MANUAL OF ACCREDITATION

(FIRST EDITION ~ 2007)

PAKISTAN ENGINEERING COUNCIL
ENGINEERING ACCREDITATION AND
QUALITY EVALUATION COMMITTEE
ATATURK AVENUE (EAST) – G-5/2
ISLAMABAD

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First Edition, 2007

Published By:

Pakistan Engineering Council
Islamabad

FOREWORD

Expansion of the technical higher education sector in Pakistan in recent years raises the question of the quality of the education imparted, the competence of the graduates and their relevance to the current technical manpower needs of our country. Simultaneous emphasis on employment in the industrial sector has highlighted the necessity for accrediting technical education programs, in terms of their role as suppliers of technically qualified human resource and high quality research.

The Pakistan Engineering Council under PEC Act 1976 as amended in 2005 has set up an Engineering Accreditation and Quality Evaluation Committee (EA&QEC) to oversee the growth and quality of technical education in Pakistan. The PEC EA&QEC is tasked to evolve procedures for quality assessment of technical education, specifically to lay down and articulate the criteria for assessment of quality, identify parameters to quantitatively assess these criteria and to establish appropriate benchmarks.

The PEC EA&QEC has carried out countrywide awareness programs and other essential activities such as benchmarking and finalization of the evaluation procedures etc. The actual program visits for Accreditation commenced in early nineties of last century and provided considerable experience in the assessment process. As a result, various formats / proformas used in this task have been revised, updated, greatly improved and introduced to meet the international criteria.

It is heartening to note in this context that the PEC EA&QEC is now bringing out much needed Manual for Accreditation, which consists of four Sections:

- **The Accreditation Process:** For propagation of the concept involved in accreditation to all the stakeholders of technical education.
- **Criteria and Weightages:** Outlining the evaluation policy as well as its methodology for the benefit of all institutions seeking accreditation of their ongoing and new programs.
- **Accreditation Proformas :** To enable the institutions seeking accreditation of programs to provide the necessary information.
- **Accreditor's Manual :** To assist the Visiting Teams in the discharge of their responsibilities.

Together, these documents represent the complete set of publications regarding the accreditation process of the EA&QEC. It is hoped that it will provide the students, parents, employers and the society at large, comprehensive information of the Quality Assurance to assist them in making a judicious choice among competing educational programs. It also fully safeguards the interests of all stake holders including that of universities being evaluated, who are provided full opportunities to submit their viewpoints even after the visitations. In order to keep pace with the changing situations, it is suggested that the Manual may be reviewed after every five years.

This publication is the culmination of sustained efforts and mutually supporting interaction among several individuals, organizations and agencies, and major contribution especially coming from EA&QEC and Dr Mahmood H. Butt.

Engr. Dr. M. Akram Sheikh
Chairman
2007 Pakistan Engineering Council

CHAPTER – 1

SECTION I

ACCREDITATION PROCESS

1. PREAMBLE

In 1976, the Government of Pakistan had constituted the Pakistan Engineering Council (PEC), a statutory body to regulate the engineering profession in the country. According to PEC Act 1976, the Council was assigned the functions of maintaining a register of persons qualified to practice as professional engineers and consulting engineers and recognition of their qualifications. Evidently, the purpose of recognition of engineering qualifications is to oversee the growth and quality of technical education in the country. In the past, evaluation of an engineering program was carried out through the inspectors of examinations. However, over a period of time the process of accreditation was developed in line with other developed countries. Accordingly, a PEC Engineering Accreditation and Quality Evaluation Committee (EA&QEC) has been formed which carries out assessment of various engineering programs through a systematic and well documented process. The committee works in harmony with the Higher Education Commission (HEC) of Pakistan. The EA&QEC assesses the quality of engineering educational institutions by evaluating various constituent elements such as academic ambience, infrastructure, financial resources, physical resources, human resources, supporting systems like library resources, computational resources and avenues to mould and develop the students' personality and learning characteristics.

In recent years, professional preparation of engineers at the undergraduate and advanced levels has undergone significant changes due to a variety of factors including knowledge explosion, new tools and techniques of teaching and learning and constructivist pedagogies. A key new element has been interdisciplinary redesign of engineering programs where teams of scholars from different disciplines of knowledge design and implement programs at the leading edge of innovation. As a consequence of these interdisciplinary teaching and research activities, new programs of health & biomedical engineering, mechatronics / manufacturing / industrial / production engineering, microelectronics, telecommunication engineering, materials, chemical engineering, geotech / structures / transportation engineering, groundwater hydrology, environmental engineering, and a host of other economically important fields have emerged that have transformed the traditional programs of Civil, Mechanical and Electrical engineering. Each branch of study, while focusing on a core of knowledge, is demanding a wider study and use of peripheral supportive disciplines. Interdisciplinary engineering programs not only demand a solid foundation of mathematics, basic and social sciences but also integrating hitherto isolated engineering systems. Engineers of the future, therefore, not only need to be competent in their chosen specialization but have to develop the needed synthesis skills to solve complex engineering design problems and to translate theoretical information into useful products and processes. Engineering education in the 21st century emphasizes the institutional ability and agility to adopt emerging technologies and disciplines well in time.

These developments have also transformed the process of accreditation and quality assurance. The US Council of Higher Education and Accreditation (CHEA) has emphasized a new Accountability Agenda in April 2006. The agenda calls on higher education and accreditation agencies to:

1. “Expand and refine evidence of institutional performance and student achievement, assessing that this vital evidence is used as the key factor in determination of quality of higher education.
2. Create more transparency – useful, relevant and easily accessible information – particularly to assist students and the public, as they make judgments about higher education quality.

3. Move voluntarily towards more consistency and comparability among institutions about performance and student achievement.”

2. WHAT IS ACCREDITATION?

Accreditation of undergraduate and advanced engineering education programs is an important aspect of ensuring quality according to the national and international criteria and benchmarks. Accreditation involves an evaluation of undergraduate and postgraduate programs offered by universities and other educational providers, through a well-defined, peer review process in which endorsements based on three broadly designated parameters and eight criteria are rendered.

An accredited engineering program is judged as providing satisfactory preparation of graduates, to initially enter the profession as registered engineers and then develop their skills subsequently to the level of professional engineers. The accreditation process is designed to publicly assure the competence of graduates, independent of the certification and credentials provided by the institutions of engineering education. The accreditation parameters and detailed criteria included in this manual are a critical component of certification to government, prospective employers and industry about the professional knowledge and skills of the engineering graduates.

This manual has been prepared, using internationally comparable criteria, to ensure reciprocity of degrees and mobility of engineering graduates in the global market. The eight specific criteria of accreditation will be uniformly and objectively applied to determine how well the institutions offering engineering education programs are preparing these graduates. They also provide opportunities for promotion and adoption of best practices and stimulation of innovation and diversity in engineering education.

Accreditation is a process of quality assurance, through which a program in an approved institution is critically appraised at intervals not exceeding three years to verify that the program meets the norms and standards prescribed by the PEC from time to time. Accreditation provides assurance that the academic aims and objectives of the program are pursued and achieved through the resources currently available, and that the institution running the program has demonstrated capabilities to ensure effectiveness of the educational program(s), over the period of accreditation. New institutions planning on offering programs of engineering must complete a process of initial accreditation by PEC before admitting the initial class of students.

A major policy adopted by the PEC EA&QEC is to accord accreditation, not to the institution as a whole, but at the program level, for example, four-year under-graduate engineering degree course after 12 years of initial education. Furthermore, the programs are to be graded into three categories viz., Accredited up to three years, Pended for six months to ensure removal of shortfalls and Not

Accredited, depending on the marks they achieve on a laid down scale. This is especially important for promoting a healthy competition for quality achievement among the different Degree/Diploma programs of the same institution, as well as among similar programs in different institutions. Thus, in a given institution, some programs may be accredited for three years, while some others may be accredited for one year and some even denied accreditation.

3. NEED FOR ACCREDITATION

a. The overwhelming objective of the accreditation process is to recognize and acknowledge the value-addition in transforming students admitted to the program into capable technical professionals, having sound knowledge of fundamentals and an acceptable level of professional skills and personal competence for ready employability in responsible technical assignments.

b. The need and demand for accreditation of technical educational programs in Pakistan has arisen because of the expansion in the number and variety of such educational institutions and programs. Though education in Engineering and Technology continues to be available only to less than ten percent of eligible students, it is not possible to meaningfully sustain the present growth rate without a parallel exercise in quality assessment of the program(s). Such an exercise will ensure that the institution running the program(s) has the necessary facilities, equipment and faculty resources for the programs, to deliver technically competent manpower that meets the local employers requirements and thereof global job market in the Engineering and Technology sectors.

Programs approved by the PEC are eligible to apply for reaccreditations.

The PEC, EA&QEC has assessed and accredited 95 programs in the country's various public and private universities so far.

4. ENGINEERING ACCREDITATION AND QUALITY EVALUATION COMMITTEE OF PEC (EA&QEC)

The Engineering Accreditation and Quality Evaluation Committee functions through site visits of the candidate institution by an expert committee constituted for the purpose and is supported by the PEC Secretariat located at the PEC Headquarters, Islamabad.

The Chairman PEC constitutes the EA&QEC by nominating the Convener and the Members in consultation with the outgoing Convener of the Committee and other professionals / experts in the field. One third of the EA&QEC Committee continues for another term to ensure continuity.

Convener EA&QEC guides and monitors the accreditation process, sanctions the approvals for the visitation schedules and composition of teams, resolves any conflicts between the visitation reports and rejoinders of the universities / Institutions regarding the accreditation of the programs. He will be the Chief Coordinator for EA&QE functions of PEC.

Deputy Convener, EA & QEC, is appointed to assist the Convener in the accreditation process and acts as a Convener in his absence from the office.

The Committee will work independently within the PEC Act and Bye-laws, and will be supported by PEC financially. The PEC Headquarter and its Branch Offices will serve as the Secretariat of the Committee. The Committee shall meet at such time and place and at such frequency as decided by the Convener. However, the EA&QEC shall meet at least three times in a calendar year. To assist EA&QEC in its task, panels of subject experts shall be drawn to constitute the Site Visiting Teams for undertaking the evaluation of the programs.

The draft report of the Site Visiting Team will be shared with the candidate Institution within 30 days of the visit. The Institution retains the right to provide additional factual information as a rejoinder before the finalization of the report. The main EA&QEC will carefully evaluate the recommendations of visiting teams and may agree / disagree or change the recommendations submitting its own recommendations to the Chairman PEC. The decision of the Chairman on the recommendations of the EA&QEC shall be final.

The Secretary of the EA&QEC shall communicate the accreditation decision to the institution, along with the report of the visitation team including Form AC-2.

5. ACTION PLAN

The PEC, EA&QEC has already developed the necessary infrastructure for the process of accreditation by formulating important policy initiatives for undergraduate and postgraduate programs. The policy guidelines have been translated into a working plan of action by developing a systematic, logical and transparent procedure of accreditation through a process of discussions, deliberations and national consensus. Various accreditation parameters have been identified and benchmarks established for their levels of acceptance.

As an aid to the accreditation process, the PEC, after approval of Chairman PEC, has laid down a set of minimum essential requirements, both in terms of the academic infrastructure as well as the financial, physical, human and other resources essential for starting a new engineering program. These represent the minimum requirements for approval of any new program. It is expected that institutions desiring of and deserving accreditation will not only meet but substantially exceed these standards. This will ensure the current competence of the institutions to provide adequate level of teaching/ learning processes and research as well as a capability to retain this competence in the future.

6. ACCREDITATION PROCESS OF PEC EA&QEC

6.1 POLICIES OF EA&QEC

(i) The EA&QEC will undertake evaluation for purposes of accreditation of all programs, at regular intervals not exceeding three years; with the third-year being the preparatory period for the next accreditation.

(ii) The PEC will provide feedback information to the Institutions, Universities and programs for commendable achievements made by them and assist further in developing initiatives for improvement of the quality of education.

(iii) The PEC will communicate its findings and recommendations to the institutions concerned.

(iv) The PEC will periodically publish a directory of all accredited programs.

(v) Each institution is expected to continue to maintain the minimum standards on which accreditation has been initially given to a program. If, at any time, the EA&QEC considers that an accredited program is no longer in conformity with the required criteria, the accreditation given may be suspended or even withdrawn. The reasons for the same, however, will be communicated to the concerned Institution.

(vi) The EA&QEC will undertake continuing accreditation of only those programs from which at least one student has graduated.

6.2 AIMS AND OBJECTIVES

The primary purpose of the EA&QEC initial accreditation and reaccredidation processes is:

(i) To assist all the potential employers, in identifying those specific programs which meet the PEC standards and other quality indicators specified from time to time.

(ii) To encourage improvement of standards of professional engineering education in the country.

(iii) To provide guidelines for the up gradation of existing programs and for the development of new programs.

6.3 PROGRAM-LEVEL ACCREDITATION

The EA&QEC has decided to focus the accreditation process on the individual undergraduate and postgraduate level programs offered by an institution rather than on the institution itself, which will be subsequently dealt with separately by PEC / HEC.

Therefore, accreditation of a degree program provides a more meaningful guidance for the students and their parents to take appropriate decisions. This also assists the potential employers during hiring process of graduate engineers of various national institutions.

6.4 GRADING OF PROGRAMS

Unlike practices in many other countries, the EA&QEC accreditation of an individual program may be granted in one of three following ways:-

Accredited up to three years: Excellent/Very good/Shortfalls: meeting or exceeding all accreditation criteria.

Pended for six months to ensure removal of shortfalls.

Not Accredited (NA): Not ready for accreditation, due to the serious deficiencies in major attributes. A re-visit be planned after the deficiencies are removed to take a decision about the accreditation.

6.5 PROVISION FOR WITHDRAWAL

The institutions have the option to withdraw a program during the accreditation process by a written request to the Visiting Team Convener, after being informed of its strengths and weaknesses, but before the Visiting Team holds formal discussion among its members for finalizing the Report.

The purpose of this provision is to enable the institutions to improve the program quality after making the necessary investments and corrections to overcome the indicated weaknesses, rather than be assigned a 'Not Accredited' status. The institution can apply again for the accreditation of program(s) being withdrawn together with the prescribed fees after a period of three months from the date of the visit.

7. ACCREDITATION PARAMETERS AND CRITERIA

The criteria and standards, by which individual programs in any institution will be judged, have been formulated to give a clear and transparent indication of the strengths and weaknesses of the programs. These are classified into quantifiable indicators for quality of different aspects of the programs including Organizational Management and Infrastructure, Faculty, Lab and Library support, Academic Performance, Interaction with industry etc. The criteria involved for the measurement of performance under each of these are given below.

7.1 Organizational Management and Infrastructure

(a) **<u>Criterion-I: Management, Mission and Integrity</u>** The institution and its program operates with integrity to ensure the fulfillment of its mission through transparent management structures including administrative leadership, faculty, staff and students to collaborate, plan, monitor and promote quality of offerings.

Examples of evidence:

(i) Documents pertaining to each program (e.g. prospectus, schedule of studies etc.) that clearly and publicly articulate its mission, objectives, commitment and the desired outcome.

(ii) Effective planning structure of a program, its committees and policies are widely known and communicated to all stake holders.

(iii) Management and administrative structures promote effective leadership and support collaborative planning and participation of faculty in decision making.

(iv) The program upholds and protects its integrity through transparent, merit-based admission, objective evaluation and quality of curriculum and instruction through regular updating of syllabi and continued professional development of its faculty.

(b) **<u>Criterion-II: Financial Resources</u>**

The resource-base of the program is adequate and appropriate/relevant to the quality of the program and to strengthen it in the future.

Examples of evidence: Institutional financial data

i) Operating / maintenance budgets for the period under review, and for the next year,
ii) Development budget,
iii) Sources of revenue e.g. tuition, HEC and other grants and their proportional breakdown,
iv) Percentage of grant utilization and its outcome.

(c) Criterion-III: Physical Resources (Central Facilities)

The program has access to adequate space and physical facilities including classrooms, well-equipped laboratories and libraries, faculty offices, library materials, computers and internet, recreational and residential space, canteens, transport, medical and consulting and career placement services.

Examples of evidence:

i) Master plan of physical facilities,
ii) Designated special laboratories,
iii) List of equipment available to faculty, staff and students for instructional and research activities,
iv) Internet access, list of providers,
v) Library budgets for acquisition of books and journals,
vi) Transport facilities and carrier policies.
vii) Sports facilities and other amenities.

(d) Criterion-IV: Human Resources: Faculty and Staff

Examples of evidence:

i) Faculty, numbers, status, qualifications and experience,
ii) Work load policies and assignments for teaching, research, consultancy and administrative service,
iii) Recruitment, retention, promotion and evaluation policies for performance appraisal including administrative, peer and students evaluation,
iv) Academic freedom for research, curriculum and instructional design,
v) Support staff, numbers, qualification, training opportunities for skill development, performance appraisal policies.

(e) Criterion-V: Human Resources: Students

The institution provides evidence of students' learning, teaching effectiveness and research opportunities that demonstrate fulfillment of the educational mission. The program's goals for students, learning outcomes are clearly stated to make their effective assessment possible. The learning resources support, transparent admission policies based on merit and effective teaching for acquisition, discovery and application of knowledge.

Example of evidence:

i) Admission criteria and policies,
ii) Application to admission ratios,
iii) Academic results, Institutional research based on student performance data and employer satisfaction surveys,
iv) Postgraduate studies data,
v) Graduation requirements.

(f) Criterion-VI: Teaching- Learning Process

The program demonstrates that acquisition of breadth of knowledge, skills and exercise of intellectual inquiry are integral to a life of professional growth and learning.

Example of evidence:

i) Course syllabi including content to be acquired and assignments to be completed,
ii) Internal and external evaluation procedures,
iii) Time on task, academic calendar and schedule of study, assignments and assessment,
iv) Library and laboratory schedules,
v) Information access and processing facilities,
vi) Equipment and instrumentation facilities.

(g) Criterion-VII: Supplementary Process

The program provides for a balanced development of knowledge, skills and dispositions of the learner to create professionally competent, healthy, balanced and ethical professionals.

Examples of evidence:

i) Schedules and lists of extra curricular activities and related facilities
ii) Field trips and participation records in professional meetings,
iii) Interaction with alumni,
iv) Student publications, newsletters and magazines,
v) List of seminars arranged and attended at the local, regional and national levels.
vi) Interaction with industry: The program has identified its various constituencies and serves them in ways valuable to both.
vii) Hands on experience in the labs, industry etc.

(h) Criterion-VIII: Research and interaction effort

The program has the capacity and the commitment towards research and engaged with its identified constituencies and industries.

Example of evidence:

i) Participation of industry representatives in curriculum refinement activities,
ii) Samples of internship reports written by students,
iii) Number and quality of research papers published in the international refereed journals,

iv) Seminars and extension lectures jointly done by representatives of industry and academia,
v) Research effort through allocation of resources including funds, faculty, projects, etc. and its utilization / outcome.
vi) Examples of consultancy for R&D projects,
vii) Short term, non-credit continuing education programs for graduates and their supervisors to meet the emerging needs.

7.2 Initial Accreditation of New Programs

Institutions desirous of starting an engineering program are advised to carefully study the Manual of Accreditation and provide the detailed information to PEC according to the questionnaire for initial accreditation (pages 36 to 44). Before filling the AC-1 Proforma, please consult guidelines for AC-1 Proforma and provide necessary documentation to assure that the institution has taken steps to meet all the eight accreditation criteria to admit the first class of students.

It is mandatory to request PEC for a zero visit at least six months before admitting any students to assure that the institution has in place the needed faculty, academic facilities, finances and academic management system and procedures for at least first year of the program.

Zero visits will be conducted by PEC appointed subject and accreditation experts to verify the institutional ability to launch an engineering program that complies with the accreditation criteria. The zero visit will provide assistance to the institution to develop all the institutional structures needed for successful completion of a four year undergraduate program in a phased manner, if necessary.

