

**The Department of Chemical Engineering  
University of Karachi**

**INTRODUCTION**

Chemical Engineering deals with the application of physical sciences particularly Chemistry, Physics and Mathematics to the process of converting raw materials or chemicals into useful and valuable forms at competitive prices. The objective of this programme is to educate students who, as graduates become capable to analyze industrial chemical engineering problems and synthesize solution to these. Also to compare their knowledge of chemical engineering with students of similar programme nationally and to use their training as a springboard to future professional and career development. In addition to preparing students for rewarding jobs in the chemical process industries, the programme provides them an excellent background in engineering, science and business administration.

On historical review, it could be revealed that Chemical Engineering largely involves the Design, Production and Maintenance of Chemical Process Industries. The development of the large-scale processes characteristic of industrial economics is also an important feature of Chemical Engineering. Indeed Chemical Engineers are responsible for the availability of the modern high-quality materials that are essential for running an industrial economy.

Realizing the importance of Chemical Industrial development of the country, University of Karachi first had started the Department of Applied Chemistry in 1970. To be more industrially oriented a programme of Bachelor in Chemical Technology, a four year course, was launched from the same Department in 1985. However, due to financial constraints the programme was discontinued. In 1995 it was restarted as an Evening programme. Efforts were made to get the degree holders accredited with Pakistan Engineering Council (PEC). PEC refused to accredit BCT and instead gave set guidelines for Engineering Programme. Following those guidelines the Faculty of Engineering was revived and the Department of Chemical Technology/Engineering was established. In accordance to PEC rules they visited the Department in 2010 and delivered further guidelines to improve as per their requirements. They shall again visit in 2010. A batch of forty students are in Final year.

In preparing this report, we acknowledge the contribution by Engineer Syed Shahamat Ali Shah and support provided by the Quality Enhancement Cell, University of Karachi.

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**Dr. Fasihullah Khan**

Chairman,

Department of Chemical Engineering,  
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**CRITERION-1**

**PROGRAM MISSION, OBJECTIVES AND OUTCOMES**

## **Criterion-1 Program Mission, Objectives and Outcomes**

### **Vision Statement for the Department of Chemical Engineering:**

The vision of the department is to be a nationally recognized undergraduate Chemical Engineering Programme coupled with research strengths in Process Systems Engineering, Applied Thermodynamics, Chemical Process Principles, Particulate Technology, Simultaneous Heat & Mass Transfer Operations, Chemical Reaction Engineering, Transport Phenomena, Chemical Process Design & Simulation.

### **Institutional Mission**

The high-quality education experiences of the faculty that will prepare graduates to accept the challenges of leadership positions within the chemical and associated industries. The department shall foster and encourage to pursuit the new knowledge, innovative technology the chemical sciences and engineering.

### **Program Mission (B.E.)**

The mission of the B.E. programme is to equip the graduates with Managerial, Technical and Industrial innovative capabilities required by the Chemical Industries, FMCGs and Chemical Engineering education organizations.

**Standard 1-1: The Program must have documented measurable objectives that support college and Institution mission statements.**

### **Program Objectives (B.E.):**

1. Are successful in early oppointment and have sustained success in their professional careers?
2. Are valued for their hands-on engineering ability and safety culture?
3. Have effectively communicated their technical knowledge via publications?
4. Have achieved leadership positions in their chosen professions.

**Table: Program Objectives Assessment**

<b>S. No.</b>	<b>Objectives</b>	<b>How Measured</b>	<b>When Measured</b>	<b>Improvement Identified</b>
1.	Are successful in early appointment and have sustained success in their professional careers	Graduating Students Survey Teacher's Evaluation Survey	Sep 2009	Graduates are successful to get employment soon after their result and also their performance careers.
2	Are valued for their hands-on engineering ability and safety culture;	Graduating Students Survey Teacher's Evaluation Survey	Sep 2009	The majority is capable to innovate, improve and BMR in industries.
3	Have effectively communicated their technical knowledge via publications.	Graduating Students Survey Teacher's Evaluation Survey	Sep 2009	Majority was found to apply theoretical knowledge in the applied field.
4	Have achieved leadership positions in their chosen professions.	Graduating Students Survey Teacher's Evaluation Survey	Sep 2009	The students possess analytical techniques and problem solving skills.
Note: The first batch of B.E. (Chemical) would pass by December 2010. Students of Bachelor of Chemical Technology (B.C.T) gave the above survey results.				

