	ents are able t	o understand the con	ncept of GLP and	d GMP			
Course Content Assignments/Readings							
Week 1	Preparation	n of Cold Cream		L	ab work / Notebo	ook	
Week 2	Week 2         Preparation of Cold Cream         Lab work / Notebook						
Week 3	Preparation of Vanishing Cream Lab work / Notebook						
Week 4	Preparation of Vanishing Cream Lab work / Notebook						
Week 5	Preparation of Cream Shampoo Lab work / Notebook						
Week 6	Preparation of Cream Shampoo Lab work / Notebook						
Week 7	Determine the % age Purity of Impure NaCl Written Assignment						
Week 8	Determine the %age Purity of Impure NaCl Lab			work / Notebook			
Week 9	Mid Term Examination			Lab	Lab work / Notebook		
Week 10	Determine the % age Purity of Impure NaCl         Lab work / Notebook						
Week 11	Determination of Carbonate Alkalies         Lab work / Notebook						
Week 12	Determination of non-Carbonate Alkalies			Lab	Lab work / Notebook		
Week 13	Determination of Potassium in water			Lab	Lab work / Notebook		
Week 14	Determination of the of $KMnO_4(\lambda_{max} \text{ and Beer's } Lab work / Notebook law verification)$						
Week 15	Determination of the of $K_2Cr_2O_7$ ( $\lambda_{max}$ and Beer's Quiz law verification)						
Week 16	Determina law verific	tion of the of $CoCl_2$ cation)	$(\lambda_{max} \text{ and Beer's})$	Lab	work / Notebook		

## **Textbooks and Reading Material**

- 1. Applied Chemistry, Haq Nawaz Bhatti and Muhammad Salman, 2017, Caravan Book Publisher, Pakistan.
- 2. Water Supply and Sewerage, T.J.McGhee, McGraw Hill Book Co. New York.(1991)
- 3. Hand Book of Industrial Chemicals, By SIRI Board of Consultants and Engineers,
- 4. Shereve's Chemical Process Industries, 5th Ed.1975 by G.T.Austin McGraw Hill Book Co. New York.
- 5. Industrial chemistry, B. K. Sharma Krishna Prakashan Media (P) Ltd., Ed-15 (2006)

## **Teaching Learning Strategies**

- 1. Lectures
- 2. Group Discussion
- 3. Laboratory work
- 4. Seminar/ Workshop

## Assignments: Types and Number with Calendar

1.Written 7<sup>th</sup> week

2.Quiz 15<sup>th</sup> week

Assessment				
Sr. No.	Elements	Weightage	Details	
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.	
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.	
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.	