Zero visit does not have any fee. It is a service provided by PEC to ensure quality of engineering programs. However, the PEC will require a two day interim site visit at the end of first year of each new program to ascertain its preparedness for the next phases. During the 3rd year of the program a full accreditation visit is mandatory. The fee structure for the interim site visit and the accreditation visit has been established by PEC.

Those institutions, which started an engineering education program prior to the widely advertised requirement of zero visit, are to submit Form AC-01 for a special accreditation visit immediately.

8. STEPS IN THE NORMAL ACCREDITATION PROCESS

Timeline

STEP 1 (Month 1)	:	Institution submits accreditation / reaccredidation application including information/data according to the Proforma (AC-1) provided by the PEC. A master list of exhibits for the site visit, arranged according to different criteria should also be provided by the Institution.
STEP 2 (Within 30 days after step 1)	:	Identifying the Visiting Team and its Convener by PEC EA&QEC; seek institutional input for any conflict of interest.

STEP 3 (Within 2 months after step1)	:	PEC provides the Visiting Team with the visit instructions / guidelines, profile of the Institution / Program(s); including the archived accreditation report of the previous visit, if any.
STEP 4 (Within 30 days after step 3)	:	Critical study including verification, by the Visiting Team, of the information furnished to the EA&QEC; (hard and soft copies provided).
STEP 5 (Within 15 days after step 4)	:	Furnishing any additional information requested by the Visiting Team of PEC (through correspondence if necessary); Institution provides a master schedule of the site visit according to PEC visit plan.
STEP 6 (Within 4^{th}/5^{th} month of the year after step 1 to 5)	:	Briefing to the visitation Team by its Convener to refresh the visit instructions / guidelines. Visit of the institution (Laboratories, Libraries, Workshops and other Infrastructure/Facilities) as per schedule; meet with administrative staff, faculty, students and alumni for reaccreditations of established programs.
STEP 7	:	Discussions with the Management, Principal, Deans, faculty and others, enumerating the strengths and weaknesses of the programs. At this stage the institution may decide to withdraw the program(s) from consideration for accreditation;
STEP 8	:	Discussions among Members of the Visiting Team followed by finalization of the Team Report (Shared with the institution for removal of factual errors, and for a rejoinder).
STEP 9	:	Institutional Rejoinder/Comments to the report within 30 days of the receipt of the team report. If the Institutional rejoinder is not received by the due date, it will be assumed that the Institution agrees to the observations of the Team.
STEP 10 (Within 30 days after Rejoinder)	:	Submission of the Team Report by the Convener of the Visiting Team to the EA&QEC;
STEP 11 (Within 6^{th} /7^{th} Month)	:	Consideration of the Report of the Visiting Team and the rejoinder, by EA&QEC;
STEP 12 (Within 7^{th} / 8^{th} month)	:	Decision of the EA&QEC on the status of accreditation; Reporting the accreditation decision by EA&QEC to Chairman PEC.

STEP 13 (Within 8th / 9th month)	:	Communication of the accreditation decision to institution(s) and issue the SRO.
STEP 14	:	Entry into the Second Schedule of the PEC Act and posting on PEC Web Site. After taking action on above steps, should a program be successful in obtaining accreditation, the entire process will be repeated at the expiry of the specified accreditation period. The period of full accreditation shall be 3 years. However, if accreditation is pended due to shortcomings identified the institution is required to provide a compliance report to PEC within 06 months highlighting corrective measures taken. This will be followed by a confirmatory visit.

Annual Report

All accredited institutions are required to provide an annual report listing changes that may have occurred in student enrolment, faculty strength, facilities, financial resources, curriculum etc, PEC will provide a Proforma for the annual report.

9. APPEALS

In case an institution wishes to appeal for a review of the action on accreditation taken by the EA&QEC, a written application along with the prescribed fee should be sent to the Secretariat within 30 days of the date of notification of the action. On receipt of such an application, and being satisfied about its prima facie case, the Chairman PEC may appoint a special Committee, consisting of a minimum of three members including Vice Chairman PEC as Chairman and two subject specialists who were not initially involved in the visitation, to conduct the appeal review. A meeting of the Committee will be convened, wherein the institution and the members of EA&QEC may be invited to present their cases. The Committee may also visit the institution, if necessary. The recommendations of this Committee will be considered by the Chairman PEC, before arriving at the final decision.

10. THE ACCREDITATION VISIT

The Visiting Team consists of a Convener, two program experts, and a member from PEC staff to provide secretarial support. The Visiting Team includes senior academicians/ engineers having no conflict of interest with the institution to be visited, and who are selected on the basis of their high standing in the profession, ability to assess curricula, competence in appraisal based on overall objectives and performance towards the achievements of set goals. These experts will have an earned doctorate and five years of teaching, research and practical experience. PEC will maintain and update a comprehensive list of qualified team members. Their formal training to conduct the site visit according to the requirements stipulated in the manual will be arranged by the PEC. Sufficient notice, in writing, shall be given to the universities before arranging the accreditation visits. The Deputy Registrar PEC shall give detailed briefing about the visit, institutional data and previous accreditation visit report(s) to the Convener of the visitation team for sharing with the visitation team.

10.1 THE CONVENER

The Convener of the Visiting Team has the overall responsibility for the accreditation visit. The Convener assigns duties to each team member keeping in view the overall perspective. He should be familiar with the accreditation process and gather in advance the earlier reports, if any. He has the responsibility for the preparation of the consolidated team report and its timely submission, for the consideration of the EA&QEC. The Convener of the visiting team may preferably be a member of the EA&QEC.

One of the senior members of the Visitation Team will be appointed to take on the role of the Convener, if the Convener is unable to undertake the visit for unforeseen circumstances.

10.2 PROGRAM EXPERTS

The program experts are responsible for the evaluation of individual programs**.** Usually there are two experts for each program from the academic field. Another member from an industry or user organization can be included only in the final visit during 3rd or 4th year of the program. The latter can sometimes serve as an expert for more than one program depending on his competence and abilities. However, in case two programs with substantial duplication in course contents are being offered within a Department, a single set of two/three experts may be chosen for both the programs. For programs in emerging or inter-disciplinary areas, there can be more experts included in the team depending on the need.

The duties of the program experts include evaluation with reference to the criteria given earlier, through physical verification of infrastructure/ facilities, records, interviews with administrators, faculty, alumni, students / stakeholders and other activities, which they find necessary for the total performance appraisal. The experts are also required to mention strengths and weaknesses against each criterion in the worksheet.

The experts deputed for accreditation purposes should be senior professionals having enough requisite teaching / research experience. Availability of these experts may be sought well in advance and the candidate institution will be informed about the composition of the visiting team. The candidate institution may object to the assignment of an expert provided it submits proof of any verifiable conflict of interest with the assigned expert(s).

In case an expert is unable to undertake the visit due to circumstances beyond his/ her control, the Convener of the team will nominate another expert in consultation with PEC, keeping in view the guidelines for selection of experts.

10.3 PEC STAFF MEMBER

The member is responsible to provide all secretarial facilities, act as an interface between Visitation Team and institutional representatives, ensure availability of relevant information on the program/institution held with PEC and compilation of the visit report for timely submission to the EA&QEC. He will not be considered as the member of the team.

10.4 ACTIVITIES DURING THE VISIT

Normally, the Visiting Team requires a 3-day visit in order to complete the assessment process. However, for single program the visit may be only for 2 days. Recent examination papers, laboratory instruction sheets, student transcripts, samples of student reports, and such other material that may be of relevance in assessing the student performance, would be made available to the Visiting Team by the institution during their visit. Textbooks, teaching assignments and lecture files which the faculty uses for instruction and continuous evaluation of students would also be made available for the perusal of the Team. Qualitative facts such as professional attitudes, staff commitment, intellectual atmosphere and morale should also be assessed and quantified by the Visiting Team to the extent possible. Specifically, the following activities are expected to be completed by the Visiting Team during the visit:

1. Discussions with senior administrators who form part of the Management, including the Vice-Chancellor (in case of University/ Constituent College) /Principal/Dean/Head of the Department of the concerned program;

2. Discussions with groups of faculty members and, if necessary, individuals to assess professional attitudes, commitment, morale and intellectual atmosphere;

3. Discussions with students, alumni and parents/employers for obtaining their feedback;

4. Discussions with faculty members of support Departments (like that of Mathematics, Physics, Chemistry, Economics and English), shared faculty, cross disciplinary faculty etc;

5. Discussion with the supporting staff, both administrative and technical;

6. Visits to laboratories, library, computer centre, centre for extension activities, career placement office, sports, medical and other facilities.

7. Perusal of all the documents furnished by the Department / Institution to support the claims made in the profiles submitted to the PEC/EA&QEC.

8. A final meeting with senior faculty, administrators and others, to explain the strengths and weaknesses of the program(s), as observed by the Visiting Team. If the institution expresses a desire to withdraw

the program(s) from being considered for accreditation, the same may be permitted at this stage.

11. SCHEDULE OF THE VISITING TEAMS

The following is a typical schedule for the Visiting Team, valid in all the cases except in those of single disciplinary programs where the visit may be for two days. However, depending on the needs and requirements of the institution, the schedule may be altered by the Convener. Members are encouraged to have post-dinner meetings among themselves during the visit.

The institution shall develop an exhibition room that will contain necessary documentation to facilitate the site visit

- Exhibit Room will be setup to provide documentation arranged by criteria from i – viii of AC-1 Proforma including the following:-

    - Samples of minutes of meetings; policy documents; faculty CVs; syllabi; research publications; project reports.
    - Random check of students' work, question papers and answer sheets.
    - Annul budgets for the period under review + one year ahead.
    - Master list of documents exhibited, available on line and in the exhibit room.

DAY ONE

- Refreshing essential features of Manual of Accreditation, and 1st discussion among the Members of the Team (at place of stay);
- Meeting and discussion/presentation etc by the institutional administrators on the overview of the program;
- Meeting with faculty members;
- Visit program laboratories, faculty and other facilities;
- Discussions with students;
- Discussions with alumni, parents and employers;
- 2nd Discussion meeting among Team Members (at place of stay in the evening).

DAY TWO

- Visit support and interdisciplinary departments; Physics, Chemistry, Mathematics, Humanities and discussion with supporting staff; etc.
- Review of documents in the exhibit room;
- Visit to Library, Computer Centers, Internet facilities and placement cell;
- Meetings with Management and members of statutory councils;
- Visits to programs group-wise; Examination of documents in the departments by team and the Convener;
- Visit to Health Centre, Sports Complex, Hostels, and Residential areas etc;
- 3rd Discussion Meeting among Team Members (at place of stay).

DAY THREE

- 4th Discussion Meeting among Team Members (at place of stay);
- Meeting with the principal staff; seeking additional information, if found necessary subsequent to discussions;
- 5th Discussion Meeting among Team Members to prepare a draft of the recommendations and site visit report;
- Sharing observations with the Principal/Management team. Opportunity for withdrawal if any;
- Final meeting of stakeholders to explain the strengths and weaknesses of the program.

12. ACCREDITATION FEE STRUCTURE

1.	a. Institutions offering conventional programs (e.g. Mechanical Engineering, Civil Engineering,. Electrical Engineering, Electronics Engineering, Computer Engineering etc.,) and b. Institutions offering Cross-disciplinary / Emerging area programs e.g. Chemical Technology, Mechatronics, Petrochemical Technology, Metallurgy, etc. c. For single program Institutions and those which are seeking accreditation up to two programs	As per PEC Policy
2.	In case of Withdrawal, fee for reapplying per program	As per PEC Policy
3.	In case of Appeal, fee per program	As per PEC Policy

Note: Please get information about current fees for accreditation from PEC.

CHAPTER – 1

SECTION II

CRITERIA AND WEIGHTAGES

13. CRITERIA FOR ACCREDITATION

One of the major objectives of EA&QEC is to encourage the institutions to continually strive towards the attainment of excellence. The EA&QEC evaluation processes are designed to facilitate identification of the strengths and weaknesses of the programs seeking accreditation. The PEC hopes that this will help the institutions in improving the quality and effectiveness of their programs.

As indicated in a earlier paragraphs, the evaluation process is based on a set of broad-based criteria developed through a lengthy participatory process concerned with Technical Education all over Pakistan and is compatible with international engineering standards. Each criterion serves to assess a principal feature of the institutional activities and program effectiveness. Hence, each of them is described in terms of carefully identified parameters, amenable to a substantially objective and quantitative assessment.

Institutions seeking accreditation of their programs are expected to satisfy each of the criteria individually. They are expected to adhere to these criteria during the validity period of accreditation granted. They are also encouraged to periodically review the strengths and weaknesses of their programs and strive for their continuous improvement.

Criterion-I: ORGANIZATION AND MANAGEMENT

This criterion applies to Institutional Management and Organization. Every institution should have a mission statement and a set of goals. Every program offered by the institution should also have its objectives and goals. The mission and goals should be articulated and made known to every one in the institution through institutional publications and websites.

The successful pursuit and realization of the mission and goals and the means adopted to accomplish them brings out the quality of the institution and its programs. The goals should be clear, concise and realistic within the context of the committed resources. They should define the educational and other dimensions, including scholarship, research, public service and customer satisfaction. The effectiveness and extent of achievement of goals depend on the commitment, attitude, planning and monitoring capacity, incentives and self-appraisal policies of the management. Similarly, Organization and Management depend on the qualities of leadership, motivation, transparency of the operations, decentralization and delegation of powers, participation of faculty in the management, planning, and general efficiency indicators.

Criterion-II: FINANCIAL RESOURCES, ALLOCATION AND UTILIZATION

An institution should be financially stable. The resources should be adequate to sustain not only the achievement of current educational objectives, but also provide for improvements in future. There should be a mechanism to ensure proper financial management and a well-organized transparent process. Not only the allocation of adequate budget for capital works (non-recurring including infrastructure, and equipment), Operational / Maintenance budget and Developmental budget of recurring type are important, but also their utilization for institutional/departmental activities should be managed properly. Generation/mobilization of finances is also important for the future of

institution/programs.

Criterion-III: PHYSICAL RESOURCES (CENTRAL FACILITIES)

There should be adequate space and appropriate physical resources available including buildings, laboratories, equipment, material, library and ancillary facilities. While examining the physical resources, there is a need to ensure provisions for safety, security, and hygiene. Besides, the availability of counseling and guidance cell, medical facilities, canteen, transport and other such facilities will go a long way in gaining the confidence and respect of students and faculty/staff alike, leading to considerable improvements in the quality of the education programs.

Criterion-IV: HUMAN RESOURCES : FACULTY AND STAFF

The faculty strength, qualifications and level of their competence and performance should be adequate to accomplish the institutional mission and goals. The commitment, attitudes and communication skills of the faculty play an important and crucial role in successfully running the academic programs. This, in turn, depends upon the recruitment procedures, incentives, exposure to industrial / field activities, faculty development programs and workload of the faculty. **An institution must have a self-appraisal and performance-appraisal system to monitor the continued effectiveness of faculty who should know the art and skill of not only transferring their knowledge to the students but also inculcate in them analytical, creative and innovative abilities. They should act as a role model for the students in every possible way including good conduct and the way they carry themselves.**

The qualifications of the faculty relevant to the program area are generally measured by the advanced degrees held by them, and their scholarship, research, creative activities and professional experiences. The faculty is expected to act not only as instructors, but also as student advisors, academic planners and curriculum developers, and occasionally assist in institutional administration.

Faculty selection reflects the effectiveness of the management's commitment. The institution is expected to adopt an open process for recruiting its faculty members on merit. Adequate employment security coupled with quick accountability, salaries and benefits commensurate with the position, provision for continued professional development, and periodic evaluation for their vertical mobility should be ensured and made known to the faculty. The system / model will differ from university to university depending upon their peculiar environment.

The workload of the faculty should be such that it should not hinder their effective performance in both teaching and research. The institution should protect and foster academic freedom for each member of the faculty and develop mechanisms to ensure that the faculty act responsibly, ethically and in conformity with the prescribed conditions of employment. The faculty members should strive to maintain professional competence and scholarly pursuits through continuous updation of knowledge and research.

In the case of supporting staff, besides adequate numbers and appropriate qualifications, the requirements include hands-on experience, skills, attitudes, commitment and involvement with the institutional objectives.

Criterion-V: HUMAN RESOURCES: STUDENTS

The administrative policies and procedures should be objective and transparent. The number of qualified candidates applying in national/provincial level tests, the number admitted, dropouts, their ranking in the overall merit list of candidates seeking admission, are some of the factors that reflect the institutional effectiveness. **The evaluation procedures, academic results and time taken for completion of these requirements are important parameters. The quality of students initially admitted, will greatly affect the quality of the end product of the institution.**

The graduation requirements should be made known to every student. The Degree awarded should appropriately reflect widely the student's attainments. Information with regard to employment of the graduates and feedback from the employers would help the institution to reorient its goals so as to enhance effectiveness and relevance.

Criterion -VI: TEACHING-LEARNING PROCESSES

Each undergraduate and postgraduate degree program should embody general and specialized professional content of adequate depth and breadth, and should include appropriate Humanities and Science components. **The core of the main program (both UG & PG) should concentrate on acquisition of knowledge and skills in the specific discipline, and also ensure exposure to inter-disciplinary areas. There should also be an effective relationship between the curricular content and practice in the field of specialization. In addition, the students successfully completing the program should demonstrate their competence in oral communication, scientific and quantitative reasoning, critical analysis, logical thinking, creativity and capacity for self-learning.**

The institutions offering both undergraduate and postgraduate degree programs should assess and reiterate the relationship and interdependence of the two levels, and utilize the resources of both for collective improvement. Postgraduate programs should not be offered unless resources and expectations greatly exceed those required for the corresponding undergraduate programs.

The academic calendar, number of instructional days, quality of faculty, contact hours per week, design and delivery of syllabi, student evaluation and feedback are some of the important aspects in evaluating the teaching-learning processes. **Effective teaching-learning processes include the development of practical skills through laboratory experiments and hands-on experiences, workshop practice, operation of modern equipment and some field experience, if needed. They also require the inculcation of computing skills which make maximum use of available library, internet and educational technology facilities.** The budget provision to meet the expenditure for the consumables required in the laboratories and the workshops is one of the indicators of the extent of hands-on practice that can be given. **Implementation of the instructional programs, lectures, tutorials, student-teacher interactions, group discussions, student-centric learning initiatives, seminars and laboratory work have a direct bearing on the effectiveness of the teaching-learning processes.** Maintenance of the course files by the teachers will help in assessing the effectiveness of the teaching and learning processes.

The institution provides the environment which fosters not only the intellectual, but also the personality development of its students. **It should have personality development opportunities provided through co-curricular and extra-curricular activities and student services.** These opportunities are to enable the students to become responsible members of the society. The services and facilities should be readily accessible to the students.

The students undergoing the program should have access to facilities for career development, counseling and health education. **Opportunities to develop leadership qualities and participation in seminars and group discussions should be encouraged / provided.**

Counseling and Guidance, professional society activities, entrepreneurship development and business ethics are some of the supplementary processes, which need to be promoted. Feedback from employers and alumni should be obtained to assess the effectiveness of the academic programs.

Criterion -VII : RESEARCH & DEVELOPMENT AND INTERACTION EFFORT

In the case of undergraduate and postgraduate degree programs, teachers should participate in projects and quality improvement programs in institutions / University departments. Such an involvement will not only improve the teaching-learning processes, but also enhance the quality of project work.

Industry participation in curriculum planning, consultancy, project work, sponsored research and extension lectures are essential to achieve the professional goals of the academic programs in Engineering and Technology. At the same time, the knowledge and experience of the teachers and resources can be utilized by the industry for technical advice. This, in turn, will help the faculty to gain insight into the latest industrial practices.

The fast-changing technologies also call for Continuing Education Programs for faculty and personnel from industry. Similarly, industrial-internship for faculty and students will give them a sound exposure to the industrial / field practices.

Industrial / field visits and training with user organizations are essential for networking and creating professionalism among the students, and will help them in securing placement at appropriate levels in industries and other employment sectors.