**Standard 1-2: The program must have documented outcomes for graduating students. It must be demonstrated that the outcomes support the program objectives and that graduating students are capable of performing these outcomes.**

### **PROGRAM OUTCOMES (B.E.)**

- 1) An ability to
  - i) apply knowledge of mathematics, science and engineering.
  - ii) design and conduct experiments as well as to analyze and interpret data.
  - iii) design a system, component, or process to meet desired needs.
  - iv) function on multidisciplinary teams.
  - v) identify, formulates, and solves engineering problems.
  - vi) communicate effectively.
  - vii) use the techniques, skills, and modern engineering tools necessary for engineering practice.
- 2) An understanding of professional and ethical responsibility.
- 3) The broad education necessary to understand the impact of engineering solutions in a global and societal context.
- 4) A recognition of the need for, and an ability to engage in life-long learning
- 5) A knowledge of contemporary issues.

In addition, graduates will have the following specific competencies:

- a) Thorough grounding in chemistry and a working knowledge of advanced chemistry such as organic, inorganic, physical, analytical,

- materials chemistry, or biochemistry, selected as appropriate to the goals of the program;
- b) Working knowledge, including safety and environmental aspects, of material and energy balances applied to chemical processes;
  - c) Working knowledge of thermodynamics of physical and chemical equilibrium;
  - d) Working knowledge of heat mass and momentum transfer;
  - e) Working knowledge of chemical reaction engineering;
  - f) Working knowledge of continuous and stage-wise operations;
  - g) Working knowledge of process dynamics and control
  - h) Working knowledge of process design
  - i) Working knowledge of modern experimental and computing techniques.

### **Surveys Result:**

The Graduating Students Survey was conducted by the Program Team of the Department of Chemical Engineering.

**Standard 1-3: The results of program's assessment and the extent to which they are used improve the program must be documented.**

#### **a) Actions Taken**

- Student Advisor was appointed for better Student-Teacher Interaction.
- Newly inducted lecturers were attached with experienced teachers to improve teaching skills.
- Number of books in seminar library have been increased around 1200.
- Course on Environmental Engineering, Risk Assessment and Renewable Energies are being taught to Final year students as Elective.

#### **b) Strengths and Weaknesses of the Program**

##### **i) Strengths**

- Highly qualified and senior faculty members (Two Ph.D, four M.E. and five members are expected to complete M.E./ M.Phil within one and half

years.

## ii) Weaknesses

- **Space Requirement:** There are only two small classrooms each of 50 students capacity. The laboratories and classrooms are housed in very old barracks (about 50 years old). Recently Pakistan Petroleum Ltd. has been generous to donate for building of four laboratories. Funds are required for classrooms, offices, remaining laboratories and procurement of equipments in order to strengthen and update the laboratories.
- Students are required to be familiar with ISO 9001-2008, 14001-2004, 18001-2004, 22000-2005, PSRM, HAZOP.

## c) Future Development Plans

Following surveys would be conducted on regular basis:

- Graduating Students Survey
- Student's Course Evaluation Survey
- Teacher's Evaluation Survey

**Standard 1-4: The department must assess its overall performance periodically.**

### a) Student Enrolment

S. No	Year	Degree				Total
		B.E. (1 <sup>st</sup> Year)	B.E. (2 <sup>nd</sup> Year)	B.E. (3 <sup>rd</sup> Year)	B.E. (4 <sup>th</sup> Year)	
1	<b>2010</b>	45	38	37	37	<b>157</b>
2	<b>2009</b>	39	39	39	37 (B.C.T.)	<b>154</b>
3	<b>2008</b>	40	39	37 (B.C.T.)	13 (B.C.T.)	<b>129</b>

