

## **Master's Program in Industrial Catalysis**

### **1. Introduction to the program**

Industrial Catalysis discipline of Tianjin University was founded in 1970. Students for Master's degree were first enrolled in 1978. Doctorate Students were first enrolled in 1984. It has been the first industrial catalysis discipline for Bachelor's, Master's and Doctor's degree in China, and it is also the first state key research discipline for industrial catalysis in China. We have established close international cooperation with advanced universities. We have been involved in many project supported by 863 and 973 programs, and the National Natural Science Foundation of China. While focusing on advanced catalytic materials and catalytic reaction engineering, four major research fields have been targeted: (1) Solid catalyst and catalytic reaction engineering, (2) Energy and environmentally benign catalytic process engineering, (3) Catalysis of rare earth and transition metal elements, (4) Product engineering in catalytic processes.

### **2. Objectives**

Training and care are the two major activities and purposes of the higher education. Course work and research on defined topics are equally important for the Master program. During the course work, we arrange compulsory and optional courses, ranging from fundamental mathematics and philosophy to advanced reaction kinetics and thermodynamics. We also arrange mini-topic investigation and presentation. The aim is to improve both the knowledge and the skills and to have a prepared mind for the final research topics. All the master students are required to finish a research program which is from the frontier topics in chemical engineering and catalysis science.

### **3. Duration**

The general period for the Master program is three years, and the the course is equivalent to one year.

### **4. Courses and Credit**

Student must complete a total of not less than 27 credit points, in which at least 13 cpts are disciplinary degree courses, at least 6 cpts are compulsory courses, and at least 8 cpts are optional ones.

<b>Course Type</b>	<b>Course code</b>	<b>Course name</b>	<b>Course hours</b>	<b>Credit points</b>	<b>Note</b>
Degree Courses	S131G001	Philosophy of scientific research	90	3	No less than 13 Cpts
		First foreign language	60	2	
	S131GA01	Applied functional analysis	40	2	
	S131GA03	Numerical analysis in engineering and science	32	2	
	S207G003	Characterization techniques of catalysts and catalytic reactions	32	2	
	S207G010	Advanced principles for catalytic	32	2	

		processes			
Compulsory Courses	S207R001	Academic Report		1	
	S207R002	Modern chemical experimental techniques	16	1	
	S207E005	Catalyst engineering	32	2	No less than 2 courses
	S207E006	Analysis of cases for catalytic reaction processes	32	2	
	S207E009	New catalytic materials and their preparation	32	2	
Optional Courses	S207EP01	The choice of problem and the dissertation writing	16	1	No less than 8 Cpts
	S402EP01	The retrieval and utilization of internet information resources	16	1	
	S402EP02	Lectures on practical use of patent technologies	16	1	
	S207E007	Design of catalysts	32	2	
	S207E013	Fundamental and application of heterogeneous catalysts	32	2	
	S207E037	Analysis and design of chemical process	32	2	
	S207E041	Scientific research methods of chemical engineering	32	2	
	S207E043	The chemistry & chemical engineering network information	32	2	
	S207E059	Biological enzymes and their catalytic reaction	32	2	
	S207E099	Determination of physiochemical property of solid catalysts	32	2	
	S207G019	Solid surface chemistry	32	2	
	S207EP05	Modern analysis and measurement methods	32	2	
	S207E118	Kinetics of catalytic reactions	32	2	

### 5. Degree dissertation

The topics will be defined by a committee according to the understanding on the research frontiers.