14. WEIGHTAGES

Each of the criteria described above has been broken down into parameters, and weightages have been assigned to these parameters by the EA&QEC. The criteria and the weightages assigned to them for undergraduate (UG) and postgraduate (PG) programs are given in chapters 6 and 9 of this manual.

CHAPTER – 2

REGULATIONS FOR ENGINEERING EDUCATION IN PAKISTAN

The Gazette of Pakistan

EXTRAORDINARY
PUBLISHED BY AUTHORITY
ISLAMABAD, THE NOVEMBER 20, 1985

PART II

Statutory Notifications, (S.R.O)
GOVERNMENT OF PAKISTAN
MINISTRY OF WATER & POWER
NOTIFICATION

Islamabad, the November 20, 1985

S.R.O. 1142(I)85.- In exercise of the powers conferred by section 25A of the Pakistan Engineering Council Act, 1975 (V of 1976), the Pakistan Engineering Council is pleased to make the following Regulations for Engineering Education in Pakistan.

REGULATIONS FOR ENGINEERING EDUCATION IN PAKISTAN

Article 1. TITLE

These regulations shall be known as Pakistan Engineering Council Regulations for Engineering Education in Pakistan.

Article 2. MINIMUM QUALIFICATIONS FOR ADMISSION TO ENGINEERING AND COMPUTER SCIENCE BACHELOR'S DEGREE PROGRAMMES OFFERED BY ENGINEERING INSTITUTIONS AND UNIVERSITIES

A candidate seeking admission in an Engineering Institution/ University for working towards Bachelor's Degree in any recognized branch of Engineering must fulfill the following minimum requirements:-

(a) (i) He or she has passed the Higher Secondary School Certificate (HSC/HSSC) Pre-Engineering Examination with Physics, Chemistry and Mathematics, securing at least 60% marks in aggregate of a University, a Board of Intermediate or Board of Intermediate and Secondary Education in Pakistan. In addition, a combination of Physics, Mathematics and Computer Studies/Computer Science may be allowed for admissions in all Computer related Engineering Programs, Electronics, Telecommunication and Avionics Engineering Programs; Provided that any candidate who has been admitted in an Engineering Institution or University for working towards Bachelor's degree in any recognized branch of engineering before 6th June, 2003, and does not

fulfill the above specified minimum requirements for such admission, shall be considered for registration by the Pakistan Engineering Council.

OR

(ii) Has passed any other examination from a Foreign University/Institution/Examination Body, which both standard as well as scope wise is equivalent to the Secondary and Higher Secondary School Certificate (Pre-Engineering) of a University or a Board of Intermediate/Intermediate and Secondary Education in Pakistan. Equivalence of the Examination passed by the candidate shall be determined by the concerned University.

(b) Has passed an entrance test conducted by the respective Institution or University.

(c) Has passed Diploma of Associate Engineer Examination, securing at least 60% aggregate marks, to be eligible for admission as per PEC revised policy.

(d) A candidate seeking admission should possess adequate mental and physical health to be able to obtain engineering education as prescribed and necessary steps should be taken by University/Institution to ensure this provision on admission of students.

Article 3. MINIMUM STANDARDS OF COURSE OF STUDY AND PRACTICAL TRAINING FOR AWARD OF BACHELOR'S DEGREE IN VARIOUS PROGRAMMES OF ENGINEERING

(a) Percentage wise break up of courses of studies in various branches of Engineering shall be:

i) Engineering Subjects 65 -70 %

ii) Other Subjects 30 – 35 %

(b) The curricula of courses approved by HEC, will be the minimum guidelines, and the universities, being autonomous, are given flexibility to adopt minor changes owing to the market needs;

(c) After initial accreditation of any programme/institution, subsequent continuing accreditation shall be carried out at regular intervals, the intervening period between the two intervals not exceeding three years.

Article 4. MINIMUM REQUIREMENTS FOR CONTENT AND DURATION OF STUDY

(a) Engineering Institutions and Universities shall follow Annual/Semester system of conducting Bachelor's Degree programme in any accredited programme of engineering; however, semester system will be preferable.

(b) Minimum period for a candidate to work towards Bachelors Degree in any accredited programme of Engineering shall be four academic years for the annual system, or a minimum of 128 credit hours normally spread over 8 semesters or 12 quarters with a minimum period of 3 years and 9 months for the semester/ quarter system, excluding any period of repetition of courses, examinations.

(c) Engineering Institutions/Universities shall frame their schedule of studies, examination programmes and vacations, in advance. The examination schedules shall be notified to Pakistan Engineering Council at least eight weeks in advance, for inspection of examinations.

Article 5. MINIMUM STANDARDS OF EXAMINATION FOR SECURING ACCREDITATION OF ENGINEERING QUALFICATIONS

(a) For a candidate to be eligible to appear in each final examination, he must have attended at least 75 percent of lectures delivered in theory and practical.

(b) Maximum period to be allowed to a candidate to earn Bachelor's Degree in any accredited programme of engineering shall be 7 calendar years, provided that any candidate who has earned Bachelor's Degree in any accredited Program of Engineering in a period of more than seven academic years before the 6th June, 2003, shall be considered for registration by the Pakistan Engineering Council.

(Note: Article 5. (b) is a guide line to the University concerned, and if the University had allowed issuance of degree beyond 7 academic years, PEC shall register such graduates.)

(c) In Annual System not more than one Supplementary/Repeat Examination shall be allowed per academic year. Such Supplementary/ Repeat examination shall be completed within 10 weeks of the announcement of the result of annual examinations for which supplementary examination is being held.

(d) Each Final Examination of Theory Papers shall carry a minimum 80% of total marks assigned to a course in Annual System and a minimum 50% in Semester System. Similarly, each final examination of practical work shall carry minimum of 60% marks for viva voce.

(e) In annual system, a failed student of 3rd year engineering examination may be provisionally promoted to 4th year but shall not be allowed to take Final B.Sc. Engineering examination, unless he has passed all the subjects of previous year examinations. In semester system a student shall become eligible for the award of Bachelor's Engineering degree, only on passing a minimum of one hundred and twenty eight credit hours in case of semester system, and having covered three thousand and two hundred lecture hours in case of annual system, prescribed in the curriculum by the concerned university in the relevant discipline; and

(f). Results of annual Examination shall be declared by Institutions/ Universities not later than 8 weeks after the date of completion of these examinations and four weeks in case of semester system.

Article 6. MINIMUM QUALIFICATIONS AND EXPERIENCE REQUIREMENT FOR APPOINTMENT OF FACULTY IN ENGINEEING UNIVERSTIES / COLLEGE / INSTITUTIONS

S.No.	Post	Minimum Qualifications and Experience
1	2	3
1.	**Lecturer**	1st Class Bachelor's Degree in relevant branch of engineering provided he is enrolled in master's level engineering programme. However, after 2010 all applicants should be at least MS / M.Sc. Engineering.
2.	**Assistant Professor**	a. Master's degree in relevant field. However, after 2010 30% should be Ph.Ds, after 2012, 60% should be Ph.Ds, and by end of 2015, 100% should be Ph.Ds. b. 2 year teaching/research experience in a recognized Institution/College/University or 2 years professional experience in the relevant field in a national or international organization.
3.	**Associate Professor**	a. Ph.D degree in relevant field recognized by HEC in consultation with PEC. b. 7 years teaching /research experience in a recognized Institution / College /University or 7 years professional experience in the relevant field in a national or international organization out of which 2 years must be teaching experience. OR 10 years teaching experience with at least 4 years experience at the Post-Ph.D level in HEC recognized University or Post-graduate Institution or professional experience in the relevant field in a national or international organization after year 2012. c. 5 research publications to be systematically increased to 10 research publication with at least 4 in last 5 years after 2012, in journals of international repute, recognized by HEC-PEC.
4.	**Professor**	a. Ph.D degree in relevant field, recognized by HEC in consultation with PEC. b. 12 years including 5 years teaching experience.

		c.	15 years teaching / research experience with at least 8 years experience at the Post-Ph.D level in HEC recognized University or Postgraduate Institution or International Organization after year 2012. OR 10 years Post-Ph D teaching / research experience in a recognized University or a postgraduate institution or professional experience in relevant field in a national or international organization after year 2012.
		d.	8 research publications to be systematically increased to 15 research publications with at least 5 in last 5 years after 2012, in journals of international repute, recognized by HEC-PEC.
5.	**Dean**	a.	Same requirements as for Professor above.
		b.	Must have worked as Professor for at least 4 years.

Note: Minimum qualifications for hiring, retention and promotion may change from time to time as per HEC guidelines and policies adapted by the universities / institutions.

CHAPTER – 3

GUIDELINES FOR THE ESTABLISHMENT OF ENGINEERING PROGRAM IN PAKISTAN

PEC GUIDELINES FOR ESTABLISHING AN ENGINEERING PROGRAM IN PAKISTAN

1. INTRODUCTION

Establishing an engineering institution is a long term objective and an obligation for all times to come. Pakistan Engineering Council (PEC) recognizes the important role which good private and public engineering institutions can play in uplifting the engineering and technological base in the country on the pattern of advanced countries where a good mix of excellent universities are functioning in the public and private sectors. However, it is also the duty of the PEC to curb the mushrooming growth of substandard engineering institutions which, at times, may be opened with inadequate requisite facilities and without completing legal formalities and with the sole aim of financial gains from the needy and economically well-placed students who are unable to secure admissions in the public universities possibly due to their being low merit. It also becomes essential for the PEC to safeguard genuine interest of both the graduates of public universities as well as those of good private universities whose programmes have been accredited. There is no doubt that excellent private engineering institutions shall not only reduce the ever-increasing burden and undue pressure on the public universities, but will also create a healthy atmosphere of competition leading to improved quality of education. In many countries, educational institutions at all levels, from primary schools to universities, compete with each other in attracting good students and more public funds. This requires them to have formal and effective quality assurance systems that are visible and verifiable.

These days, many entrepreneurs are planning to set up engineering institutions in Pakistan without knowing the statutory PEC regulatory role in engineering education and its relevant rules. It is hoped that this document will be useful for concerned individuals/parties in knowing the essentials to be fulfilled before opening an engineering institution. For further assistance please refer to PEC regulations for Engineering Education in Pakistan (SRO 1142) and contact PEC HQ Islamabad.

2. ROLE OF THE PEC IN ACCREDITATION OF ENGINEERING PROGRAMMES

As per bylaws of the PEC, all graduates of an engineering institution must be registered with the PEC prior to seeking employment in Pakistan. This inherently entails that the engineering graduates must qualify from the PEC-accredited institutions and all programmes of study must also be accredited.

Many a time, PEC receives applications from graduate engineers who have qualified either from an un-accredited institution or the relevant study programme is not accredited by the PEC. Such cases are refused registration, causing great deal of difficulties and hardships for the PEC as well as for the applicants.

To combat such problems, the PEC has devised a well documented procedure for accreditation of a programme of study from institutions in Pakistan wherein initial and continuing essential parameters have been considered and assigned accounted for with due weightages. A careful study of these documents including the Manual of Accreditation facilitates better understanding of the requirements of establishing an engineering institution in Pakistan, and their initial and subsequent accreditation by the PEC.

Each institution is therefore, advised to carefully evaluate its engineering programme in the light of the PEC accreditation criteria. It is mandatory that the new institutions should request for the initial accreditation visit of the PEC Accreditation Committee at an early stage of its establishment and ensure that all the facilities are in place before the first intake of students. Through the visit of the PEC Accreditation Team, all essentials will be checked & verified. In case any deficiency is found the same can be corrected before formal intake of students. Similarly, subsequent continuing accreditation visit(s) of the Accreditation Committee must be arranged at regularly prescribed internals. Through such multi-stage evaluation, the deficiencies can be timely corrected at each level which will facilitate the continuing accreditation of engineering programmes of the new institution.

3. ESSENTIAL REQUIREMENTS FOR ESTABLISHING AN ENGINEERING PROGRAMME/INSTITUTION IN PAKISTAN

For opening an engineering institution or initiating an engineering programme at an existing institution, the following guidelines must be strictly adhered to in order to facilitate accreditation at a later stage. It is the sole responsibility of the applicant institutions to complete important formalities and ensure that the minimum essential pre-requisites are in place. A brief summary is given as under :

3.1 Preparation of a Feasibility Report

As the first step, a detailed feasibility report must be prepared. This should include information on the proposed institution, its programmes of study, justification, objectives to be achieved and its relevance to the local, regional, national and international needs. All essential means and resources required to establish an engineering institution/programme and their availability should be reflected in the feasibility report.

3.2 Fulfillment of Legal Requirements

An important step in establishing an engineering institution/programme is fulfillment of legal formalities and registration by the sponsoring body under the relevant laws of the *PEC*, HEC, Companies Ordinance/Societies Registration Act/Trust Act and HEC regulations as a Foundation/Society or a Trust. Each applicant institution must satisfy the legal formalities of the relevant bodies.

3.3 Charter/Affiliation Acquisition

The PEC does not issue any Charter for granting degrees. The Charter is granted either by the National Assembly or Provincial Assembly as the case may be. The applicant institution must take up this matter with concerned bodies and satisfy all specified relevant requirements. If some affiliation is desired, it has to be obtained by the applicant institution.

3.4 Quality of Teaching Faculty and other Technical Staff

The appointments, retention and promotion of teaching staff must be in line with the requirements of SRO 1142 and HEC criteria. The most important component of an engineering institution is its faculty. Therefore, utmost care should be exercised in getting good faculty. Again, for a new institution, faculty hiring can be carried out in phases but they must have at least 70% permanent faculty of the required quality and strength

determined on the basis of standard/conventional teaching / research load and teacher/student ratio. The following parameters relate to the teaching faculty:

- Total faculty requirements for each programme based on standard student/teacher ratio as per laid down criteria.
- Full-time faculty and their ranks / status.
- Qualification, experience, and recruitment procedure for the faculty (as per PEC regulations related to engineering education) and the HEC requirements for tenure track faculty, if adapted.
- Criteria for promotion to higher ranks.
- Part-time and shared faculty and their percentages.
- Plan to replace part-timers with full-time faculty as part of overall faculty development program.
- Financial package for the faculty.
- Faculty training and their career development.
- Faculty-linkage programme with other PEC-accredited engineering institutions in Pakistan and abroad.

As regards miscellaneous technical laboratory staff, it primarily includes qualified demonstrators, lab supervisors and technicians, who should be able to impart quality laboratory training and support during laboratory experimentations. The applicant institution must, therefore, be in a position to convince the Inspection Team of any relevant accredited organizations that the Faculty and Technical staff, are at par or better than other counterpart PEC-accredited UETs in the country.

Many PEC-accredited UETs in Pakistan have Master's degree programmes in several disciplines. Therefore, a new institution should develop a plan to get its young faculty holding Bachelor degrees to acquire at least Master degrees from the national institutions. The proposed institution must develop a comprehensive plan for recruitment, retention, continuous professional development and promotion of faculty.

3.5 Infrastructural Resources

The applicant institution shall ensure availability of needed infrastructure such as land, buildings, equipment, library, laboratories, workshops, computer centre, playgrounds, hostels, stadium and other recreational facilities. The intention here is that the applicant institution must be fully aware of its present and future needs well in advance. The phasing out of infrastructural facilities can be suitably justified in the feasibility report by ensuring that the needs of each academic programme at its current level are fully and satisfactorily met. An evidence of strong financial commitment and availability of the needed finances for the project has to be documented.

3.6 The Programmes of Study

The applicant institution must document its short-term and long-term academic plans and the programmes of study it plans to offer. A careful consideration at the inception stage will facilitate more detailed planning and execution of plans that comply with the professionals standards and criteria of engineering education.

3.7 The Syllabi and Course Contents

If the applicant institution is going to initiate a programme of study which is already taught in Pakistan, then guidance can be sought from the existing syllabi and course

contents of any PEC - accredited institutions in Pakistan. Since the accredited Pakistani institutions are required to update/upgrade their syllabi on continuous basis, the applicant institution must be fully aware of such changes in the pipelines.

If the programme of study is a two-phased programme, guidance must be sought from the PEC as well as from those Universities abroad whose programme of study are ABET-accredited FEANI-accredited, or meet the national accreditation standards of their native countries.

Please note that the programmes of study must fulfill the minimum requirements of engineering course contents laid down by the PEC to qualify acceptance/accreditation at a later stage.

Nomenclature of the engineering programs offered by accredited institutions has become an issue since the emergence of new interdisciplinary programs. At the 24th Vice Chancellors' Committee meeting held on February 7, 2006 it has been agreed that "if elective courses formed a minimum of 40% of the core engineering subjects of engineering program e.g. B.E Urban Engineering, and if it meets the above mentioned criteria, it may qualify as a separate engineering program, otherwise it may be termed as an offshoot of a parent program e.g. B.E. Civil (Urban) Engineering.

3.8 Admission Criteria, Fee Structure and Scholarship

All aspects of the admission policy of the proposed Institute/University must be guided by the PEC-approved pre-admission requirements. To impart quality education, admission should be exclusively merit-based. While designing admission criteria, quality of intake must be ensured. Already, almost all UETs in Pakistan have introduced entrance-exam system in addition to assigning some weightage to the SSC and HSSC Examination results. By following minimum PEC / HEC admission criteria, the probability of accreditation of new institution and programmes of study by the PEC will be enhanced.

Endowment donors, if any, should not enjoy any advantage with respect to the quality of intake. Fee structure should be decided with all care to ensure that admission should not get restricted only to economically well-placed candidates but the benefits of education should also be available to other deserving students. Introduction of scholarships for deserving students will enhance the quality of intake, and the image of the institution when the graduates go into practical life.

3.9 Laboratories and Equipment

Laboratory needs and requirements need to be well defined at each level of a programme. For example, the laboratories, workshops and computing facilities required for the first year students must be in place before the first intake of students. Similarly, before the end of first year, the needed laboratory facilities for the next two years must be available.

Some times, a few new institutions approach other national engineering institutions to get access to their laboratory facilities. This is not a good practice. Only under unavoidable circumstances, such adhoc arrangement may be acceptable but only for a very limited period (months and not years).

Pakistan Engineering Council, would like to see engineering institution to be self-sufficient both in faculty and laboratory facilities to ensure that effective education is being imparted.

3.10 Research Facilities and Equipment

An engineering institution can impart more effective education if it has active research programmes. Therefore, it is important that a new engineering institution must consider procurement of those tools and equipment which are research related. Experience has shown that those UETs which have better infrastructure for R&D can retain good faculty on long-term basis. Using such facilities, various client-sponsored studies can be conducted which become a source of revenue as well as enhance the credentials of the institution,

A new institution can benefit, if it initiates collaborative academic/research programmes with PEC-accredited engineering institutions in the country. Therefore, these factors should be given due consideration at the early stages of establishing an engineering institution.

3.11 Governance / Management Statutes, Rules and Regulations

To make various academic and administrative decisions, the PEC-accredited UETs in Pakistan have several statutory governing bodies like Senate, Syndicate as well as academic bodies like Boards of Studies, Board of Faculty and Academic Council etc. where representation is given to concerned Government Functionaries, eminent educationists/engineers and sponsors. The new institution must have a well defined governance and management structure and relevant guidance can be sought from the practices of other PEC-accredited engineering institutions. Each new institution is also required to have well-defined statutes, rules and regulations related to the total scope and functions of the management bodies.

3.12 Lecture Rooms & Other Teaching Aids

Neat and well-equipped classrooms should be available and other required instructional and research space should be provided. It is recommended that for a lecture theatre/room, the available space should be about 12-15 ft^2 per student. The institution should also have other teaching aids such as PCs, internet connectivity, electronic overhead projectors and multimedia presentation tools.

3.13 Library Facilities

The library is an essential requirement of an academic institution. The library should have a range of online and traditional collections consisting of reference materials for faculty as well as students.

There should be ample availability of textbooks and upto-date supplementary materials in the library which could be borrowed by students.

The library should also have scientific journals and other research publications to keep the faculty and students upto-date on latest advances in relevant knowledge/techniques. The library should also get latest scientific publications through regular subscriptions. The library facilities generally grow with the age of an institution. However, it is required that a new institution must have a collection of at least 3,000 books/journals per discipline at the inception stage. Moreover, at least 100 latest books per program must be added to the library every year.