4	<b>2007</b>	40	35 (B.C.T.)	25 (B.C.T.)	31 (B.C.T.)	<b>131</b>
<i>B.C.T. – Bachelor in Chemical Technology</i>						

b) **Student/Faculty Ratio**

Max- 14:1

Present- 12:1

c) i) **Time for B.E. in Department**

Minimum Four Years

d) **The average student grade point (CGPA)**

3.0 CGPA

e) **Employer's Satisfaction**

During visits of Karachi University's team to the industries for induction of internship programme, the employers seem to be satisfied with respect to knowledge, communication skills, working and interpersonal skills. Later this year, we shall conduct Employer's Opinion Survey again.



**CRITERION-2**

**CURRICULUM DESIGN AND ORGANIZATION**

## Criterion-2 Curriculum Design and Organization

### Program of Studies offered

The Department of Chemical Engineering, University of Karachi offers Four Years Course of Bachelor in Chemical Engineering.

### B.E. Degree Program – Semester Wise Courses

First Year					
Semester-I			Semester-II		
Course no.	Course Title	Credit Hours	Course no.	Course Title	Credit Hours
CE300.1	English-I	3	CE300.2	Pakistan Studies	2
CE300.1	Islamic Studies/ Ethics	2	CE300.2	English-II	2
CE301	Chemical Process Principles-I	3	CE300	Applied Chemistry-I	4
CE303	Physics	4	CE302	Chemical Engineering Thermodynamics-I	4
CE305	Mathematics-I	3	CE304	Mathematics-II	3
CE307	Engineering Drawing	1	CE306	Computer & Computation	2

## B.E. Degree Program – Semester Wise Courses

<b>Second Year</b>					
<b>Semester-III</b>			<b>Semester-IV</b>		
<b>Course no.</b>	<b>Course Title</b>	<b>Cr Hrs</b>	<b>Course no.</b>	<b>Course Title</b>	<b>Cr Hrs</b>
CE401	Applied Chemistry-II	4	CE400	Chemical Process Technology-I	3
CE403	Chemical Process Principles-II	3	CE402	Heat Transfer	4
CE405	Mathematics-III	3	CE404	Particulate Technology	4
CE407	Fluid Mechanics	4	CE406	Logic & Critical Thinking	2
CE409	Electrical & Electronics Engineering	2	CE408	Numerical Methods & Engineering Statistics	3
CE411	Workshop Practices	1	CE410	Computer Added Drawing	1

<b>Third Year</b>					
<b>Semester-V</b>			<b>Semester-VI</b>		
<b>Course no.</b>	<b>Course Title</b>	<b>Credit Hours</b>	<b>Course no.</b>	<b>Course Title</b>	<b>Credit Hours</b>
CE501.1	Communication Skills	2	CE500	Engineering Materials	3
CE501	Mass Transfer	4	CE502	Chemical Reaction Engineering	4
CE503	Fuels & Combustion	4	CE504	Simultaneous Heat & Mass Transfer Operation	4
CE505	Engineering Economics	2	CE506	Transport Phenomena	3
CE507	Chemical Engineering Thermodynamics-II	3	CE508	Chemical Process Technology-II	4
CE509	Computer Programming & Software Application	3			

<b>Fourth Year</b>					
<b>Semester-VII</b>			<b>Semester-VIII</b>		
<b>Course no.</b>	<b>Course Title</b>	<b>Credit Hours</b>	<b>Course no.</b>	<b>Course Title</b>	<b>Credit Hours</b>
CE601	Instrumentation & Process Control	4	CE600	Chemical Engineering Design Project "B"	3
CE603	Chemical Process Design & Simulation	3	CE602	Production & Operation Management	3
CE605	Project Management	2	CE604	Maintenance Engineering & Safety	3
CE609	Chemical Engineering Plant Design Project "A"	3		Elective-II	3
				Elective-III	3

Note: Credit Hours:  
4(3,3,0) in HEC Booklet mean total credit hours is 4, theory is of3 credit hours and one practical of 3 hours duration. This is identical as our (3+1) i.e. 3 hours of theory and one practical per week. Similarly 3 (3,0,0) means theory of 3 credit hours only with no practical, identical to our (3+0)

**Standard 2-1: The Curriculum must be consistent and support the program's documented objectives**

The following table manifests how the program content (Courses) meets the Program Objectives.

