UNIVERSITY OF KARACHI

Department of Chemical Engineering
University of Karachi

Self-Assessment Report
For B.E(Chemical Engineering) Programme
Revised & Updated 2012

Prepared for
Quality Enhancement Cell, University of Karachi

Ms. Shagufta Ishtiaque Team Leader
Incharge,
Department of Chemical Engineering,
University of Karachi

PROGRAMME TEAM

- **Engr. Kashif Hussain Mangi** Team Leader
  Department of Chemical Engineering,
  University of Karachi

- **Ms. Kehkashan Nawaz** Member
  Department of Chemical Engineering,
  University of Karachi

SELF ASSESSMENT TEAM

- **Dr. Muhammad Asad Hasan** Member
  Department of Chemical Engineering,
  University of Karachi

- **Engr. Syed Shahamat Ali Shah** Member
  Department of Chemical Engineering,
  University of Karachi

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Errors & Omissions are expected

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 porgramme 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 2011 and delivered further guidelines to improve as per their requirements. They shall again visit in 2012. A batch of forty students duly accredited by PEC have launched in 2010 & 2011.

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.

Ms. Shagufta Ishtiaque

Incharge,

Department of Chemical Engineering, University of Karachi

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, and Chemical Process Design & Simulation.

Institutional Mission

The high-quality education expertise 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 undergraduate program in chemical engineering builds a strong foundation for the professional development of its students and prepares them to meet the technological challenges of the future. With a bachelor's degree, the graduates are well equipped for a wide variety of positions as practicing chemical engineers or for graduate studies in engineering and scientific disciplines. The intensive program encourages continued learning and professional development by providing the proper knowledge and stimulation in a setting that promotes personal growth. The program emphasizes to build strength in and chemical process design; continuous and stage wise separation operations; process dynamics and control; chemical equilibra; reaction engineering, heat, mass & momentum transfer, chemical thermodynamic; computer simulation and simulation topics and scholarly accomplishments of its faculty to integrate traditional chemical engineering topics with specialized studies in the contemporary fields of materials, bio-processing, environmental engineering, polymer sciences.

The faculty of the chemical engineering program is committed to sharing the responsibility of learning with the students, providing a rigorous academic environment that encourages active learning, high quality student performance, and ethical conduct. While the faculty recognizes that the professional accomplishments of the program graduates stem from the personal aspirations and individual initiative, the program faculty seeks to optimize their opportunities for success and their continued professional growth and development. Through the integration of knowledge and skills acquired in a demanding set of courses, extracurricular experiences, and faculty expertise.

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

Program Objectives (B.E.):

1. Understanding of the needs of the society & demands of the 21st century & able to improve quality of life. An ability to understand, analyze, interpret and solve problems of chemical & allied industries by using modern techniques of engineering, research and innovation

2. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. To identify, formulate, and solve engineering problems.
3. To produce graduates who pursue careers as practicing chemical engineers in fields such as, chemical process industry, pharmaceuticals, energy sector polymers/advanced materials, food processing.
4. Leadership skills to serve on managerial positions with chemical & associated industries. Motivation to maintain & raise their level of engineering competence and achievement by engaging in lifelong learning. Effective communication of technical knowledge, skills & training.
5. Understanding of health safety environmental (HSE) rules, regulations, principles and practices. Understanding of life cycles environmental impacts, its mitigation measures in chemical and allied industries.