Latest information access like internet facilities should be available and it is expected that all new engineering institutions will be equipped with these facilities.

3.14 Computing Facilities

With the improvement of memory capacity, many needs of the engineering institutions can be met by PCs. All new engineering institutions must therefore, be equipped with sufficient PCs and local area networks and academic portals so that students could have easy access to the tools of discovery and dissemination of knowledge.

3.15 Other Allied Facilities

It is expected of any new engineering institution to have sufficient hostel space to lodge the students. For this purpose, the establishment plan must consider accommodating at least those students who are non-locals. It should however, be kept in mind that site selection of the institution is also an important factor for determining the boarding and lodging needs of the student. In remote and isolated locations, 100% student accommodation may be required to be housed in separate hostels. Other than hostels, there should be provision of gymnasium/stadium and other playgrounds for sports and other recreational activities on campus. There should be cafeteria and some other recreational healthy facilities to make the life of students comfortable and conducive to scholarly activities. Another important consideration is faculty housing. It is required that faculty housing facility should be provided on-campus. Therefore, it is important to consider space availability for creation of such facilities for faculty and staff. Experience has shown that on-campus faculty is more productive and effective in running the academic programme of an institution. Therefore, PEC will certainly prefer new engineering institutions to have their own campus to house majority of faculty and staff.

Experience has also shown that provision of centralized facilities for school-going children of the employees increases the working efficiency of the staff. Therefore, some transport facilities are required to facilitate the pick & drop duties for the children and some community transport for the families of the Faculty and staff residing on campus. Pick & drop facility is also needed for staff and students coming from the neighboring town/city.

3.16 Financial Aspects

Only those private institutions may launch engineering programs who have the financial resources to establish an engineering institution. This requires that before embarking on this challenging assignment, financial requirements are fully understood. The PEC, must convince itself about the financial health of any new engineering institution before considering the case of initial accreditation. Therefore, the PEC point of view must be well understood with regards to guaranteed financial support in the form of endowment funds/donations/grants/seed money etc and a sound financial plan of the institution.

3.17 Expansion Provision

The main gross covered area for an engineering institution is recommended to be around 300 ft^2 per student. In terms of open space availability, it must meet the criteria laid down by HEC for immediate use and for future expansion.

4. CONCLUDING REMARKS

PEC Form AC-1 provides details of the essential accreditation requirements of engineering programs/intuitions. This document, however, should not be considered as

final reference. There may be some mandatory requirements of various other government bodies/agencies for establishing an engineering institution, which should be duly investigated and complied with by the sponsors. However, further guideline should also be available from PEC which can be contacted on telephone, fax, Email and Internet for further information.

The PEC being the only statutory body in the country to regulate engineering education has refused PEC registrations to many graduate engineers of un-accredited institutions in the past. Serious and full professional commitments of the sponsors in faithfully fulfilling the requirements given in these guidelines will facilitate initial accreditation of a new institution and its programmes of study.

FORM PEC AC - 1

PEC PROFORMA CONTAINING GUIDELINES / REQUIREMENTS FOR OPENING AN ENGINEERING UNIVERSITY/INSTITUTION

Before opening an engineering university / institution, the following guidelines must be strictly adhered to in order to avoid disappointment later. It is the sole responsibility of private engineering institutions to have the required minimum essential pre-requisites before attempting to launch an engineering institution / programme. The following essentials must exist and data should be provided to PEC alongwith completed PEC Form AC-1 (enclosed), when making request for initial accreditation of programmes. Failing this, it shall not be the obligation of PEC to register their graduates.

1. An executive summary containing details on development of proposal and its justification, objectives for opening engineering university/institution, needs of local society and available facilities.
2. Proof / information of status and acquisition of charter, description of management system, academic and administrative bodies and their hierarchy, financial resources, initial investment and its proof alongwith assurance for sound sustainable financial position.
3. Proof of completion of fulfillment of all legal formalities.
4. Separate information on requisite existing infra-structure for each discipline/programme in terms of land, buildings, equipments, library, laboratories, hostels, stadium, playgrounds and other facilities.
5. Details of additions in the proposed infrastructure and the estimated time frame for completion.
6. Details of proposed programs of study / disciplines and areas of specialization.
7. Detailed course outlines of the syllabi for all proposed courses of study.
8. Clearly publicized admission criteria and all related details including number of students per discipline, admission policy, fee structure and its year-wise break-up and scholarships and other financial aid programs available to needy, talented students.
9. Details of proposed examination and assessment systems.
10. Proposed measures on quality assurance for the students and teachers performance.
11. Details of faculty strength, their qualifications and experience in line with the PEC/HEC regulations, pay scales and criteria of selection and promotion of teachers in various cadres.
12. Details of any existing or proposed collaboration with national/international Engineering institutions accredited by PEC in the relevant disciplines after fulfilling PEC pre-admission eligibility requirements for seeking admissions in Engineering institution.
13. Detailed financial plan for the next 10 years including sources of yearly income and expenditure and their amount. Initial capital/seed money etc. available alongwith its documentary proof.

14. Details of laboratories, installed and proposed equipment alongwith lists of trained laboratory staff.

15. Title of proposed institution and the nomenclature of the degrees to be awarded.

16. Draft copies of the Act / Charter, statutes, rules and regulations for finance, students including discipline rules and service rules for the teachers.

17. Details of the members of governing body of the proposed institution.

18. Besides above following should be kept in sight:

(a) The library may have at least 3000 books per discipline and access to online materials is available.

(b) Maximum number of students in class shall be 40 and faculty workloads be kept according to HEC guidelines.

(c) Lecture theatres should have space of at least 12-15 ft^2 per student for theory and 40-50 ft^2 for laboratory. As suggested class strength for a normal classroom can be 40, while for a classroom equipped with audio visual aids it can be 60 for joint classes.

(d) The main gross covered area for an Engineering Institution should be at least 300 ft^2 per student. The land, for current use and future possible extension, shall be according to HEC guidelines for campus space.

CHAPTER – 4

QUESTIONNAIRE FOR ACCREDITATION / RE-ACCREDITATION

PAKISTAN ENGINEERING COUNCIL

QUESTIONNAIRE FOR ACCREDITATION/RE-ACCREDITATION

PEC FORM AC-1

NOTE: The information on the following points may be given precisely and in detail by attaching extra sheets if the space provided falls short. Attribute numbering must be given. Each page must be signed by the concerned head of the program / department. Before filling AC-1 Proforma, please consult attached Guidelines for AC-1 and the explanatory notes as well. Further information, if any, may also be obtained from the Registrar, PEC.

1. MANAGEMENT AND INFRASTRUCTURE OF THE INSTITUTION

1.1 AUSPICES

1.2 ORGANIZATIONAL SETUP

1.3 CONTROL

2. FINANCES

3. FACULTY

3.1 STRENGTH AND QUALITY OF FACULTY

3.1.1 FULL-TIME FACULTY

3.1.2 PART-TIME (OVER AND ABOVE FULL TIME) FACULTY

3.1.3 SHARED FACULTY

3.1.4 ACADEMIC QUALIFICATIONS

3.1.5 TRAINING OF FACULTY

3.1.6 FACULTY DEVELOPMENT AND CAREER PLANNING

3.1.7 SALARIES AND BENEFITS

3.1.8 PEC REGISTRATION AND UPDATION (Qualifications etc)

3.1.9 TEACHING AND RESEARCH LOAD

3.1.10 STUDENT/TEACHER RATIO

3.1.11 SUBJECT/TEACHER RATIO / CONTACT-HOURS

3.1.12 RESEARCH COMMITMENTS

4. ACADEMIC PROGRAMS

4.1 OBJECTIVES

4.2 CURRICULUM

4.2.1 HEC / PEC GUIDELINES

4.3 SYSTEM OF INSTRUCTIONS AND EXAMINATIONS (AS EVIDENT BY COURSE FILES)

4.3.1 INSTRUCTIONS

4.3.2 EXAMINATIONS

4.4 TEXTBOOKS

4.5 NET INSTRUCTIONAL HOURS

4.6 CURRICULUM REVISION

5. LABORATORIES AND ALLIED STAFF

5.1 ADEQUACY AND QUALITY OF EQUIPMENT AVAILABLE IN LABORATORIES AND WORKSHOPS

5.2 EQUIPMENT UTILIZATION

5.3 AVAILABILITY OF LABORATORY STAFF

5.4 QUALIFICATION OF LABORATORY STAFF

5.5 TECHNICAL COMPETENCY OF LABORATORY STAFF

5.6 ADEQUACY AND QUALITY OF ADMINISTRATIVE / SUPPORT STAFF

6. LIBRARY

6.1 BUDGET

6.2 BOOKS, MANUALS, INTERNATIONAL PUBLICATIONS ETC.

6.3 BOOK BANK

6.4 LIBRARY EQUIPMENT

6.5 ACCESS TO NATIONAL AND INTERNATIONAL DATA-BASES

6.5 JOURNALS / INTERNATIONAL PUBLICATIONS

7. STANDARD AND QUALITY OF INSTRUCTIONS

7.1 COMPLETION OF COURSES

7.1.1 THEORY

7.1.2 PRACTICALS

7.2 PERCEPTION OF STUDENTS

7.2.1 THEORY

7.2.2 PRACTICAL

7.3 COURSE FILES

7.4 STUDENTS' FEEDBACK

8. STUDENTS

8.1 ADMISSIONS

8.2 ADMISSION RESPONSE AND %AGE ADMITTED

8.3 INTAKE AND ITS QUALITY

9. ACADEMIC BUILDINGS AND OTHER ALLIED FACILITIES

9.1 BUILDINGS (HIRED OR OWNED)

9.2 OTHER ALLIED FACILITIES

10. ANNUAL COST PER STUDENT

11. FINANCIAL SUPPORT TO STUDENTS

12. CLASS SIZE

12.1 THEORY

12.2 PRACTICALS

13. OFFICE HOURS FOR ACADEMIC COUNSELING

14. OTHER FACILITIES FOR STUDENTS

14.1 HOSTEL(S) ACCOMMODATION

14.2 CONVOCATION HALL / AUDITORIUM

14.3 SPORTS FACILITIES (including swimming pool, gymnasium etc)

14.4 STUDENT TRANSPORT

14.5 OTHER FACILITIES

15. YIELD

16. DROPOUTS

17. AVERAGE DURATION

18. INTERNSHIP / PRACTICAL TRAINING

19. QUALITY OF PRODUCT

19.1 PLACEMENT BUREAU

19.2 ALUMNI'S SATISFACTION

19.3 EMPLOYERS' FEEDBACK

19.4 ACCEPTANCE FOR ADMISSIONS IN FOREIGN UNIVERSITIES

19.5 AVERAGE STARTING SALARY OF GRADUATES

19.6 AVERAGE TIME TAKEN TO FIND A JOB

20. OPERATIONAL BUDGET

21. DEVELOPMENT BUDGET

22. INVESTMENT AND INTERNAL RESOURCE GENERATION

22.1 INVESTMENT

22.2 INTERNAL RESOURCE GENERATION

23. RESEARCH AND PUBLICATIONS

23.1 FACULTY RESEARCH GRANT

23.2 EFFECTIVE UTILIZATION OF RESEARCH GRANT AND ITS NET OUTCOME

23.3 FACULTY PUBLICATIONS IN HEC APPROVED / ***INTERNATIONAL*** JOURNALS

23.4 CONTINUITY OF FACULTY RESEARCH

23.5 ACADEMIC COLLABORATIONS

23.6 TEXTBOOKS WRITTEN BY FACULTY MEMBERS

23.7 BUDGETARY ALLOCATION FOR CONFERENCES, SEMINARS, COLLOQUIA ETC.

23.8 COMPUTER AND INTERNET FACILITIES

23.9 ACCESSIBILITY OF FACULTY/STUDENTS TO COMPUTERS/INTERNET FACILITIES AND INTERNATIONAL DATABASES

24. INDUSTRIAL LINKAGES

24.1 MECHANISM

24.2 INDUSTRIAL LIAISON OFFICE

24.3 COMMERCIALIZATION OF RESEARCH FINDINGS

25. WEBSITE

EXPLANATORY NOTES TO FILL IN AC-1 PROFORMA FOR ACCREDITATION OF AN ENGINEERING PROGRAMME

1. AC-1 Proforma is a questionnaire arranged in a way to include all possible attributes required for academic evaluation of an engineering program incorporating the requirements of almost all internationally-recognized accrediting bodies of engineering including ABET (Accreditation Board for Engineering and Technology), USA.

2. AC-1 Proforma requires data of all such attributes which are essentially required by the PEC (Pakistan Engineering Council) to evaluate an engineering program being offered by an institution in Pakistan for the purpose of its recognition.

3. Guidelines for AC-1 Proforma further elaborate the nature of information required by the PEC. In case more information or clarification on any aspect of the questionnaire is required by an institution for any/all of its programs, the Registrar PEC may be contacted.

4. Each page of AC-1 Proforma after being duly filled in must be signed by the head of concerned department offering that program before its submission to the PEC.

5. The purpose of accreditation is to identify those institutions which offer professional programs in engineering worthy of recognition by the PEC. Accreditation exercise is also intended to provide guidance for the improvement of existing programs for an overall improvement of engineering education in Pakistan.

6. While accreditation of an engineering institution in the US is voluntary, about 99% of US engineering institutions apply for accreditation to ABET mostly at baccalaureate level. In Pakistan however, this is the mandatory and statutory obligation of the PEC to register all qualified engineers.

7. The prime considerations of PEC in evaluating any engineering program are:

    a. That it is considered as containing the requisite HEC-approved engineering curriculum as minimum requirement.
    b. That the program must also meet the requirements of the PEC.

8. The PEC criteria are intended to ensure an adequate foundation in science, humanities and social sciences, engineering sciences, engineering analysis and design methods and preparation for pursuing higher engineering specializations. The criteria afford sufficient flexibility in science requirements to permit expression of an institution’s individual qualities.

9. The overall curriculum must provide an integrated educational experience to develop the ability to apply the pertinent knowledge to identification and solution of practical problems in an area of engineering specialization.

10. After receiving the AC-1 Proforma duly filled in, the institution is visited by the members of engineering accreditation and quality evaluation committee and engineering program is evaluated by using the already approved criteria in AC-2 form and its guidelines in addition to a visit report.

11. After the above exercise by the PEC, the evaluation of engineering program is processed through requisite channels and ultimately a final decision on accreditation/re-accreditation is taken by the Chairman PEC regarding recognition or otherwise of a program of an institution.

12. Before admitting the students, it is the responsibility of institution to ensure that minimum infrastructural facilities, adequate full-time faculty and other requirements of the PEC are satisfactorily met for the purpose of accreditation. The maintenance of minimum standards by already-accredited programs is also the responsibility of the concerned institution. In case of failure to acquire/maintain the required standards, the accreditation may be denied or re-accreditation may not be granted as the case may be.

13. PEC strongly recommends that annual system of examination may be gradually phased out and institutions should get converted to semester system at an early date.

14. Net instructional hours mean the time spent in the lecture theaters/laboratories by the students under the supervision of a teacher according to his approved timetable.

15. Every possible effort should be made to enhance the morale of the faculty in order to achieve good academic results.

16. Revision of curriculum on regular basis while considering international trends, job position in the market and the demand of industry, is a good sign for the improvement of engineering education on continuous basis.

17. Internal resource generation "including income from short courses, seminars, consulting services and testing of material, equipment and structures" is also essential for a program to attain self-sufficiency.

18. The main strength of any program is its regular full-time faculty. All aspects pertaining to it would be given special consideration in the evaluation process.

CHAPTER – 5

EXPLANATION OF ATTRIBUTES FOR PEC FORM AC-1

EXPLANATION OF ATTRIBUTES
FOR AC-1

1. MANAGEMENT AND INFRASTRUCTURE OF THE INSTITUTION

1.1 AUSPICES

This aspect pertains to the type of status i.e. corporate, university, institute, affiliated college, constituent college or independent college.

1.2 ORGANIZATIONAL SETUP

This aspect pertains to essential governance and management setups including financial and academic infrastructure like Syndicate, Senate, Academic Council, Board of Studies, Deans, Chairmen, Heads of Divisions, Registrar, Treasurer, Controller of Examination, Director Sports and Health Services. In case of a private institution, it must be managed by a Foundation / Trust, properly registered under the law.

1.4 CONTROL

This aspect pertains to academic and administrative powers given to essential organs mentioned above. The financial powers should be decentralized to the extent possible.

2. FINANCES

This aspect pertains to the financial resources available to the institution from various sources such as grant by the Higher Education Commission (HEC), self-financing and other income generation schemes etc. An audited balance sheet duly audited by a registered chartered accounting firm should be attached.

3. FACULTY

3.1 STRENGTH AND QUALITY OF FACULTY

This aspect pertains to the faculty employed. The faculty members who are full-time employees dedicated to the program would be considered as permanent faculty. Full-time also means that the faculty has served the institution at least for a minimum of one year. Two shared faculty members would be counted as one regular faculty.

FULLTIME FACULTY

This aspect pertains to regular, full-time faculty teaching core subjects based on 20:1 student-teacher and 2.5:1 subject-teacher ratio for UG programs. Separately, the team will examine the faculty dealing with humanities, mathematics and sciences, and record its observations.

3.1.2 PART-TIME (OVER AND ABOVE FULL-TIME) FACULTY

Upto 20% teaching staff may be allowed on part-time basis as a temporary arrangement (but only in special circumstances). This aspect pertains to visiting faculty.

3.1.3 SHARED FACULTY

This aspect pertains to those faculty members who are serving in the same institution as a full-time faculty dedicated to some other programs and are being used to teach subjects relating to their disciplines of the under-review program. To ensure that each program develops independently, the maximum limit of shared faculty is 25% of the regular strength. However, while employing the shared faculty, teaching load limit, as prescribed in Section 3.1.9, should be strictly adhered to.

3.1.4 ACADEMIC QUALIFICATION

This aspect pertains to the HEC/PEC-recognized degrees of regular/full-time faculty members. Article (6) of Regulations for Engineering Education in Pakistan is reproduced below, which indicates the academic qualifications for engineering faculty.

S.No.	Post	Minimum Qualifications and Experience
1	**2**	**3**
1.	**Lecturer**	1st Class Bachelor's Degree in relevant branch of engineering provided he is enrolled in master's level engineering programme. However, after 2010 all applicants should be at least MS / M.Sc. Engineering.
2.	**Assistant Professor**	a. Master's degree in relevant field. However, after 2010 30% should be Ph.Ds, after 2012, 60% should be Ph.Ds, and by end of 2015, 100% should be Ph.Ds. b. 2 year teaching/research experience in a recognized Institution/College/University or 2 years professional experience in the relevant field in a national or international organization.
3.	**Associate Professor**	a. Ph.D degree in relevant field recognized by HEC in consultation with PEC. b. 7 years teaching /research experience in a recognized Institution / College /University or 7 years professional experience in the relevant field in a national or international organization out of which 2 years must be teaching experience. OR 10 years teaching experience with at least 4 years experience at the Post-Ph.D level in HEC recognized University or Post-graduate Institution or professional experience in the relevant field in a national or international organization after year 2012. c. 5 research publications to be systematically increased to 10 research publication with at least 4 in last 5 years after 2012, in journals of international repute, recognized by HEC-PEC.
4.	**Professor**	a. Ph.D degree in relevant field, recognized by HEC

in consultation with PEC.

b. 12 years including 5 years teaching experience.

c. 15 years teaching / research experience with at least 8 years experience at the Post-Ph.D level in HEC recognized University or Postgraduate Institution or International Organization after year 2012.

OR

10 years Post-Ph D teaching / research experience in a recognized University or a postgraduate institution or professional experience in relevant field in a national or international organization after year 2012.

d. 8 research publications to be systematically increased to 15 research publications with at least 5 in last 5 years after 2012, in journals of international repute, recognized by HEC-PEC.

