

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

REMEDIAL COURSES				
Dept.	Code	Course Name	CR.	ECTS
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	
PROGRAM COURSES				
Dept.	Code	Course Name	CR.	ECTS
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
		Departmental Elective I	3	7
		Departmental Elective II	3	7
		Area Elective I*	3	7
CHBE	690	PhD Seminar	NC	2
CHBE	691	Independent Study for Qualifying Exam	NC	30
CHBE	700	PhD Dissertation	NC	150
		TOTAL	21	240
EXTRA/NON-DEGREE COURSES				
Dept.	Code	Course Name	CR.	ECTS
		Extra/Non-degree	NC	

* If a student did not take a research methods/methodologies course during MS work, he/she shall take one of the courses in Research Methodologies instead of Area Elective I.

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