Courses	Program's Objectives			
	1	2	3	4
Major Courses	CE301, 307, 302, 306	CE403, 407, 400, 402, 404	CE406, 408, 501, 505	CE605, 602, 604
Elective Courses	CE610, 612	CE618, 621	CE632, 623	CE621, 623
Practical (Field and Lab)	CE307, 407, 402, 404	CE 410, 411, 501, 503	CE502,504, 508	CE601, 603, 609

**Standard 2-2: Theoretical background, problem analysis and solution design must be stressed within the program's core material.**

The following table indicates the elements covered in core courses:

Elements	Courses
i) Theoretical Background	Chemical Process Principles, Chemical Engineering Thermodynamics, Fluid, Heat and Mass Transfer, Chemical Reaction Engineering
ii) Problem Analysis	Chemical Process Principles, Simultaneous Heat and Mass Transfer, Chemical Reaction Engineering, Transport Phenomena
iii) Solution Design	Chemical Engineering Plant Design, Programming & Software Application,

	Chemical Process Design and Simulation.
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**Standard 2-3: The curriculum must satisfy the core requirements for the program, as specified by the respective accreditation body.**

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**Standard 2-4: The curriculum must satisfy the major requirements for the program, as specified by the respective accreditation body/council.**

The curriculum adopted by Department of Chemical Engineering has been approved by Academic Council, competent authority and statutory bodies of University of Karachi.

The Syllabus is in line with the curriculum of Chemical Engineering for B.E. prepared by Higher Education Commission in 2008. The department also participated in National Curriculum Revision. The syllabus conforms to PEC requirements.

**Standard 2-5: The curriculum must satisfy the general education, arts and other discipline requirements for the program as specified by the accreditation body.**

<b>Program</b>	<b>Math and Basic Sciences</b>	<b>Engineering Topics</b>	<b>General Education</b>	<b>Others</b>
B.E.	Maths (4), Physics (1), Applied Chemistry (2)	Foundation (8), Core Breadth (11), Design Project	English (3), Islamiat (1), Pakistan Studies (1), Logic (2)	Interdisciplinary Workshop (1), Electrical (1), Engineering Materials (1), Engineering Drawing (1)
Note: number of courses are given in parenthesis.				

**Standard 2-6: Information technology component of the curriculum must be integrated throughout the program.**

Following courses cover Information Technology component of the Curriculum of B.E. Programme.

- Computer and Computation (306),
- Computer Added Drawing (CAD) -410
- Computer Programming and Software Application (509)

**Standard 2-7: Oral and written communication skills of the student must be developed and applied in the program.**

Courses, Workshops and Internship Programmes help in developing communication skills.

**CRITERION-3**

**LABORATORY AND COMPUTING FACILITIES**



### **CITERION-3: Laboratory and Computing Facilities**

#### **LABORATORY FACILITIES**

##### **1. Heat Transfer Laboratory**

Heat exchange using single and double pass, Loss of heat, Thermal conductivity of liquid and gases and Heat transfer through coils.

##### **2. Mass Transfer Laboratory**

Liquid gas absorption, Liquid gas diffusion, Liquid-Liquid diffusion, Liquid-Liquid extraction, Cooling Tower, Arnold cell.

##### **3. Chemical Reaction Engineering Laboratory**

Single, Double and Triple stage, CSTR, Gas Solid non-catalytic reaction, Dynamic behaviour of CSTR, Kinetic study using differential integral and fractionating methods.