Table: Program Objectives Assessment

S. No.	Objectives	How Measured	When Measured	Improvement Identified
1.	Understanding of the needs of the society & demands of the 21st century & able to improve quality of life. An ability to understand, analyze, interpret and solve problems of chemical & allied industries by using modern techniques of engineering, research and innovation	Graduating Students Survey Teacher's Evaluation Survey	Sep 2012	Graduates are successful to get employment soon after their result and also their performance careers.
2	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. To identify, formulate, and solve engineering problems.	Graduating Students Survey Teacher's Evaluation Survey	Sep 2012	The majority is capable to innovate, improve and BMR in industries.
3	To produce graduates who pursue careers as practicing chemical engineers in fields such as, chemical process industry, pharmaceuticals, energy sector polymers/advanced materials, food processing.	Graduating Students Survey Teacher's Evaluation Survey	Sep 2012	Majority was found to apply theoretical knowledge in the applied field.
4	Leadership skills to serve on managerial positions with chemical & associated industries. Motivation to maintain & raise their level of engineering competence and achievement by engaging in lifelong learning. Effective communication of technical knowledge, skills & training.	Graduating Students Survey Teacher's Evaluation Survey	Sep 2012	The students possess analytical techniques and problem solving skills.
5	Understanding of health safety environmental (HSE) rules, regulations, principles and practices. Understanding of life cycles environmental impacts, its mitigation measures in chemical and allied industries.	Graduating Students Survey Teacher's Evaluation Survey	Sep 2012	Health and Safety Management System (OHSAS 18001) and 14001 helped students to develop and assist in the reduction and prevention of accidents and accident related loss of lives, equipment and time on their job. Green initiatives is taking as a challenge for better environment.

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

- Additional Laboratory Equipments, Text Books and Computers are required.
- Students are required to be familiar with ISO 9001-2008, 14001-2007,18001-2007,22000-2005, 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. (1st Year)	B.E. (2nd Year)	B.E. (3rd Year)	B.E. (4th Year)	
1	**2012**	44	40	35	30	**149**
2	**2011**	44	40	36	30	**150**
3	**2010**	45	38	37	37	**157**
4	**2009**	39	39	39	37 (B.C.T.)	**154**

b) **Student/Faculty Ratio**

Max- 14:1
Present- 13.5:1

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

Minimum Four Years

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

3.2 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 Thermodymics-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

Second Year					
Semester-III			**Semester-IV**		
Course no.	**Course Title**	**Cr Hrs**	**Course no.**	**Course Title**	**Cr Hrs**
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

Third Year					
Semester-V			**Semester-VI**		
Course no.	**Course Title**	**Credit Hours**	**Course no.**	**Course Title**	**Credit Hours**
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.E. Degree Program – Semester Wise Courses

Fourth Year					
Semester-VII			**Semester-VIII**		
Course no.	**Course Title**	**Credit Hours**	**Course no.**	**Course Title**	**Credit Hours**
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**	**5**
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	623	CE621
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.

Standard 2-3: The curriculum must satisfy the core requirements for the program, as specified by the respective accreditation body.

&

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.

Program	**Math and Basic Sciences**	**Engineering Topics**	**General Education**	**Others**
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. Heat transfer through insulating bricks.

2. **Mass Transfer Laboratory**
   Liquid gas absorption, Liquid gas diffusion, Liquid-Liquid diffusion, Liquid-Liquid extraction, Cooling Tower, Arnold cell, Leaching and Crystallizer.

3. **Chemical Reaction Engineering Laboratory**
   Single, Double and Triple stage, CSTR, Gas Solid non-catalytic reaction, Dynamic behavior 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. Fuldized Bed Dryer.

5. **Particulate Technology Laboratory**
   Ball mill, Pin mill, Size reduction and separation in sieve shaker, Sedimentation column.
   Mixing: Optimum conditions determination by changing speed baffle size, turbine size, Cyclo Separator.

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 (open cup and closed cup), pour point and cloud point, determination of Viscosity Index

7. **Chemical Engineering Thermodynamics Laboratory**
   Vapor Compression cycle, Specific heat using Bomb calorimeter, Domestic Refrigeration, Phase Diagram, Value of J apparatus, Heat of neutralization, Partition coefficient, Mechanical equipment of heat transfer, Thermal Conductivity of Liquid and Gases.

8. **Applied Chemistry Laboratory**
   General chemistry analytical experiments

9. **Chemical Process Technology Laboratory**
   Extraction of oil using Soxhelet apparatus, Yield determination using Rotary evaporator, Nitrogen contents by Kjhedahl apparatus, Food Preservation by Sterilizer.

