

**CHEMICAL ENGINEERING PhD Program (on BSc)**

<b>REMEDIAL COURSES</b>				
<b>Dept.</b>	<b>Code</b>	<b>Course Name</b>	<b>CR.</b>	<b>ECTS</b>
CHBE	215	Material and Energy Balances	NC	
CHBE	232	CHBE I : Fluid Mechanics	NC	
CHBE	331	CHBE II : Heat Transfer	NC	
CHBE	333	CHBE III : Mass Transfer	NC	
CHBE	362	Reactor Design	NC	
MATH	241	Differential Equations	NC	
<b>PROGRAM COURSES</b>				
<b>Dept.</b>	<b>Code</b>	<b>Course Name</b>	<b>CR.</b>	<b>ECTS</b>
CHBE	512	Modeling and Analysis of Chemical Engineering Systems	3	10
CHBE	514	Advanced Engineering Thermodynamics	3	10
CHBE	534	Transport Phenomena	3	10
CHBE	562	Advanced Chemical and Biological Reaction Engineering	3	7
		Department Elective I	3	7
		Department Elective II	3	7
		Department Elective III	3	7
		Department Elective IV	3	7
		Area Elective I	3	7
		Area Elective II	3	7
		Area Elective III	3	7
		Area Elective IV	3	7
		Area Elective V	3	7
		Area Elective VI	3	7
CHBE	690	PhD Seminar	NC	2
CHBE	691	Independent Study for Qualifying Exam	NC	30
CHBE	700	PhD Dissertation	NC	150
		TOTAL	42	289
<b>EXTRA/NON-DEGREE COURSES</b>				
<b>Dept.</b>	<b>Code</b>	<b>Course Name</b>	<b>CR.</b>	<b>ECTS</b>
		Extra/Non-degree	NC	

<b>Course Group</b>	<b>Description</b>
Department Elective I-IV	Chemical Engineering courses under the GSNAS
Area Elective I	BTEC 550, ESYE 501.
Area Elective II-VI	All GSNAS courses in the elective pool offered by all departments
Extra/Non-degree	Optional non-credit (NC) courses that are not part of the program
Remedial Courses	Undergraduate level courses offered by department.