The universities are encouraged to determine the number of faculty members on professorial ranks (i.e. Prof., Assoc. Prof. and Asst. Prof.) without a bar on the ratio among different ranks to encourage promotion to deserving candidates.

3.1.5 TRAINING OF FACULTY

It is strongly recommended that each newly-inducted faculty member undergoes eight-weeks training to become an effective teacher. There should be no exception even in case of postgraduate faculty. This training should be suitably designed to encompass at least the following aspects.

- General aspects of lecture delivery including thorough preparation.
- Use of support systems during lecture delivery.
- Mode and means of efficient student-teacher interactions.
- Developing course files.
- Dedicated office-hours and their effectiveness.
- Conducting effective quizzes/mid-term tests/final exams.
- How to make home work an effective tool to assess students.
- The role of attendance in learning.
- Lecture breakdown to ensue complete course coverage.
- Making semester system more transparent and effective.
- Code of conduct and integrity issues.
- Dress code.
- Teacher as a role model.
- Communication skills and ability to disseminate knowledge especially at the conceptual level.
- Student psychology and how to deal with them, without hampering their investigative and questioning attributes.

3.1.6 FACULTY DEVELOPMENT AND CAREER PLANNING

This aspect pertains to the improvement schemes of faculty qualification.

3.1.7 SALARIES AND BENEFITS

This aspect pertains to the salaries and benefits of the teaching staff of the institution, which may be compared with the other Public / Private institutions.

3.1.8 PEC REGISTRATION AND UPDATION (Qualifications etc).

It is highly desirable that all engineering faculty members be registered with the PEC, except for non-engineering subject specialists.

3.1.9 TEACHING LOAD

This aspect pertains to the number of credit-hours teaching per week, based on actual number of teachers present with single section teaching at a time both for annual and semester system of Instructions. The following guidelines for weekly credit-hours are given with an average load not exceeding 09 credit-hours per week. However, one credit hour for lab work means three contact hours in the lab in a semester system.

Professor	: *9*	(Any combination of teaching, research and admin duties but with maximum attention to research).
Associate Professor	: 9 – 12	
Assistant Professor	: 8 – 12	(With maximum focus on teaching, but some time for research and hands-on experience).
Lecturer	: 8 – *14*	

3.1.10 STUDENT: TEACHER RATIO

This aspect pertains to the permissible student-teacher ratio which has been presently agreed as (20:1) for UG programs, considering the core faculty only. On this basis, the actual number of required faculty may be worked out. This will be brought to the level of 15:1 subsequently.

3.1.11 SUBJECT: TEACHER RATIO / CONTACT-HOURS

The concept of subject-teacher ratio pertains to the annual system of instructions and examination. For semester system, the faculty loading is defined in terms of credit-hours per week. The PEC plans to get the system of education fully semesterised by September 2010. For the time being however, both criteria need to be considered.

4. ACADEMIC PROGRAM

This aspect pertains to the academic program for the whole academic period leading to the award of a degree in engineering.

4.1 OBJECTIVES

The objectives of the program and its visualized outcome should be clearly highlighted.

4.2 CURRICULUM

4.2.1 HEC / PEC GUIDELINES

HEC has laid down minimum guidelines for syllabi of all major engineering programs taught in Pakistan. While imparting education, the institution may avail the flexibility of diversification and additions based on the changes taking place internationally but with due consideration to the minimum requirements set by the HEC / PEC.

The HEC and PEC have also agreed on the contents of engineering and non-engineering courses as: engineering courses 65-70% and non-engineering courses: 30-35%.

4.3 SYSTEM OF INSTRUCTIONS AND EXAMINATIONS (AS EVIDENT BY COURSE FILES)

The semester system is universally followed for obvious advantages it offers over annual system. The semester system will become more successful as we improve the quality of faculty. All engineering institutions will be required to convert to the semester system by Sept. 2010 when faculty except lecturers (MSc) will be required to have PhD degrees. Therefore, the universities are encouraged to make necessary planning to achieve the target. Another deficiency in the examination of annual system lies in the form of choice, which encourages selective study. This must be done away with latest by March 2009. The bi-annual system should be converted into semester system as early as possible.

4.3.1 INSTRUCTIONS

4.3.2 EXAMINATIONS

4.4 TEXTBOOKS

Prescribed textbooks, codes and design aids may be examined in the light of international practices.

4.5 NET INSTRUCTIONAL HOURS

This aspect pertains to the total contact-hours committed to theory and laboratory/ practical work for effective teaching of different subjects. The length of a semester should preferebly be 16-20 weeks.

4.6 CURRICULUM REVISION

This aspect pertains to curriculum revision in the light of national, HEC and international requirements and on the demand of the industry. On conclusion of the final examinations, the Board of Studies of each department should have a mandatory meeting to discuss this issue exclusively.

5. LABORATORIES AND ALLIED STAFF

This aspect pertains to the departmental infrastructure in the context of quality and adequacy of laboratory equipment, space and technical staff.

5.1 ADEQUACY AND QUALITY OF EQUIPMENT AVAILABLE IN LABORATORIES AND WORKSHOPS

5.2 EQUIPMENT UTILIZATION

5.3 AVAILABILITY OF LABORATORY STAFF

The PEC strongly recommends that each major laboratory must be supervised by a qualified engineer who should be supported by a diploma holder in relevant technology.

5.4 QUALIFICATION OF LABORATORY STAFF

5.5 TECHNICAL COMPETENCY OF LABORATORY STAFF

6. LIBRARY

This aspect pertains to the collection and efficient and smooth running of main library considering related programs of the institution.

6.1 BUDGET

A minimum of Rs. 1.0 Million budget should be allocated to cater for: (a) addition of 100 new/latest books per year; (b) expenses of 3 journals and 3 magazines per program & (c) maintenance/operational cost of the library.

6.2 BOOKS

This aspect pertains to the availability of various volumes available in the central library which should include books published within the last 10 years pertaining to different disciplines of the institution. A minimum of 3,000 distinct books should be available relevant to each program.

6.3 BOOK BANK

This aspect pertains to the availability of textbooks in the central library for borrowing by the students of different disciplines for the whole session.

6.4 LIBRARY EQUIPMENT

This aspect pertains to various items of equipment of the central library such as photocopiers, computers, scanners, video and audio equipment, CD ROMS, computerized search etc. Library software is available in the market which can help in improving the functioning of the library in all aspects.

6.5 JOURNALS

This aspect pertains to the availability of different research journals for different disciplines in the library such as gazettes, magazines, periodicals, journal publications, etc. The institution must be linked to the HEC-supported on-line access to research journals. A minimum of 3 magazines and 3 journals per program must be subscribed through hard copies.

7. STANDARD AND QUALITY OF INSTRUCTION

7.1 COMPLETION OF COURSES

7.1.1 THEORY

This aspect pertains to completion of theory courses during the prescribed period as per official record.

7.1.2 PRACTICAL

This aspect pertains to the completion of assigned practical experiments to a course during the prescribed period as per official record.

7.2 PERCEPTION OF STUDENTS

This information may be gathered from the random sampling of students in an independent environment.

7.2.2 THEORY

7.2.2 PRACTICAL

7.3 COURSE FILE

The practice of course file is adopted internationally to monitor as how effective the course has been taught. It is strongly recommended that all engineering institutions in Pakistan make maintenance of course-file mandatory. A course file must include all relevant data (such as given below) which could become the basis of evaluation.

- Lecture breakdown for entire semester.
- List of subjects taught, teaching notes and sample of practical printouts
- Schedule of monthly / mid-term tests and final examination.
- Breakdown of laboratory experiments pertaining to the course and record of successful conduct.
- Samples of best, worst and average answer sheets, along with the question paper of each exam, quiz and home work.
- Samples of quizzes.

- Listing of textbook and other reference books pertaining to the course.
- Record of make-up classes for any un-scheduled holiday.
- Details of office hours for tutoring etc.
- Recommendation and suggestions related to the course for the next session.

7.4 STUDENTS' FEEDBACK

This aspect pertains to the performance evaluation of the faculty members through secret feedback of students at the end of each semester, and the remedial measures taken.

8. STUDENTS

8.1 ADMISSIONS

It is to be examined whether the students are admitted in accordance with the minimum eligibility conditions prescribed by the PEC and whether the merit is strictly followed. The PEC has set the following minimum requirements for admission into an engineering program:-

- * Matric/O level (with science) : 60%
- * F.Sc/A level (pre-engineering/Computer Science) : 60%
- Entry test : 50% (pass marks)

*Note: However, if any University admits a candidate with less than 60% from the backward areas (not below 50%) marks, the University will then arrange a three to six month zero semester for preparing the students for qualifier examination in pre-engineering core subjects, in which these provisionally admitted candidates will be required to secure at least 60% marks to confirm their permanent admissions.

8.2 ADMISSION RESPONSE AND PERCENTAGE ADMITTED

This aspect pertains to the ratio of students selected and the total number of applications received.

8.3 INTAKE

This aspect pertains to the number of students admitted considering the capacity of a given engineering program and its allied available facilities.

9. ACADEMIC BUILDINGS AND OTHER ALLIED FACILITIES

9.1 BUILDINGS (HIRED OR OWNED)

This relates to central and departmental building infrastructure in the context of academic and administrative requirements.

9.2 OTHER ALLIED FACILITIES

This aspect pertains to existence of seminar rooms, reproduction facilities, audiovisual aides, computer facilities for staff and students etc.

10. ANNUAL COST PER STUDENT

The actual expenditure incurred on each student per year, based on overall recurring budget, should be worked out and compared with the standard cost of engineering education in Pakistan.

11. FINANCIAL SUPPORT TO STUDENTS

This aspect pertains to various scholarships and interest-free loans which the students may get from various sources.

12. CLASS SIZE

12.1 THEORY

This aspect pertains to the number of students per section. For engineering subjects, the class size may not exceed 40 students. For non-engineering subjects, bigger class of 60 - 70 students may be allowed but only with appropriate verifiable infrastructural support.

12.2 PRACTICAL

This aspect pertains to the number of students per workstation/experimental setup.

13. OFFICE HOURS FOR ACADEMIC COUNSELING

This aspect pertains to the guidance available to the students from teachers through dedicated office-hours beyond the scheduled time-table.

14. OTHER FACILITIES FOR STUDENTS

This aspect pertains to hostel accommodation, auditorium, sports facilities, gyms, transport, health centre, clinic, guest house etc.

14.1 HOSTEL(S) ACCOMMODATION

14.2 CONVOCATION HALL / AUDITORIUM

14.3 SPORTS FACILITIES (including swimming pool, gym etc)

14.4 TRANSPORT FOR STUDENTS

14.5 OTHER FACILITIES

This aspect pertains to other common facilities such as cafeteria, health centre, clinic, guest house, club etc.

15. YIELD

This aspect pertains to the yearly percentage of the graduating students to the respective intake.

16. DROPOUTS

17. AVERAGE DURATION

This aspect pertains to the actual number of calendar years actually spent for graduation with respect to the minimum prescribed time limit.

18. INTERNSHIP / PRACTICAL TRAINING

This aspect pertains to the involvement of students in practical training in industry, user organizations etc, during summer vacations.

19. QUALITY OF PRODUCT

19.1 PLACEMENT BUREAU

Each university should have a placement bureau that will maintain record of students' employment, assist the students in placement and interact with relevant employers.

19.2 ALUMNI'S SATISFACTION

This aspect pertains to the opinion of former graduates regarding the quality and adequacy of their education, and that of fresh graduates of the same institution and in the same discipline. The institutions are encouraged to develop a data base of outgoing graduates to receive their feedback through the placement bureau and **from** alumni's associations.

19.3 EMPLOYER'S OPINION

The quality of the engineers produced by the institution may be assessed on the basis of market survey made by the end users, Public Service Commission, employers and hired consultants etc.

19.4 ACCEPTANCE FOR ADMISSIONS IN FOREIGN UNIVERSITIES

The data available from regular faculty members regarding admission of their graduating students in foreign universities in graduate programs.

19.5 AVERAGE STARTING SALARIES OF GRADUATES

This aspect pertains to the market forces which determine the salary package of a fresh graduate of an Institution, depending on their quality.

19.6 AVERAGE TIME TAKEN TO FIND A JOB

The time taken after graduation to find a job is a reflection on the quality of the graduate.

20. OPERATIONAL BUDGET

This aspect pertains to the allocated recurrent budget compared with the demanded budget of the institution and its adequacy.

21. DEVELOPMENT BUDGET

This aspect pertains to the budget available for development of Infrastructural academic and administrative facilities.

22. INVESTMENT AND INTERNAL RESOURCE GENERATION

22.1 INVESTMENT

This aspect pertains to the investment of various funds available with the institution such as G.P. Fund, Pension, C.P. Fund, Benevolent Fund, income from self-finance scheme and surplus funds available after appropriations etc. The institution may consider initiating the loan scheme to facilitate deserving students.

22.2 INTERNAL RESOURCE GENERATION

This aspect pertains to the internal resources generated through short courses, seminars, consulting services and testing etc.

23. RESEARCH AND PUBLICATIONS

The work regarding research carried out in each engineering program of the Institution will be examined in the light of attributes of good faculty members who are Ph.D. degree holders, Consultancy & Design experience, interaction with industry and user organizations to attract R&D funds and indulgence in research etc. and papers published in the refereed journals.

23.1 FACULTY RESEARCH GRANT

23.2 EFFECTIVE UTILIZATION OF RESEARCH GRANT AND ITS NET OUTCOME

23.3 FACULTY PUBLICATIONS IN HEC APPROVED JOURNALS

Research is very important for a dynamic program. In a year, each faculty member is expected to publish at least 1 - 2 good papers in a reputed referred journal.

23.4 CONTINUITY OF FACULTY RESEARCH

To ensure continued commitment to research by each faculty member.

23.5 ACADEMIC COLLABORATION

This aspect pertains to the collaboration with national and foreign universities for joint research, training, data exchanges and holding of seminars etc. The collaboration can be quite effective if the objectives of the program are clearly defined.

23.6 TEXTBOOKS WRITTEN BY FACULTY MEMBERS

23.7 BUDGETARY ALLOCATION FOR CONFERENCES, SEMINARS, COLLOQUIUM ETC.

23.8 COMPUTER AND INTERNET FACILITIES

This aspect pertains to computer facilities (i.e. computers, scanners, internet facilities, printers etc.) provided in the department for the students and teachers.

23.9 ACCESSIBILITY OF FACULTY/STUDENTS TO COMPUTER/INTERNET FACILITIES AND INTERNATIONAL DATABASES

This aspect pertains to the computing facility / library available in the department and its degree of accessibility to the students.

24. INDUSTRIAL LINKAGE

24.1 INDUSTRIAL LIAISON OFFICE

Presence of Corporate Office in the University for linkage with industry and other organizations.

24.2 COMMERCIALIZATION OF RESEARCH FINDINGS

25. WEBSITE

Each engineering institution must have its web page where accreditation status of each program should be clearly and correctly displayed. It should also contain information of all major parameters of accreditation such as faculty, laboratory equipment, laboratory staff, R&D activities undertaken and library facilities etc.

CHAPTER – 6

DETERMINATION OF ACCREDITATION STATUS ACCORDING TO THE PEC CRITERIA FOR AN UNDERGRADUATE ENGINEERING PROGRAM

PEC FORM AC-2

DETERMINATION OF ACCREDITATION STATUS ACCORDING TO THE PEC CRITERIA FOR AN UNDERGRADUATE ENGINEERING PROGRAM

NAME OF THE INSTITUTION: _____

ACCREDITATION STATUS: _____

PROGRAM / DISCIPLINE: _____

CRITERIA FOR ACCREDITATION OF UNDERGRADUATE ENGINEERING PROGRAMS OFFERED BY THE INSTITUTIONS IN PAKISTAN

SECTION 'A' **(TOTAL SCORE 760)**

ATTRIBUTES	MAXIMUM RATING	SCORE OBTAINED	REMARKS / JUSTIFICATION
1. MANAGEMENT AND INFRASTRUCTURE OF THE INSTITUTION [25]			
1.1 AUSPICES * Status not defined * Status vaguely defined * Status clearly defined	5		
1.2 ORGANIZATIONAL SETUP * Weak * Overlapping * Well laid out	10		
1.3 CONTROL * Power not delineated * Power not clearly delineated * Power clearly delineated	10		
2. FINANCES [25] * Non existing * Existing but not stable * Stable * Highly stable	25		

3. FACULTY [250]			
3.1 STRENGTH AND QUALITY OF FACULTY **3.1.1 FULLTIME FACULTY** * Poorly staffed (Student/teacher ratio 30:1 or more) * Adequately staffed (Student/teacher ratio 21-30:1) * Well staffed (Student/teacher ratio 15-20:1)	45		
3.1.2 PART-TIME (OVER AND ABOVE FULL-TIME) FACULTY * More than allowed * Allowed * Less than allowed * No visiting faculty	15		
3.1.3 SHARED FACULTY * More than allowed * Allowed * Less than allowed * No shared faculty	15		
3.1.4 ACADEMIC QUALIFICATION * Weak Faculty * Reasonable Faculty * Strong Faculty	40		
3.1.5 TRAINING OF FACULTY * No system of training in place * Some orientation but no formal training * Systematic training scheme in place	20		

3.1.6 FACULTY DEVELOPMENT AND CAREER PLANNING * No planning * Poor planning * Well planned	30		
3.1.7 SALARIES AND BENEFITS * Low * Reasonable * Attractive	20		
3.1.8 PEC REGISTRATION AND UPDATION (Qualifications etc). * Not registered with the PEC * Registered with the PEC	10		
3.1.9 TEACHING LOAD * Average load more than prescribed * Average load manageable * Average load nearly as prescribed	20		
3.1.10 STUDENT:TEACHER RATIO * Very high * High * Appropriate	20		
3.1.11 SUBJECT:TEACHER RATIO/CREDIT-HOURS **SEMESTER SYSTEM** **Credit Hours / week** Teaching Res/Admin * **Professor (8-10) 40% 60%** *** Assoc. Prof. (8-10) 50% 50%** *** Assist. Prof. (8-12) 60% 40%** *** Lecturer (8-14) 70% 30%** **OR** **ANNUAL SYSTEM** Subject : teacher ratio * 3.0 to 2.7 * 2.6 to 2.3 * 2.2 to 2.0	15		

4. ACADEMIC PROGRAM [100]			
4.1 OBJECTIVES * Not defined * Vaguely defined * Well defined **4.2 CURRICULUM**	10		
4.2.1 HEC/PEC GUIDELINES * Not well structured and not in line with HEC / PEC Guidelines * Closely structured to the HEC/PEC requirements * Well structured and rich in contents as compared to HEC / PEC Guidelines	20		
4.3 SYSTEM OF INSTRUCTIONS AND EXAMINATIONS (AS EVIDENT BY COURSE FILES) **4.3.1 INSTRUCTIONS** **SEMESTER SYSTEM** * Unsatisfactory * Satisfactory * Good * Excellent **OR** **ANNUAL SYSTEM** * Unsatisfactory * Satisfactory * Good * Excellent	15		
4.3.2 EXAMINATIONS **SEMESTER SYSTEM** * Unsatisfactory * Satisfactory * Good * Excellent **OR** **ANNUAL SYSTEM** * Unsatisfactory * Satisfactory * Good * Excellent	25		

4.4 TEXTBOOKS * Sub-standard (older than 10 years). * Acceptable (5 to 10 years old). * Highly recommended (New to 5 years old)	10		
4.5 NET INSTRUCTIONAL HOURS * Insufficient * Sufficient (close to PEC guidelines) * More than PEC guidelines	10		
4.6. CURRICULUM REVISION * No revision * Revised occasionally * Revised regularly (every four years)	10		
5. LABORATORIES AND ALLIED STAFF [110]			
5.1 ADEQUACY AND QUALITY OF EQUIPMENT AVAILABLE IN LABORATORIES AND WORKSHOPS * Not available/non-operational / low quality * Inadequate and partly operational / medium quality * Adequate, fully operational and good quality	40		
5.2 EQUIPMENT UTILIZATION * Poorly utilized * Inadequately utilized * Properly utilized	20		
5.3 AVAILABILITY OF LABORATORY STAFF * Not available * Available but not sufficient * Available in sufficient number	10		
5.4 QUALIFICATION OF LABORATORY STAFF * Unqualified (Matriculate) with some experience * Poorly qualified (Matriculate + DAEs) * Well qualified (BEs + DAEs)	15		