10. **Computer Laboratory**
    Computer with networking, Hysys software.

11. **Fluid Mechanics Laboratory**
    Venturimeter, Contraction, Expansion, Fitting Losses, Friction losses Experiments, Flow meters experiments, Dead weight, RO Plant.

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.

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.

CRITERION-4

STUDENT SUPPORT AND ADVISING

Criterion-4 Student Support and Advising

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

Program	Classes per Week	Practical Classes per Week
B.E.	Three lectures per week for 3+0 or 3+1 course. Two lectures per week for 2+0 or 2+1 course.	Practical sessions of three hours per week for courses which include practical.

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 weight age:
  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 is held meetings. Additional classes are adjusted, immediately for any unscheduled closure. Midterm tests are conducted during 8^{th} 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 3rd division in the Academic Career from HEC recognized University/Institution. During the next two years (i.e. until June 30th, 2008) if no candidate is available without 3rd 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.Phil. 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.

The Department of Chemical Engineering is currently having the services of 4 regular faculty members and 8 full-time 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 at least 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 acute 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.

Degree Program	**Years**		
	2009	**2010**	**2011**
B.E.	31	28	28

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 of Department of Chemical Engineering- 2012

Name	PEC #	Designation	Joining Date	Details of Qualification			Specialization	Experience Teaching (Total) Years
				Degree	Year	Institution		
1. Engr. Shagufta Ishteyaque	CHEM/ 2353	Incharge & Assistant Professor	Feb 2006	ME BE	2010 1990	NED Mehran	Chemical Engg Chemical Engg	7.5 (24)
2. Engr. M. Yasir Khan (S.L)	CHEM/ 6880	Assistant Professor	Feb 2007	ME BE	2009	NED Mehran	Chemical Engg. Chemical Engg.	6.5
3. Engr. M. Saquib Ali	CHEM/ 8437	Lecturer	Nov 2010	BE	2008	Dawood	Chemical Engg.	2.5 (5)
4. Engr. M. Furqan Ali	CHEM/ 7095	Lecturer	Oct 2009	ME BE	2011 2008	NED Dawood	Chemical Engg. Chemical Engg.	3.5 (4)
5. Engr. Kashif Hussain Mangi	CHEM/ 7531	Lecturer	March 2012	BE	-	Mehran	Chemical Engg.	1 (3)
6. Dr. Fasihullah Khan	-	Professor	Jan 1975	Ph.D M.Sc	1983 1974	Bath ,UK Karachi	Chemical Reaction Engg Process Industries	38
7. Ms. Kahkashan Nawaz	-	Lecturer	July 2009	BCT	2008	KU	Chemical Process Industry Chemistry	3.5 (4.5)
8. Dr. Engr. M. Asad Hasan	CHEM/ 349	Adjunct Professor	Jan 2004	Ph.D.	1974	Leeds U.K	Chemical Engg	10 (47)
9. Engr. Quayiser Raza	CHEM/ 573	Full Time Cooperative	Jan 2005	ME. BE.	1965 1963	I.I.T India I.I.T India	Chemical Engg. Chemical Engg.	8 (45)
10. Engr. Shahamat Ali Shah	CHEM/ 180	Full Time Cooperative	Oct 2009	BE.	1970	U.E.T Lahore	Chemical Engg.	3.5 (42)
11. Engr. Mehwish Qaseem	CHEM/ 9482	Full Time Cooperative	2011	BE	2011	KU	Chemical Engg.	2
12. Engr. Ahsan Ghani	CHEM/ 8939	Full Time Cooperative	2011	BE	2011	KU	Chemical Engg.	1 (2)
13. Engr. ShaoibSaleem	CHEM/ 9010		2012	BE	2011	KU	Chemical Engg.	(2)

SURVEY RESULTS

Syllabus

Bachelor in Chemical Engineering