##### **4. Simultaneous Heat and Mass Transfer Laboratory**

Differential distillation and fractional distillation, azeotropes distillation, Rate of drying, humidity calculation in dryers with or without circulation of hot air.

##### **5. Particulate Technology Laboratory**

Ball mill, Pin mill, Size reduction and separation in sieve shaker, Sedimentation column.

Mixing: Optimum conditions determination by changing speed beffle size, turbine size etc.

##### **6. Fuels of Combustion Laboratory**

Ash, Volatile, Moisture contents of coal and oil, Calorific value using Bomb Calorimeter, ASTM D-86 and D-189, Gas chromatograph, Orsat gas analysis, flash point, core point, determination of Viscosity Index

##### **7. Chemical Engineering Thermodynamics Laboratory**

Vapour Compression cycle, Specific heat using Bomb calorimeter, Domestic Refrigeration, Phase Diagram, Value of Joules apparatus, Heat of neutralization, Partition coefficient, Mechanical equipment of heat transfer.

##### **8. Applied Chemistry Laboratory**

General chemistry analytical experiments

##### **9. Chemical Process Technology Laboratory**

Extraction of oil using Soxhlet apparatus, Yeild determination using Rotary evaporator, Nitrogen contents Kjeldahl apparatus

**10. Computer Laboratory**

Computer with networking, Hysis software

**11. Fluid Mechanics Laboratory**

Venturimeter, Contraction, Expansion, Fitting Losses, Friction losses Experiments, Flow meters experiments, Dead weight.

**12. Instrumentation and Control Laboratory**

Temperature, Pressure, Flow, level, Measurement instruments

**Computer Facilities**

The Department has one computer lab with 17 PCs, having internet facility for the teachers and students. These are adequate to meet the department's requirements. A large number of international research journals are also available on HEJ's Digital library provided by Higher Education Commission and research article of interest can be downloaded from this library. Students have access to digital library.

**Standard 3-1: Laboratory manuals/ documentation instruction for experiments must be available and readily accessible to faculty and students**

All laboratories are equipped with laboratory manuals/ instructions.

**Standard 3-2: There must be adequate support personnel for instruction and maintaining the laboratories**

Trained staff is available in laboratories.

A request has been made to university to increase number of laboratory staff.

**Standard 3-3: The University computing infrastructure and facilities must be adequate to support program's objectives**

**i) Computing Facilities**

Chemical Engineering Department has adequate networking computer facilities. There is licensed HYSYS software.

**ii) Multimedia**

The department has one multimedia.

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**iii) Website**

The university website <http://www.uok.edu.pk> has a link for Department of Chemical Engineering.

**iv) Internet**

The department has Internet facility and all computers are interconnected with main communication network of the University.

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**CRITERION-4**

**STUDENT SUPPORT AND ADVISING**

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#### **Criterion-4 Student Support and Advising**

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The Department of Chemical Engineering have satisfactory support for students to complete the programme according to schedule and the students have ample opportunity to interact with their teachers of respective courses to receive timely advice about program requirements and career development.

**Standard 4-1: Courses must have been offered with sufficient frequency and number for students to complete the program in a timely manner.**

#### **Departmental Strategy for Course Offering**

The Department of Chemical Engineering offers four years B.E. programme as per following weekly schedule

<b>Program</b>	<b>Classes per Week</b>	<b>Practical Classes per Week</b>
B.E.	Three lectures per week for 3+0 or 3+1 course. Two lectures per week for 2+0 or 2+1 course.	Practicals sessions of three hours per week for courses which include practicals.

**Standard 4-2: Course in the major must be structured to ensure effective interaction between students, faculty and teaching assistants.**

Course allocation is made in the meeting of the faculty members. There is also provision for Tutorial Classes for greater interaction between students and teachers.

**Standard 4-3: Guidance on how to complete the program must be available to all students and access to academic advising must be available to make course decisions and career choices**

- The Chairman of the Department nominates a faculty member as 'Students Advisor' who is available to all students for course decision and career choices. The Student Advisor and the Chairman help the students by providing information regarding career opportunities available for them.
- The Chairman places on the Notice Board the opportunities of job, membership in technical and professional societies as and when received.