5.5 TECHNICAL COMPETENCY OF LABORATORY STAFF * Poor * Good * Very Good * Excellent	15		
5.6 ADEQUACY AND QUALITY OF ADMINISTRATIVE / SUPPORT STAFF * Poor * Good * Very Good * Excellent	10		
6. LIBRARY [100]			
6.1 BUDGET * Inadequate * Adequate * More than adequate	30		
6.2 BOOKS * No books * Insufficient books * Sufficient books	30		
6.3 BOOK BANK * Non-existing * Existing, but insufficient. * Sufficient	15		
6.4 LIBRARY EQUIPMENT * Non-existing * Insufficient * Sufficient	15		

6.5 JOURNALS * Non-existing * Insufficient * Sufficient but variety not available * Sufficient and variety available	10		
7. STANDARD AND QUALITY OF INSTRUCTION [90]			
7.1 COMPLETION OF COURSES **7.1.1 THEORY** * Unsatisfactory (< 75% coverage) * Satisfactory (> 75% coverage) * Excellent (100% coverage)	20		
7.1.2 PRACTICAL * Unsatisfactory (< 75%) * Satisfactory (> 75%) **7.2 PERCEPTION OF STUDENTS**	15		
7.2.1 THEORY * Unsatisfactory * Satisfactory * Good	15		
7.2.2 PRACTICAL * Unsatisfactory * Satisfactory * Good	10		
7.3 COURSE FILE * Course file not maintained * Course file maintained but not properly organized * Course file maintained and well organized	20		

7.4 STUDENTS' FEEDBACK * No system in place * System in place but not effective * System in place and highly effective	10		
8. STUDENTS [60]			
8.1 ADMISSIONS * Matric/O-level (with science) : 60% * F.Sc/A-level (pre-engineering) : 60% * Entry test : 50% (pass marks) Admission based on overall marks secured. * < 60 % * 60–70 % * Above 70%	20		
8.2 ADMISSION RESPONSE AND PERCENTAGE ADMITTED * Very high (50% and above) * Low (30 – 50%) * Very Low (< 30%)	25		
8.3 INTAKE * Unmanageable * Large * Manageable * Correct	15		

SECTION 'B' **(TOTAL SCORE 500)**

ATTRIBUTES	MAXIMUM RATING	SCORE OBTAINED	REMARKS / JUSTIFICATION
9. ACADEMIC BUILDINGS AND OTHER ALLIED FACILITIES [40]			
9.1 BUILDINGS (HIRED OR OWNED) * Inadequate (lease period less than 15 years) * Adequate (lease period more than 15 years) * More than adequate (owned)	15		
9.2 CONVOCATION HALL/AUDITORIUM * Non existing * Satisfactory * Good	15		
9.3 OTHER ALLIED FACILITIES * Not available * Inadequate * Adequate	10		
10. ANNUAL COST PER STUDENT [10] * Too low (<Rs.30,000 per student) * Low (Rs.31,000-45,000 per student) * Reasonable (Rs.46,000-65,000 per student) * High (Rs.66,000 and above per student)	10		
11. FINANCIAL SUPPORT TO STUDENTS [15] * Not available * Available (but limited to <50% of eligible students) * Adequate (available to >50% of eligible students)	15		

12. CLASS SIZE [20]			
12.1 THEORY (Engineering Subjects/Non-Engineering Subjects) * Large > 40 / 70 * Correct Size 35 / 60	10		
12.2 PRACTICAL * Large > 4 * Manageable = 4 * Correct size < 4	10		
13. OFFICE HOURS FOR ACADEMIC COUNSELING [10] * No counseling at all * Some counseling * Well organized counseling	10		
14. OTHER FACILITIES FOR STUDENTS [75]			
14.1 HOSTEL(S) ACCOMMODATION (Boys & Girls) * Poor accommodation * Inadequate accommodation * Adequate accommodation	40		
14.2 SPORTS FACILITIES (including swimming pool, gym. etc) * Non existing * Inadequate * Adequate	10		
14.3 TRANSPORT FOR STUDENTS * Non existing * Inadequate * Adequate	10		

14.4 OTHER FACILITIES * Not available * Partially available * Available	15		
15. YIELD [10] * Unreasonably Low (below 30%) * Low (30% - 50%) * High (50% - 75%) * Very High (75% - 100%)	10		
16. DROPOUTS [10] * Extremely high dropouts (more than 10% of intake). * Reasonable dropouts (5-9 % of intake). * Minimum dropouts (<5 % of intake).	10		
17. AVERAGE DURATION [10] * Unduly long (> 6 years). * Longer than minimum prescribed duration (>4<6 years) * Within minimum prescribed duration (4 years).	10		
18. INTERNSHIP/PRACTICAL TRAINING [10] * No provision * Reasonable provision * Compulsory practical training	10		
19. QUALITY OF PRODUCT [90] **19.1 PLACEMENT BUREAU** * Does not exist * Exists but not functionally operative * Exists and operative	10		

19.2 ALUMNI'S SATISFACTION * Not available * Unsatisfied * Satisfied * Extremely satisfied	15		
19.3 EMPLOYERS' FEEDBACK * Not good * Reasonably good * Very Good * Excellent	25		
19.4 ACCEPTANCE FOR ADMISSION IN FOREIGN UNIVERSITIES * Not accepted at all * Accepted with reservations / tests * Readily accepted	20		
19.5 AVERAGE STARTING SALARY OF GRADUATES * Less than Rs. 15,000 per month * Between Rs. 15,000-25,000 per month * More than Rs. 25,000 per month	10		
19.6 AVERAGE TIME TAKEN TO FIND A JOB * Less than 6 months * Between 6 and 12 months * More than 12 months	10		
20. OPERATIONAL BUDGET [20] * Inadequate * Adequate * More than adequate	20		

21. DEVELOPMENT BUDGET [20]	20		
* Not adequate (<10 % of operational budget) * Adequate (10-20%) * More than adequate (more than 20%)			
22. INVESTMENT AND INTERNAL RESOURCE GENERATION [20]			
22.1 INVESTMENT * No investment * Improper investment * Proper investment	10		
22.2 INTERNAL RESOURCE GENERATION * No fund generation * Inadequate fund generation * Adequate fund generation	10		
23. RESEARCH AND PUBLICATIONS [130]			
23.1 FACULTY RESEARCH GRANT * Nil * Reasonable * Sufficient	15		
23.2 EFFECTIVE UTILIZATION OF RESEARCH GRANT AND ITS NET OUTCOME * Not used * Reasonably used * Appropriately used	10		

23.3 FACULTY PUBLICATIONS IN HEC-APPROVED JOURNALS * Nil * Reasonable * Good	20		
23.4 CONTINUITY OF FACULTY RESEARCH * Nil * Moderate * Appropriate	15		
23.5 ACADEMIC COLLABORATION * No system of collaboration * Weakly established * Inadequately established * Adequately established	20		
23.6 TEXTBOOKS WRITTEN BY FACULTY MEMBERS * No book written * Some manuals but no formal book published * Book(s) published	10		
23.7 BUDGETARY ALLOCATION FOR CONFERENCES, SEMINARS, COLLOQUIUMS ETC. * No provision * Irregular provision * Regular provision	10		
23.8 COMPUTER AND INTERNET FACILITIES * Non existing * Inadequate * Adequate	20		

23.9 ACCESSIBILITY OF FACULTY / STUDENTS TO COMPUTER / INTERNET FACILITIES AND INTERNATIONAL DATABASES * Low * Reasonable * Fully accessible	10		
24. INDUSTRIAL LINKAGE [30]			
24.1 INDUSTRIAL LIAISON OFFICE * Non-existing * Existing but not well-organized * Existing, well-organized but no formal linkage established * Existing, well-organized and some linkage established	10		
24.2 COMMERCIALIZATION OF RESEARCH FINDINGS * No effort made to commercialize research findings * Some efforts made but without success * Some commercialization realized * Significant commercialization realized	20		
25. WEBSITE [20]	20		
* Not available * Available but accreditation data are not complete * Relevant accreditation data available and complete			

26. TOTAL SCORE OF SECTION A ____ / **760**

27. TOTAL SCORE OF SECTION B ____ / **540**

28. OVERALL SCORE ____ / **1300**

29. GENERAL OBSERVATIONS

_____

_____

_____

_____

_____

_____

30. Accreditation Status

i. Accredited up to three years _____

ii. Pended for Six Months _____

iii. Not accredited _____

CHAPTER – 7

GUIDELINES TO FILLING UP PEC FORM AC-2 BY THE EVALUATION TEAM MEMBERS

MANDATORY REQUIREMENTS

- *To qualify for accreditation, overall qualifying marks for both sections (A & B) should not be less than 50%.*
- *In case of obtaining less than 50% marks specifically in item number (3) Faculty, the program may not be accredited.*
- *In case of obtaining less than 50% aggregate score in item number (5) Laboratories and allied staff, (6) Library, (7) Standards & quality of instructions and (8) Students, the program may also be disqualified for accreditation.*

SECTION A

1. MANAGEMENT & INFRASTRUCTURE OF THE INSTITUTION [25]

1.1 AUSPICES (05)

This aspect pertains to the type of status (i.e. corporate, university, institute, affiliated college, constituent college or independent college).

* Status not defined	0
* Status vaguely defined	1 - 3
* Status clearly defined	4 - 5

This is very important and emphasis on this item is required

1.2 ORGANIZATIONAL SETUP (10)

This aspect pertains to essential governance and management setups including financial and academic infrastructure like Syndicate, Senate, academic Council, Board of studies, Deans, Chairmen, Heads of Divisions, Registrar, Treasurer, Controller of examination, Director sports and Health services. In case of a private institution, it must be managed by a Foundation/Trust, properly registered under the law.

* Weak	0 - 2
* Overlapping	3 - 6
* Well laid out	7 - 10

This is very important and emphasis on this item is required

1.3 CONTROL (10)

This aspect pertains to academic and administrative powers given to essential organs mentioned above. The financial powers should be decentralized to the extent possible.

* Power not delineated	0
* Power not clearly delineated	1 - 5
* Power clearly delineated	6 - 10

This is very important and emphasis on this item is required

2. FINANCES [25]

This aspect pertains to the financial resources available to the institution from various sources such as grant by the HEC, self-financing and other income generation schemes etc. An audited balance sheet duly audited by a registered chartered accounting firm should be attached.

* Non existing	0
* Existing but not stable	1 - 7
* Stable	10 - 17
* Highly stable	18 - 25

3. FACULTY [250]

3.1 STRENGTH AND QUALITY OF FACULTY

This aspect pertains to the faculty employed. The faculty members who are full-time employees dedicated to the program would be considered as permanent faculty. Full- time also means that the faculty has served the institution atleast for a minimum of one year. Two shared faculty members would be counted as one regular faculty.

3.1.1 FULL-TIME FACULTY (45)

This aspect pertains to regular, full-time faculty teaching core subjects based on 20:1 student/teacher ratio for UG programs. Separately, the team will examine the faculty dealing with humanities, mathematics and sciences, and record its observations.

* Poorly staffed	(30:1 or more)	0 - 9
* Adequately staffed	(21 - 30:1)	10 - 30
* Well staffed	(15 - 20:1)	30 - 45

This is the most important factor to be considered for Accreditation decision.

3.1.2 PART-TIME (OVER AND ABOVE FULL-TIME) FACULTY (15)

Upto 25% teaching staff may be allowed on part-time basis but only in special circumstances. This aspect pertains to visiting faculty.

* More than allowed	0 - 2
* Allowed	3 - 8
* Less than allowed	9 - 14
* No visiting faculty	15

This is very important and emphasis on this item is required

3.1.3 SHARED FACULTY (15)

This aspect pertains to those faculty members who are serving in the same institution as a full-time faculty dedicated to some other programs and are being used to teach subjects relating to their disciplines of the under-review program. To ensure that each program develops independently, the maximum limit of shared faculty is 25% of the regular strength.

* More than allowed	0 - 5
* Allowed	6 - 9
* Less than allowed	10 - 15

This is very important and emphasis on this item is required

3.1.4 ACADEMIC QUALIFICATION (40)

This aspect pertains to the HEC/PEC-recognized degrees of regular/full-time faculty members. By September 2006, all faculty members should have at least postgraduate qualification. By September 2010, all faculty members (Prof., Assoc Prof. & Asst Prof.) should have PhD degrees. The universities are encouraged to determine the number of faculty members on professorial ranks (i.e. Prof., Assoc. Prof. and Asst. Prof.) without a bar on the ratio among different ranks to encourage promotion to deserving candidates.

* Weak Faculty	0 - 12
* Reasonable Faculty	13 - 25
* Strong Faculty	26 - 40

This is the updated requirement specified by PEC & HEC.

3.1.5 TRAINING OF FACULTY (20)

It is strongly recommended that each newly inducted faculty member undergoes eight-weeks training to become an effective teacher. There should be no exception even in case of postgraduate faculty. This training should be suitably designed to encompass at least the following aspects:

- General aspects of lecture delivery including thorough preparation.
- Use of support systems during lecture delivery.
- Mode and means of efficient student - teacher interactions.
- Developing course files.
- Dedicated office hours and their effectiveness.
- Conducting effective quizzes/mid-term tests/final exams.
- How to make homework an effective tool to assess students.
- The role of attendance in learning.
- Lecture breakdown to ensure complete course coverage.
- Making semester system more transparent and effective.
- Code of conduct and integrity issues.
- Dress code.
- Teacher as a role model.
- Communication skills and ability to disseminate knowledge especially at the conceptual level.
- Student psychology and how to deal with them, without hampering their investigative and questioning attributes.

This is very important and emphasis on this item is required especially new inducted faculty is required to undergo a formal training before they are supposed to teach any class. This is also applicable to Fresh Ph.D faculty.

* No system of training in place	0
* Some orientation but no formal training	1 - 10
* Systematic training scheme in place	11 - 20

3.1.6 FACULTY DEVELOPMENT AND CAREER PLANNING (30)

This aspect pertains to the improvement schemes of faculty qualification.

* No planning	0
* Poor planning	1 - 12
* Well planned	13 - 30

This is very important and emphasis on this item is required

3.1.7 SALARIES AND BENEFITS (20)

This aspect pertains to the salaries and benefits of the teaching staff of the institution, which may be compared with other public/private institutions.

* Low	0 - 2
* Reasonable	3 - 9
* Attractive	10 - 20

This is very important and emphasis on this item is required. Some of the Public sector Universities has already take initiatives to offer competitive salaries to attract the faculty.

3.1.8 PEC REGISTRATION AND UPDATION (Qualifications etc) (10)

* Not registered with the PEC	0
* Registered with the PEC	1 - 10 (depending on %age - registered)

3.1.9 TEACHING LOAD (20)

This aspect pertains to the number of credit-hours teaching per week, based on actual number of teachers present with single section teaching at a time both for annual and semester system of Instructions. The following guidelines for weekly credit-hours are given with an average load not exceeding 09 credit-hours per week. However, one credit hour for lab work means three contact hours in the lab in a semester system.

Professor	: 9	(Any combination of teaching, research and admin duties but with maximum attention to research).
Associate Professor	: 9 – 12	
Assistant Professor	: 8 – 12	(With maximum focus on teaching, but some time for research and hand on experience).
Lecturer	: 8 – 14	

* Average load more than prescribed	(>14)	0 - 5	***This is very important and emphasis on this item is required.***
* Average load manageable	(12 - 14)	6 - 12	
* Average load nearly as prescribed	(10)	13 - 20	

3.1.10 STUDENT-TEACHER RATIO (20)

This aspect pertains to the permissible student-teacher ratio which has been agreed as 20:1 for UG programs considering the core faculty only. On this basis, the actual number of required faculty may be worked out. This will be brought to the level of 15:1 subsequently.

* Very high	0 - 3	***This is very important and emphasis on this item is required.***
* High	4 - 9	
* Appropriate	10 - 20	

3.1.11 SUBJECT-TEACHER RATIO/CREDIT HOURS (15)

The concept of subject - teacher ratio pertains to the annual system of instructions and examination. For semester system, the faculty loading is defined in terms of credit-hours per week. The PEC plans to get the system of education fully semesterised by September 2010. For the time being however, both criteria need to be considered.

SEMESTER SYSTEM

(Credit-hours / week)

* > 14	0 - 2
* 12 - 14	3 - 9
* 8 - 12	10 - 15

OR

ANNUAL SYSTEM

(Subject-Teacher ratio)

* 3.0 to 2.7	0 - 2
* 2.6 to 2.3	3 - 9
* 2.2 to 2.0	10 - 15

4. ACADEMIC PROGRAM [100]

This aspect pertains to the academic program for the whole academic period leading to the award of a degree in engineering.

4.1 OBJECTIVES (10)

* Not defined	0
* Vaguely defined	1 - 5
* Well defined	6 - 10

This is very important and emphasis on this item is required. This should be executed in its true spirit by all institutes / universities.

4.2 CURRICULUM

4.2.1 HEC/PEC GUIDELINES (20)

Higher Education Commission (HEC) has approved the syllabi of all major engineering programs taught in Pakistan as the minimum guidelines. While imparting education, the institution may avail the flexibility of diversification based on the changes taking place internationally but with due consideration to the minimum requirements set by the HEC.

The HEC and PEC have also agreed on the contents of engineering and non-engineering courses as 65-70% and 30-35%, respectively.

* Not well structured and not in line with HEC/PEC Guidelines	0 - 9
* Closely structured to the HEC/PEC requirements	10 - 15
* Well structured and rich in contents as compared to HEC/PEC Guidelines	16 - 20

4.3 SYSTEM OF INSTRUCTIONS AND EXAMINATIONS (AS EVIDENT BY COURSE FILES)

The semester system is universally followed for obvious advantages it offers over the annual system. The semester system will become more successful as we improve the quality of faculty. All engineering institutions will be required to convert to the semester system by Sept. 2010 when 100% faculty members except lecturer (MSc) will be required to have PhD degrees. Therefore, the universities are encouraged to make necessary planning to achieve the target. Another deficiency in the examination of annual system lies in the form of choice, which allows selective study. This must be done away with latest by March 2009. The bi-annual system should be converted to the semester system at the earliest.

4.3.1 INSTRUCTIONS (15)

SEMESTER SYSTEM

* Unsatisfactory	0
* Satisfactory	1 – 5
* Good	6 – 10
* Excellent	11 – 15

OR

ANNUAL SYSTEM

* Unsatisfactory	0
* Satisfactory	1 – 5
* Good	6 – 10
* Excellent	11 – 15

4.3.2 EXAMINATION (25)

SEMESTER SYSTEM

* Unsatisfactory	0
* Satisfactory	1 – 7
* Good	8 – 15
* Excellent	16 – 25

OR

ANNUAL SYSTEM

* Unsatisfactory	0
* Satisfactory	1 – 7
* Good	8 – 15
* Excellent	16 – 25

4.4 TEXTBOOKS (10)

Prescribed textbooks, codes and design aids may be examined in the light of international practices.

* Sub - standard (older than 10 years).	0 - 2
* Acceptable (5 to 10 years old).	3 - 5
* Highly recommended (New to 5 years old).	6 - 10

4.5 NET INSTRUCTIONAL HOURS (10)

This aspect pertains to the total contact hours committed to theory and laboratory/ practical work for effective teaching of different subjects. The length of a semester should be 16-20 weeks.

* Insufficient	0 - 2
* Sufficient (close to PEC guidelines)	3 - 5
* More than PEC guidelines	6 - 10

4.6. CURRICULUM REVISION (10)

This aspect pertains to curriculum revision in the light of national, HEC and international requirements and on the demand of the industry.

* No revision	0
* Revised occasionally	1 - 4
* Revised regularly (every four years)	5 - 10

5. LABORATORIES AND ALLIED STAFF [110]

This aspect pertains to the departmental infrastructure in the context of quality and adequacy of laboratory equipment, space and technical staff.