**CRITERION-5**  
**PROCESS CONTROL**

## **Criterion-5: Process Control**

**Standard 5-1: The process by which students are admitted to the program must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives.**

### **Admission Policy:**

- Minimum 60% marks in Intermediate Pre-Engineering eligible to apply for admission.
- All applicants are required to appear in Admission Entry Test, based on following break-up
  - English, Physics, Mathematics 50% marks
  - Chemistry 50% marks
- Applicants merit list is compiled on the following weightage:  
50% Academic Marks (Inter Science) and 50% Entry Test Marks

**Standard 5-2: The process by which students are registered in the program and monitoring of students progress to ensure timely completion of the program must be documented. This process must be periodically evaluated to ensure that it is meeting its objectives.**

Courses are completed timely, Monitoring procedures for students are documented regularly. Regular teaching staff are held meetings. Additional classes are adjusted, immediately for any unscheduled closure. Midterm tests are conducted during 8<sup>th</sup> week. Half of the course should be covered by mid term test.



**Standard 5-3: The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institutional mission statement. These processes must be periodically evaluated to ensure that it is meeting with its objectives.**

HEC rules with approval by the University Syndicate are applied for appointment.

Teachers are encouraged to enhance their qualifications.

### **Appointments/ Promotion Procedure**

#### **Basic Pay Scale (BPS)**

Appointments are based on HEC rules given below.

#### **a. Lecturer (BPS- 18):**

##### **Minimum Qualification**

Bachelor's Degree (first Class) in the relevant field with no 3<sup>rd</sup> division in the Academic Career from HEC recognized University/Institution. During the next two years (i.e. until June 30<sup>th</sup>, 2008) if no candidate is available without 3<sup>rd</sup> division in the academic record, then the University may forward the case for appointment of a selected candidate to the HEC for consideration and approval.

No experience required

#### **b. Assistant Professor (BPS- 19):**

##### **Minimum Qualification**

Ph.D. in the relevant field from HEC recognized University/Institution, No experience required.

**OR**

Master's Degree (foreign) or M.phill or equivalent degree in the relevant field after 18 years of education as determined by the HEC in the subject from HEC recognized University/Institutions, with 4 years

teaching/research experience in a recognized university or a post-graduate Institution or in National or International Organization.

**c. Associate Professor (BPS- 20)**

**Minimum Qualification**

Ph.D. in relevant field from HEC recognized University / Institution.

**Experience**

10-years teaching / research in HEC recognized University or a Post-graduate Institution or Professional Experience in the relevant field in a National or International Organization.

**OR**

5-years post Ph.D. teaching/research experience in HEC recognized University or a post-graduate Institution or professional experience in the relevant field in a National or International Organization.

**Minimum Number of Publications**

10 research publications (with at least 2 publications in last 5 years) in internationally abstract Journals recognized by the HEC.

**d. Professor (BPS-21)**

**Minimum Qualification**

Ph.D. from HEC recognized Institution in relevant field.

**Experience**

15-years teaching / research experience in HEC recognized University or post-graduate Institution or professional experience in the relevant field in a National or International Organization.

**OR**

10-years post-Ph.D teaching/research experience in a recognized University or a post post-graduate Institution or professional experience in the relevant field in a National or International Organization.

**Minimum Number of Publications**

15 research publications in internationally abstracted Journals recognized by the HEC.

PEC Registration is essential for all appointments.

**Basis for Appointments / Promotions (under tenure track system)**

Four main areas where a candidate is evaluated for Tenure Track Scheme;

- Teaching
- Research
- Service
- Personal Characteristics

### **General Criteria for Appointment on TTS**

All faculty members in any discipline are eligible to apply for appointment provided they fulfill the following minimum eligibility conditions;

#### **a. Assistant Professor**

##### **Minimum Qualification**

PhD from a recognized University with excellent communication/presentation skills.

#### **b. Associate Professor**

##### **Minimum Qualification**

PhD with 6 years post - PhD teaching / research experience in a recognized University.

##### **Minimum Number of Publications**

10 research articles published in journals having impact factor.

#### **c. Professor: Minimum Qualification**

PhD with 11 years post-PhD teaching / research experience from a recognized University.

##### **Minimum Number of Publications:**

15 research articles published in journals having impact factor.

#### **Faculty Evaluation Process**

University rules are adopted.

**Standard 5-4: The process and procedure used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives.**

The methodology to ensure teaching and delivery of course material is as follows:

- a. Schedule/ time table is followed by all faculty members
- b. Chairman of the Department regularly gets feed back from the students during the semester.

**Standard 5-5: The process that ensures that graduates have completed the requirements of the program must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.**

- a) The department ensures that the students are punctual and fulfill the attendance requirement i.e. 75%.
- b) Promotions to the next year is restricted to only those who have cleared more than 80% courses.
- c) Exams by the students are regularly held.

**CRITERION-6**

**FACULTY**

## **Criterion-6 Faculty**

The faculty members of the Department of Chemical Engineering makes harmonies combination of highly experienced managers of chemical industries and highly experienced teachers having the necessary technical depth to support the program. Teachers attempt to cover the curriculum adequately and in case of need conduct extra classes

**Standard 6-1: There must be enough full time faculty who are committed to the program to provide adequate coverage of the program areas / courses with continuity and stability. The interest of all faculty members must be sufficient to teach all courses, plan, modify and update courses. The majority must hold a Ph.D. degree in the discipline.**

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The Department of Chemical Engineering is currently having the services of 4 regular faculty members and 8 fulltime cooperative teachers. Two members are Ph.D. and four are M.E in Chemical Engineering,

**Standard 6-2: All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programs for faculty development must be in place.**

Faculty members of Department of Chemical Engineering are considered current in the discipline based on the following criteria:

- i) All teachers meet the HEC/PEC criteria for appointment in the respective cadre.
- ii) Teachers generally participate in seminars, conferences at National / International levels.
- iii) Teachers take interest in teaching and involve themselves in research and consultancy.
- iv) Teachers are generally available in department or are in library or digital library.
- v) Those who are engaged in increasing qualification are provided

relaxation in their teaching loaded.

**Standard 6-3: All faculty members should be motivated and have job satisfaction to excel in their profession**

To help the faculty of Department of Chemical Engineering in their progress to excel in their profession, department make efforts to implement following strategies:

- i) The department ensures fair, timely selection, appointment/promotion as per HEC criteria. Posts have been advertized and shall be fulfilled through the Selection Board shortly.
- ii) Good working environment exists for teaching and innovative technology programmes.

**CRITERION-7**

**INSTITUTIONAL FACILITIES**



## **Criterion-7 Institutional Facilities**

At present, departmental workshop/ laboratories are equipped as per PEC requirement and a new building is under construction for laboratories. Library, class rooms and offices are inadequate. As soon as the department shall receive the fund, all facilities shall be improved.

**Standard 7-1: The Institution must have the infrastructure to support new trends in learning such as E-learning.**

### **a) Departmental library and Internet Facility**

Departmental library has around 1200 books .Effort is made to acquire latest books. Subscription to atleast four international level chemical engineering journals is required. The Department of Chemical Engineering has inadequate internet facility which needs to b improved.

### **b) Main Library**

Faculty members and students of the institute are allowed to use the main Library which has extended working hours. The main library provides the following services;

- i. Course books
- ii. Digital library having access to journals and E-books

**Standard 7-2: The library must possess on up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel.**

New books are regularly purchased. The seminar librarian holds Masters of Library Science (M.L.S) degree.

**Standard 7-3: Class rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibility.**

### **Classrooms**

Teachers are required to take extra classes in order to get the course completions. Teachers have access to overhead projectors and multimedia. The department faces acquate space protection.