5.1 ADEQUACY AND QUALITY OF EQUIPMENT AVAILABLE IN THE LABORATORIES AND WORKSHOPS (40)

* Not available/non - operational / low quality	0 - 8
* Inadequate and partly operational / medium quality	9 - 24
* Adequate, fully operational and good quality	25 - 40

5.2 EQUIPMENT UTILIZATION (20)

* Poorly utilized	0 - 4
* Inadequately utilized	5 - 10
* Properly utilized	11 - 20

5.3 AVAILABILITY OF LABORATORY STAFF (10)

* Not available	0
* Available but not sufficient	1 - 5
* Available in sufficient number	6 - 10

5.4 QUALIFICATION OF LABORATORY STAFF (15)

The PEC strongly recommends that each major laboratory must be supervised by a qualified engineer who should be supported by a diploma holder in relevant technology.

* Unqualified (Matriculate) with adequate experience	0 - 3
* Poorly qualified (Matriculate + DAEs)	5 - 9
* Well qualified (BE + DAEs)	10 - 15

5.5 TECHNICAL COMPETENCY OF LABORATORY STAFF (15)

* Poor	0 - 3
* Good	4 – 6
* Very Good	7 – 10
* Excellent	11 – 15

5.6 ADEQUACY AND QUALITY OF ADMINISTRATIVE / SUPPORT STAFF (10)

* Poor	0 - 2
* Good	3 – 4
* Very Good	5 – 7
* Excellent	8 – 10

6. LIBRARY [100]

This aspect pertains to the collection and efficient and smooth running of main library considering related programs of the institution.

6.1 BUDGET (30)

A minimum of Rs.1.0 Million budget should be allocated to cater for: (a) addition of 100 new / latest books per year; (b) expenses of 3 journals and 3 magazines per program & (c) maintenance / operational cost of the library.

* Inadequate	0 - 7
* Adequate	8 - 16
* More than adequate	17 - 30

6.2 BOOKS (30)

This aspect pertains to the availability of various volumes available in the central library which should include books published within the last 10 years, pertaining to different disciplines of the institution. A minimum of 1,000 distinct books should be available relevant to each program.

* No book.	0
* Insufficient books	1 - 12
* Sufficient books	13 - 30

6.3 BOOK BANK (15)

This aspect pertains to the availability of textbooks in the central library for borrowing by the students of different disciplines for the whole session.

* Non-existing	0
* Existing, but insufficient.	1 - 6
* Sufficient.	7 - 15

6.4 LIBRARY EQUIPMENT (15)

This aspect pertains to various items of equipment of the central library such as photocopiers, typewriters, scanners, video and audio equipment, CD ROMS, computerized search etc. Library software is available in the market which can help in improving the functioning of the library in all aspects.

* Non-existing	0
* Insufficient.	1 - 7
* Sufficient.	8 – 15

6.5 JOURNALS (10)

This aspect pertains to the availability of different research journals for different disciplines in the library such as gazettes, magazines, periodicals, journal publications, etc. The institution must be linked to the HEC - supported on - line access to research journals. A minimum of 3 magazines and 3 journals per program must be subscribed through hard copies.

* Non-existing.	0
* Insufficient.	1
* Sufficient but variety not available	2 - 5
* Sufficient and variety available	6 - 10

7. STANDARD AND QUALITY OF INSTRUCTIONS [90]

7.1 COMPLETION OF COURSES

7.1.1 THEORY (20)

This aspect pertains to completion of theory courses during the prescribed period as per official record.

* Unsatisfactory	(< 75% coverage)	0 - 4
* Satisfactory	(> 75% coverage)	5 - 12
* Excellent	(100% coverage)	13 - 20

This is an important item and needs attention.

7.1.2 PRACTICAL (15)

This aspect pertains to the completion of assigned practical experiments to a course during the prescribed period as per official record.

* Unsatisfactory	(< 75%)	0 - 6
* Satisfactory	(> 75%)	7 - 15

7.2 PERCEPTION OF STUDENTS

This information may be gathered from the random sampling of students in independent environment.

7.2.1 THEORY (15)

* Unsatisfactory	0 - 5
* Satisfactory	6 - 9
* Good	10 - 15

7.2.2 PRACTICAL (10)

* Unsatisfactory	0 - 2
* Satisfactory	3 - 6
* Good	7 - 10

7.3 COURSE FILE (20)

The practice of course file is adopted internationally to monitor as how effective the course has been taught. It is strongly recommended that all engineering institutions in Pakistan make maintenance of course-file mandatory. A course file must include all relevant data (such as given below) which could become the basis of evaluation.

- Lecture breakdown for entire semester.
- Schedule of monthly/mid-term tests and final examination.
- Breakdown of laboratory experiments pertaining to the course and record of successful conduct.
- Samples of best, worst and average answer sheets, alongwith the question paper of each exam, quiz and homework.
- Samples of quizzes.

This is very important and emphasis on this item is required.

- Listing of textbook and other reference books pertaining to the course.
- Record of make-up classes for any un-scheduled holiday.
- Details of office-hours for tutoring etc.
- Recommendation and suggestions related to the course for the next session.

* Course file not maintained	0
* Course file maintained but not properly organized	1 - 9
* Course file maintained and well organized	11 - 20

7.4 STUDENTS' FEEDBACK (10)

This aspect pertains to the performance evaluation of the faculty members through secret feedback of students at the end of each semester.

* No system in place	0
* System in place but not effective	1 - 5
* System in place and highly effective	6 - 10

8. STUDENTS [60]

8.1 ADMISSIONS (20)

It is to be examined whether the students are admitted in accordance with minimum eligibility conditions prescribed by the PEC and whether the merit is strictly followed. The PEC has set the following minimum requirements for admission into an engineering program:

This is very important, its proper implementation is required.

- Matric/O-level (with science) : 60%
- F.Sc./A-level (pre-engineering / Computer Science) : 60%
- Entry test : 50% (pass marks)

Admission based on overall marks secured.

* < 60 %	0 - 6
* 60–70 %	7 - 12
* Above 70%	13 - 20

8.2 ADMISSION RESPONSE AND PERCENTAGE ADMITTED (25)

This aspect pertains to the ratio of students selected and the total number of applications received.

* Very high	(50% and above)	0 - 8
* Low	(30 – 50%)	9 – 16
* Very Low	(< 30%)	17 – 25

8.3 INTAKE (15)

This aspect pertains to the number of students admitted considering the capacity of a given engineering program and its allied available facilities.

* Unmanageable	0
* Large	1 - 5
* Manageable	6 - 9
* Correct	10 - 15

SECTION B

9. ACADEMIC BUILDINGS AND OTHER ALLIED FACILITIES [40]

9.1 BUILDINGS (HIRED OR OWNED) (15)

This relates to central and departmental building infrastructure in the context of academic and administrative requirements.

* Inadequate (lease period less then 15 years)	0 - 5
* Adequate (lease period more than 15 years)	6 - 8
* More than adequate (owned)	9 - 15

9.2 CONVOCATION HALL / AUDITORIUM (15)

* Non-existing but managing	0 - 4
* Satisfactory	5 - 9
* Good	10 - 15

9.3 OTHER ALLIED FACILITIES (10)

This aspect pertains to existence of seminar rooms, reproduction facilities, audiovisual aides, computer facilities for staff and students etc.

* Not available	0
* Inadequate	1 - 5
* Adequate	5 - 10

10. ANNUAL COST PER STUDENT [10]

The actual expenditure incurred on each student per year based on overall recurring budget, should be worked out and compared with the standard cost of engineering education in Pakistan.

* Too low	(<Rs.30,000 per student)	0
* Low	(Rs.31,000 - 45,000 per student)	1 - 3
* Reasonable	(Rs.46,000 - 65,000 per student)	4 - 6
* High	(Rs.66,000 and above per student)	7 – 10

11. FINANCIAL SUPPORT TO STUDENTS [15]

This aspect pertains to various scholarships and interest-free loans which the students may get from various sources.

* Not available.	0
* Available (but limited to <50% of eligible students)	1 - 8
* Adequate (available to >50% of eligible students)	9 - 15

12. CLASS SIZE [20]

12.1 THEORY (10)

This aspect pertains to the number of students per section. For engineering subjects, the class size must not exceed 35 students. For non-engineering subjects, bigger class of 60-70 students may be allowed but only with appropriate infrastructural support.

* Too large	>80	0
* Large	70–80	1 - 3
* Manageable	60–70	4 - 7
* Correct size	< 40	8 - 10

12.2 PRACTICAL (10)

This aspect pertains to the number of students per work station/experimental setup.

* Large	> 4	0 - 3
* Manageable	= 4	4 - 5
* Correct size	< 4	6 - 10

13. OFFICE-HOURS FOR ACADEMIC COUNSELING [10]

This aspect pertains to the guidance available to the students from teachers through dedicated office hours beyond the scheduled timetable.

* No counseling at all	0
* Some counseling	1 - 5
* Well organized counseling	6 - 10

14. OTHER FACILITIES FOR STUDENTS [75]

This aspect pertains to hostel accommodation, auditorium, sports facilities, gym., transport, health centre, clinic, guest house etc.

14.1 HOSTEL(S) ACCOMMODATION (40)

(Boys & Girls)

* Poor accommodation	0 - 8
* Inadequate accommodation	9 - 20
* Adequate accommodation	21 - 40

14.2 SPORTS FACILITIES (including swimming pool, gym etc) (10)

* Non-existing	0
* Inadequate	1 - 5
* Adequate	6 - 10

14.3 STUDENT TRANSPORT (10)

* Non-existing	0
* Inadequate	1 - 5
* Adequate	6 - 10

14.4 OTHER FACILITIES (15)

This aspect pertains to other common facilities such as cafeteria, health centre, guest house, club etc.

* Not available but manageable	0 - 4
* Partially available	5 - 10
* Available	11 - 15

15. YIELD [10]

This aspect pertains to the yearly percentage of the graduating students to the respective intake.

* Unreasonably Low	(below 30 %)	0
* Low	(30 % - 50 %)	1
* High	(50 % - 75 %)	2 - 5
* Very High	(75 % - 100 %)	6 - 10

16. DROPOUTS [10]

* Extremely high dropouts (more than 10% of intake).	0 - 3
* Reasonable dropouts (5-9 % of intake).	4 - 7
* Minimum dropouts (<5 % of intake).	7 – 10

17. AVERAGE DURATION [10]

This aspect pertains to the actual number of calendar years actually spent for graduation with respect to the minimum prescribed time limit.

* Unduly long (>6 years).	0 - 2
* Longer than minimum prescribed duration (>4<6 years)	3 - 5
* Within minimum prescribed duration (4 years).	6 - 10

18. INTERNSHIP/PRACTICAL TRAINING [10]

This aspect pertains to the involvement of students in practical training in industry during summer vacations.

* No provision	0
* Reasonable provision	1 - 5
* Compulsory practical training	6 – 10

19. QUALITY OF PRODUCT [90]

19.1 PLACEMENT BUREAU (10)

Each university should have a placement bureau that will maintain record of students' employment, assist the students in placement and interact with relevant employers.

* Does not exist	0
* Exists but not functionally operative	1 - 4
* Exists and operative	5 - 10

19.2 ALUMNI'S SATISFACTION (15)

This aspect pertains to the opinion of former graduates regarding the quality and adequacy of their education, and that of fresh graduates of the same institution and in the same discipline. The institutions are encouraged to develop a database of outgoing graduates to receive their feedback through the placement bureau and from alumni's associations.

* Not available	0
* Unsatisfied	1 - 4
* Satisfied	5 - 10
* Extremely satisfied	11 - 15

19.3 EMPLOYER'S OPINION (25)

The quality of engineers produced by an institution may be assessed on the basis of market survey made by the end - users, Public Service Commission, employers and hired consultants etc.

* Not good	0 - 3
* Reasonably good	4 - 11
* Very Good	12 - 17
* Excellent	18 - 25

19.4 ACCEPTANCE FOR ADMISSION IN FOREIGN UNIVERSITIES (20)

The data available from regular faculty members regarding admission of their graduating students in foreign universities in graduate programs.

* Not accepted at all	0
* Accepted with reservations / tests	1 - 10
* Readily accepted	11 - 20

19.5 AVERAGE STARTING SALARY OF GRADUATES (10)

This aspect pertains to the market forces which determine the salary package of a fresh graduate of an Institution, depending on their quality.

* Less than Rs. 15,000 per month	2 - 3
* Between Rs. 15,000-25,000 per month	4 - 7
* More than Rs. 25,000 per month	8 - 10

19.6 AVERAGE TIME TAKEN TO FIND A JOB (10)

The time taken after graduation to find a job is a reflection on the quality of the graduate.

* More than 12 months	1 - 3
* Between 6 and 12 months	4 - 7
* Less than 6 months	8 - 10

20. OPERATIONAL BUDGET [20]

This aspect pertains to the allocated recurrent budget compared with the demanded budget of the institution and its adequacy.

* Inadequate	0 - 5
* Adequate	6 - 13
* More than adequate	14 - 20

21. DEVELOPMENT BUDGET [20]

This aspect pertains to the budget available for development of infrastructural, academic and administrative facilities.

* Not adequate	(<10 % of operational budget)	0 - 5
* Adequate	(10 - 20%)	6 - 13
* More than adequate	(more than 20%)	14 - 20

22. INVESTMENT AND INTERNAL RESOURCE GENERATION [20]

22.1 INVESTMENT (10)

This aspect pertains to the investment of various funds available with the institution such as G.P. Fund, Pension, C.P. Fund, Benevolent Fund, income from self-finance scheme and surplus funds available after appropriations etc. The institution may consider initiating the loan scheme to facilitate deserving students.

* No investment	0
* Improper Investment	1 - 5
* Proper Investment	6 - 10

22.2 INTERNAL RESOURCE GENERATION (10)

This aspect pertains to the internal resources generated through short courses, seminars, consulting services and testing etc.

* No generation and distribution.	0
* Inadequate fund generation and distribution.	1 - 4
* Adequate fund generation and distribution.	5 - 10

23. RESEARCH AND PUBLICATIONS [130]

The work regarding research carried out in each engineering program of the Institution will be examined in the light of attributes of good faculty members who are Ph.D degree holders, Consultancy & Design experience, interaction with industry and user organizations to attract R&D funds and indulgence in research etc.

23.1 FACULTY RESEARCH GRANT (15)

* Nil	0
* Reasonable	1 - 9
* Sufficient	10 – 15

23.2 EFFECTIVE UTILIZATION OF RESEARCH GRANT AND ITS NET OUTCOME (10)

* Not used	0
* Reasonably used	1 - 5
* Appropriately used	6 - 10

23.3 FACULTY PUBLICATIONS IN HEC-APPROVED JOURNALS (20)

Research is very important for a dynamic program. In a year, each faculty member is expected to publish at least 1 - 2 good papers in a reputed referred journal.

* Nil	0
* Reasonable	1 - 9
* Good	10 - 20

23.4 CONTINUITY OF FACULTY RESEARCH (15)

* Nil	0
* Moderate	1 - 7
* Appropriate	8 - 15

23.5 ACADEMIC COLLABORATION (20)

This aspect pertains to the collaboration with national and foreign universities for joint research, training, data exchanges and holding of seminars etc. The collaboration can be quite effective if the objectives of the program are clearly defined.

* No system of collaboration	0
* Weekly established	1 - 5
* Inadequately established	6 - 12
* Adequately established	13 - 20

23.6 TEXTBOOKS WRITTEN BY FACULTY MEMBERS (10)

* No book written	0
* Some manuals but no formal book published	1 - 5
* Book(s) Published	6 - 10

23.7 BUDGETARY ALLOCATION FOR CONFERENCES, SEMINARS, COLLOQUIUMS ETC. (10)

* No provision	0
* Irregular provision	1 - 4
* Regular provision	5 - 10

23.8 COMPUTER AND INTERNET FACILITIES (20)

This aspect pertains to computer facilities (i.e. computers, scanners, internet facilities, printers etc.) provided in the department for the students and teachers.

* Non existing	0
* Inadequate	1 - 11
* Adequate	12 - 20

23.9 ACCESSIBILITY OF FACULTY/STUDENTS TO COMPUTER/INTERNET FACILITIES AND INTERNATIONAL DATABASES (10)

This aspect pertains to the computing facility available in the department and its degree of accessibility to the students.

* Low	0 - 3
* Reasonable	4 - 7
* Fully accessible	8 - 10

24. INDUSTRIAL LINKAGE [30]

24.1 INDUSTRIAL LIAISON OFFICE (10)

This pertains to the persons of a corporate office in the institution for linkage with industry and other organization**s**. This linkage may involve sponsored research**,** initiating joint research projects, conducting short courses, organizing conference, sharing R&D facilities and facilitating student internship etc.

* No Liaison Office	0
* Liaison office available but without a proper system	1 - 3
* A liaison office exists with proper staff and supporting mechanism but no formal linkage established	4 - 7
* A well organized liaison office in place with proper staff and supporting mechanism which has resulted in some type of linkage	7 - 10

24.2 COMMERCIALIZATION OF RESEARCH FINDINGS (20)

Through a proper marketing strategy, the institution should find the potential beneficiaries of its R&D undertakings to commercialize the scientific know-how for mutual benefits of the user organization (client) as well as the institution itself.

* No efforts made for commercialization of research	0
* Some efforts made but without success	1 – 8
* Some commercialization realized	9 – 14
* Significant commercialization realized	15 – 20

25. WEBSITE [20]

Each engineering institution must have its web page where accreditation status of each program should be clearly and correctly displayed. It should also contain information of all major parameters of accreditation such as faculty, laboratory equipment, laboratory staff, R&D activities undertaken, library facilities etc.

* Not available	0
* Available but accreditation data are not complete.	1 - 8
* Relevant accreditation data available and complete	9 - 20

26. TOTAL SCORE OF SECTION A

/ 760

27. TOTAL SCORE OF SECTION B

/ 540

28. OVERALL SCORE

/ 1300

29. GENERAL OBSERVATIONS

CHAPTER – 8

POSTGRADUATE PROGRAMS IN ENGINERING SPECIALIZATION

Postgraduate Programs in Engineering Specializations

1. Preamble:

Accredited universities in Pakistan offering engineering programs in various specializations at the undergraduate level are encouraged to develop post-graduate programs at the M.S/M.Phil and M.S Leading to Ph.D levels. These programs are needed to meet the requirements of highly educated faculty for engineering programs and to create new and useful knowledge based on high quality research and advanced methods of engineering design. Besides, these programs cannot be separated from each other due to common faculty / laboratories / libraries etc.

Recently new minimum qualification and experience requirements for appointment as faculty in engineering programs have been promulgated by PEC and HEC. All candidates for the post of lecturers after 2010 should have at least an MS / M.Sc Engineering degree. A graduated time scale for advanced degrees has been approved for the appointment of Assistant Professors in engineering disciplines. While Master' degree is minimum requirement for such appointment now; after 2010, 30% should have Ph.Ds, after 2012, 60% and by 2015, 100% assistant professors shall be Ph.Ds. For promotion or initial hiring as associate and full professor, Ph.D. is the minimum requirement now. Hence engineering universities need to pay serious attention to developing specialized postgraduate programs in the existing and evolving interdisciplinary specializations. A tangible benefit of these programs will be to foster research-based learning to discover new engineering knowledge that will transform the professional practices in all relevant fields. These advanced programs are also necessary to achieve the national development goals.