### **Faculty Offices**

The Department of Chemical Engineering is short of space to adequately accommodate its faculty and administrative staff. A separate building for department is required.

**CRITERION-8**

**INSTITUTIONAL SUPPORT**

## **Criterion-8 Institutional Support**

The institution's support for the program is sufficient enough to provide an environment in which the program can achieve its objectives and retain its strength. However, financial resources are required to meet the programme's objectives.

**Standard 8-1: There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teacher and scholars.**

HEC rules may be made more attractive for highly qualified professional teachers.

**Standard 8-2: There must be an adequate number of high quality graduate students, research assistants and Ph.D. Students**

It is planned that M.S/M.E programme shall start from next year.

<b>Degree Program</b>	<b>Years</b>		
	<b>2007</b>	<b>2008</b>	<b>2009</b>
B.C.T	37	13	31
Note: First batch of B.E. would be pass out by December 2010			

Student/Faculty Ratio (for the last three years)

Max- 14:1, Present- 12:1

**Standard 8-3: Financial resources must be provided to acquire and maintain library holding, laboratories and computing facilities.**

The University of Karachi provides financial resources to maintain library and computing facilities. The department, however, is not having the separate fund of its own to maintain and upgrade its library and computing facilities. HEC is also requested to provide additional financial resources for further strengthening of the Department of Chemical Engineering.

## **FACULTY CVs**

**Faculty Members in Department of Chemical Engineering**

Name of Faculty Member	PEC Regn #	Designation	Joining Year	Details of Qualifications			Specialization for each level of education	Experience
				Qualification BSc Engg MSc Engg PhD Engg	Year	Institution		Total
DR. M. ASAD HASAN	CHEM/349	Adjacent Professor	2004	PhD (CHEMICAL ENGG)	1974	LEEDS	Chemical Engg	47
ENGR.QAISER RAZA	CHEM/573	Full time Co-operative	2005	BSC (CHEMICAL) MS	1963 1965	KHARAGPURI INDIA	Chemical Engg	45
ENGR.SHAGUFTA ISHTIAQUE	CHEM/2353	Lecturer	2006	B.E (CHEMICAL) MBA	1996	MEHRAN AIOU	Chemical Engg	15
ENGR.YASIR KHAN	CHEM/5973	Lecturer	2007	B.E (CHEMICAL) M.E (CHEMICAL)	2009	MEHRAN NEDUET	Chemical Engg	4
ENGR.SAEED AHMED	CHEM/5906	Lecturer	2006	B.E (CHEMICAL) M.E (CHEMICAL)	2004 2009	D.C.E.T NEDUET	Chemical Engg	4
ENGR. YASIR MAQSOOD	CHEM/6880	Full time Co-operative	2009	B.E (CHEMICAL)	2007	D.C.E.T	Chemical Engg	2
ENGR. ZEESHAN SIDDIQUI	CHEM/6125	Full time Co-operative	2009	B.E (CHEMICAL)	2005	MEHRAN	Chemical Engg	3
ENGR. SHAHAMAT ALI	CHEM/180	Full time Co-operative	2009	BSc (CHEMICAL)	1970	UET LAHORE	Chemical Engg	40
ENGR. FURQAN ALI	CHEM/7095	Full time Co-operative	2009	B.E (CHEMICAL)	2008	D.C.E.T	Chemical Engg	1
ENGR.MEHRISH MUNAWAR	INDUS/899	Full time Co-operative	2009	B.E (IND & MFG)	2008	NEDUET	Chemical Engg	1
MS. KEHKASHAN NAWAZ		Full time Co-operative	2009	BCT	2008	KARACHI UNIVERSITY	Chemical Engg	1
DR.FASIH ULLAH KHAN		CHAIRMAN	1975	MSc PhD (CHEM Engg.)	1974 1983	BATH U.K.	Chemical Reaction Engg	35

## **SURVEY RESULTS**

# **Syllabus**

**Bachelor in Chemical Engineering**