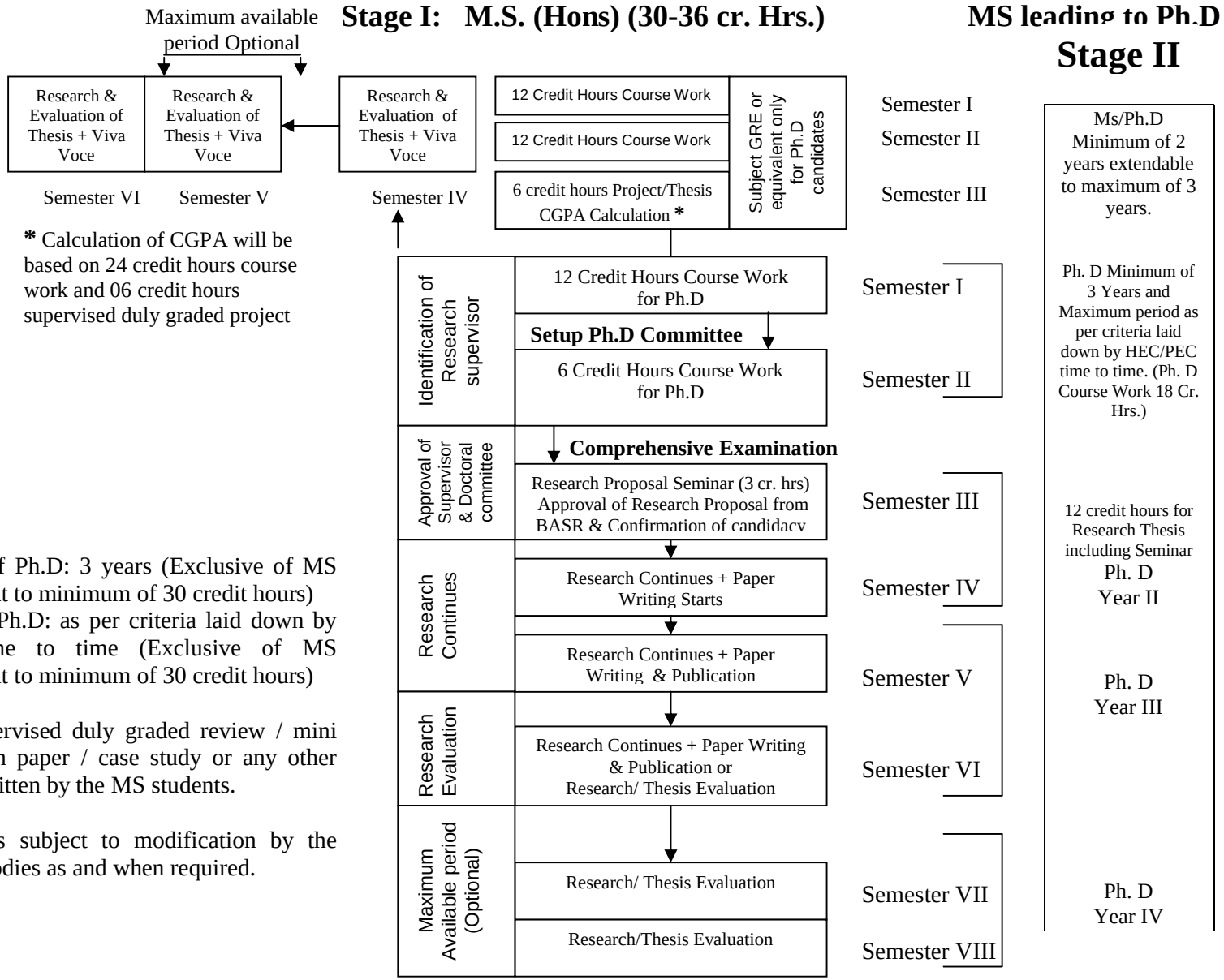
Development of postgraduate engineering programs demands special attention not only to the supporting infrastructure but also to highly educated faculty and exceptionally talented graduate students. New policies and procedures regarding recruitment, promotion and retention of high quality faculty, academic/evaluation systems based on quality and quality alone, will be needed. HEC has developed basic guidelines for postgraduate programs and has encouraged universities to structure their curricula and academic policies even beyond those basic guidelines.

The following summary of the semester wise workload requirements and scheme of studies for M.S/M.Phil and M.S leading to Ph.D. have been based on HEC guidelines. Universities offering these programs need to get these guidelines, policies and procedures ratified by their statutory bodies.

Note: Guidelines given in Chapters 1 to 7, are by and large, equally applicable to all PG and PhD programs as well.

2. **Summary of the Semester Wise Workload Requirements and Scheme of Studies of M.S (Hons), MS Leading to Ph.D. Programmes**

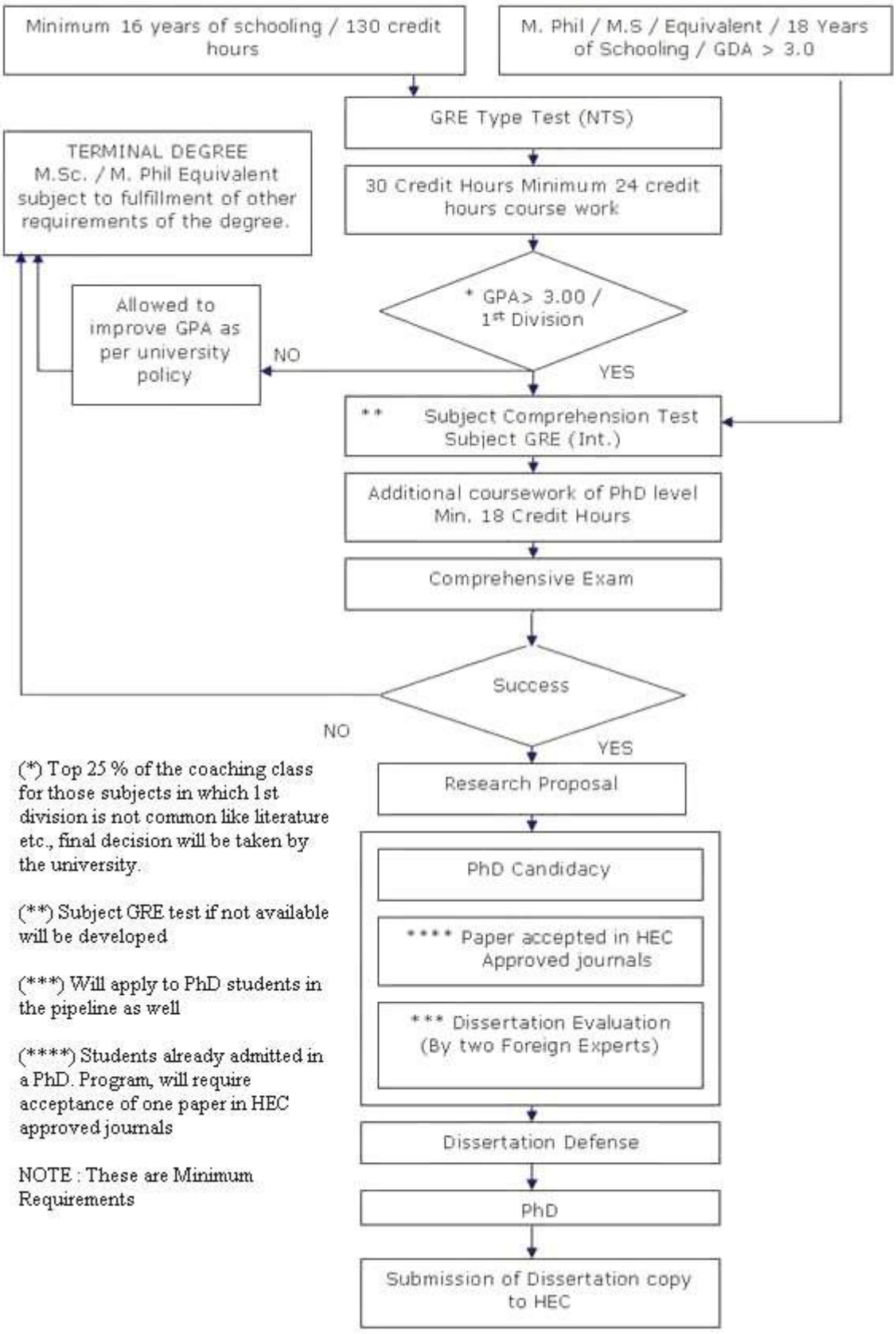
Prerequisite: 16 years of Schooling (Minimum B.E. 128 Credit Hours + General GRE)



* Minimum period of Ph.D: 3 years (Exclusive of MS requirement equivalent to minimum of 30 credit hours) Maximum period of Ph.D: as per criteria laid down by HEC/PEC from time to time (Exclusive of MS requirement equivalent to minimum of 30 credit hours)

* Project means supervised duly graded review / mini research report / term paper / case study or any other documented report written by the MS students.

* This flow chart is subject to modification by the university statutory bodies as and when required.



(*) Top 25 % of the coaching class for those subjects in which 1st division is not common like literature etc., final decision will be taken by the university.

(**) Subject GRE test if not available will be developed

(***) Will apply to PhD students in the pipeline as well

(****) Students already admitted in a PhD. Program, will require acceptance of one paper in HEC approved journals

NOTE : These are Minimum Requirements

3. Stage I: M.S (Hons)

Entrance Requirements:

- As per HEC / PEC criteria

Credit Hours: 30 – 36

Thesis Option: Minimum 30 credit hours including 06 credit hours for thesis. Coursework shall include at least two courses in advanced mathematics or statistics.

Non Thesis Option: Minimum 30 credit hours including 06 credit hours for project and internship.

Annual Review: On Completion of the first year, students must have an annual progress review with their adviser / supervisor.

Graduate Seminar: All students enrolled in postgraduate programs are required to share their project reports in graduate seminars held once a fortnight. The seminar includes technical presentations of students, faculty and invited guests from industry and other disciplines. M.S students opting for thesis are required to present at least ***one*** and Ph.D students at least ***two*** seminars during their graduate programs.

Examination: Oral defense of the thesis is conducted by the supervisor and the graduate faculty. For non-thesis option candidates, a comprehensive examination will be conducted by the department.

4. Stage II: MS Leading to Ph.D

Study at Ph.D level intensifies as relationships with graduate faculty become more professional often resulting in mentoring, collaborative study and research. Advanced graduate coursework is often serendipitous exploration of problems and searching for their creative solutions that often lead to individualized research that raises technical maturity. The ultimate purpose of the Ph.D program is to explore the frontiers of knowledge and create new knowledge. Each doctoral thesis is expected to result in new engineering practice, design or materials. It must be shared widely through participation in professional meetings both on and off-campus and publications in peer-reviewed journals of international repute, preferably leading to an impact factor / citation index.

Entrance Requirements:

- As per HEC / PEC criteria

Credit Hours: 30 including 18 credit hours of advance graduate coursework and 12 credit hours of research dissertation, including a 03 credit hour seminar to develop research proposal.

Comprehensive Qualifying Examination: Written comprehensive examination must be passed after completing 18 credit hours coursework. It may be retaken only once.

5. Dissertation and Viva Voce:

12 credit hours of research leading to a dissertation can be completed in a maximum of three years after completing the Ph.D coursework. Candidates are required to defend the dissertation in an open professional forum after the permission is granted by the doctoral committee. At least one article based on the research ought to be published in a peer reviewed journal of international repute***, with an impact factor***.

6. Graduate Supervisor:

The selection of a graduate supervisor / advisor is a mutual decision of the candidate and a member of graduate faculty in the program. The supervisor will mentor the candidate, monitor the semester wise progress of the candidate and supervise the research dissertation. Supervisors shall have workload and honoraria as prescribed by PEC and HEC guidelines.

7. Doctoral Program Committee:

In consultation with the supervisor, the candidate will select a doctoral program committee consisting of at least two additional graduate faculty members in the program. The doctoral committee guides the candidate in completing all the degree requirements and research activities. It provides annual progress review and constructive feedback on research reports and is responsible for maintaining the accepted norms of ethical scholarly behavior.

Thesis is the objective written report of research methodology and findings. It describes the selected research problem, prior findings through a comprehensive review of related literature and the new avenues explored by the candidate. The yardstick to measure the value of a doctoral dissertation is its original contribution to professional knowledge. The supervisor and the doctoral program committee are responsible along with the candidate to ensure the authenticity of the data and its reporting in the internationally accepted style of professional reports. Thesis once accepted by the doctoral committee should be evaluated by two international specialists in the discipline.

The final decision about approval/acceptance of the dissertation rests with the doctoral committee, which after gathering all expert appraisals and viva voce may declare it as acceptable, acceptable with qualifications or not acceptable.

The following PEC AC-3 has been designed to provide the criteria and weightage for evaluating the postgraduate engineering programs offered by the PEC accredited institutions offering these programs.

CHAPTER – 9

DETERMINATION OF ACCREDITATION STATUS ACCORDING TO THE PEC CRITERIA FOR POSTGRADUATE ENGINEERING PROGRAM

PEC FORM AC-3

DETERMINATION OF ACCREDITATION STATUS ACCORDING TO THE PEC CRITERIA FOR A POSTGRADUATE ENGINEERING PROGRAM

NAME OF THE INSTITUTION: _____

ACCREDITATION STATUS: _____

PROGRAM / DISCIPLINE: _____

CRITERIA FOR ACCREDITATION OF POSTGRADUATE ENGINEERING PROGRAMS OFFERED BY THE INSTITUTIONS IN PAKISTAN

PEC FORM AC - 3

SECTION 'A' (TOTAL SCORE: 970)

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
1. MANAGEMENT AND INFRASTRUCTURE OF THE POSTGRADUATE PROGRAMS [25]			
1.1 AUSPICES * Status not defined * Status vaguely defined * Status clearly defined	5		
1.2 ORGANIZATIONAL SETUP * Weak * Overlapping * Well laid out	10		
1.3 CONTROL * Power not delineated * Power not clearly delineated * Power clearly delineated * Graduate Committees	10		
2. FINANCES [25]	25		
* Non existing * Existing but not stable * Stable * Highly stable * Financial Aid Programs available			

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
3. FACULTY [265]			
3.1 STRENGTH AND QUALITY OF FACULTY			
3.1.1 FULL-TIME QUALIFIED FACULTY (As related to Students) * Poorly staffed (20:1 or more) * Adequately staffed (15-20:1) * Well staffed (10-14:1)	60		
3.1.2 ACADEMIC QUALIFICATION * Weak Faculty (Only MS degree till 2010) * Reasonable Faculty (M.S./M.Phil with additional PhD course work, and PhD) * Strong Faculty (Ph.D/Post Doc) * ***Research Publications / Consultancy experiences***	60		
3.1.3 PART-TIME (OVER AND ABOVE FULL-TIME) FACULTY * More than allowed * Allowed * Less than allowed * No visiting faculty } As per PEC / HEC Criteria	10		
3.1.4 SHARED FACULTY * More than allowed * Allowed * Less than allowed * No shared faculty } As per PEC / HEC Criteria	15		
3.1.5 TRAINING OF FACULTY * No system of planned CPD in place * Some orientation but no formal plan for CPD * Systematic plan in place for CPD	30		

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
3.1.6 SALARIES AND BENEFITS * Low * Reasonable (Market Equity) * Attractive (TTS)	20		
3.1.7 TEACHING / RESEARCH LOAD (Inclusive of Research) * Average load more than prescribed by PEC / HEC * Average load manageable by PEC / HEC * Average load as prescribed by PEC / HEC	30		
3.1.8 Ph D STUDENT:TEACHER RATIO * Very high (more than 8:1) * High (8:1) OR * Appropriate (5:1)	20		
3.1.9 SUBJECT:TEACHER RATIO/CREDIT-HOURS **SEMESTER SYSTEM** Credit Hours / week **Teaching/Research** * Prof. (9 Cr Hrs) 40% - 60% * Assoc Prof. (9-12 Cr Hrs) 50% -50% * Asstt Prof. (8-12 Cr Hrs) 60% - 40% * Lecturer (8-14 Cr Hrs) 70% - 30% OR **ANNUAL SYSTEM** Subject: teacher ratio * 3.0 to 2.7 * 2.6 to 2.3 * 2.2 to 2.0	20		
4. ACADEMIC PROGRAMS [195]			
4.1 OBJECTIVES * Not defined * Vaguely defined * Well defined	15		

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
4.2 CURRICULUM	50		
* Not well structured and not in line with HEC/PEC Guidelines * Closely structured to the PEC/HEC requirements and meets well defined objectives * Well structured and rich in contents as compared to HEC/PEC Guidelines			
4.3 SYSTEM OF INSTRUCTION AND EXAMINATIONS (AS EVIDENT BY COURSE FILES)			
4.3.1 INSTRUCTION **SEMESTER SYSTEM** * Unsatisfactory * Satisfactory * Good * Excellent **OR** **ANNUAL SYSTEM** * Unsatisfactory * Satisfactory * Good * Excellent	20		
4.3.2 EXAMINATIONS (Contents and Quality) **SEMESTER SYSTEM** * Unsatisfactory * Satisfactory * Good * Excellent **OR** **ANNUAL SYSTEM** * Unsatisfactory * Satisfactory * Good * Excellent	50		

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
4.4 INSTRUCTIONAL / RESEARCH RESOURCES * Sub-standard (only textbooks) * Acceptable (Digital Library) * Highly recommended (Professional Databases).	30		
4.5 NET INSTRUCTIONAL SEMINAR HOURS * Insufficient * Sufficient (close to PEC guidelines) * More than PEC guidelines	15		
4.6 CURRICULUM REVISION * No revision * Revised occasionally * Revised regularly (every year or on as required basis)	15		
5. STANDARD AND QUALITY OF SEMINARS [110]			
5.1 SEMINARS **5.1.1 THEORY** * Unsatisfactory (Review of old literature) * Satisfactory (Current issues/materials) * Excellent (Creative Problem Solving)	25		
5.1.2 PRACTICAL * Unsatisfactory (< 75%) Repetitive * Satisfactory (>75%) Creative/Constructive	15		
5.2 PERCEPTION OF STUDENTS **5.2.1 THEORY** * Unsatisfactory * Satisfactory * Good	15		

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
5.2.2 PRACTICAL * Unsatisfactory * Satisfactory * Good	15		
5.3 SEMINAR PORTFOLIO * Not maintained * Maintained but not properly organized * Maintained and well organized	20		
5.4 FORMAL STUDENT'S FEEDBACK / EVALUATON * No system in place * System in place but not effective * System in place and highly effective to improve instruction / research	20		
6. LABORATORIES AND ALLIED STAFF [135]			
6.1 ADEQUACY AND QUALITY OF EQUIPMENT AVAILABLE IN LABORATORIES AND WORKSHOPS * Not available/non-operational / low quality * Inadequate and partly operational / medium quality * Adequate, fully operational and good quality * Equipment and materials workshop	60		
6.2 EQUIPMENT ACCESS AND UTILIZATION * Poorly utilized / accessible * Inadequately utilized / accessible * Properly utilized , available 24/7 (round the clock)	30		
6.3 AVAILABILITY OF LABORATORY STAFF * Not available * Available but not sufficient	15		

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
* Available in sufficient number			
6.4 QUALIFICATION OF LABORATORY STAFF * Unqualified (Matriculate) with some experience * Poorly qualified (Matriculate + DAEs) * Well qualified (BEs + DAEs)	15		
6.5 TECHNICAL COMPETENCY OF LABORATORY STAFF * Poor * Good * Very Good * Excellent	15		
7. LIBRARY [115]			
7.1 BUDGET * Inadequate * Adequate * More than adequate	25		
7.2 BOOKS & JOURNALS * No of old & new books / journals * Insufficient books / journals * Sufficient books / journals * Recent Publications	35		
7.3 DIGITAL LIBRARY EQUIPMENT / COMPUTERS / INTERNET / PERN CONNECTIVITY * Non-existing * Insufficient * Sufficient	25		
7.4 JOURNALS (HARD COPIES/ONLINE) * Non-existing * Insufficient * Sufficient but variety not available	30		

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
* Sufficient and variety available			
8. QUALITY OF STUDENTS [100]			
8.1 ADMISSIONS **(Stage I – M.S/M.Phil)** * Compliance with HEC / PEC criteria **(Stage II – M.S leading to Ph.D)** * Compliance with HEC / PEC criteria	40		
8.2 ADMISSION RESPONSE AND PERCENTAGE ADMITTED BASED ON QUALITY ALONE * Very high (30%) * Low (20-30%) * Very Low (< 20%)	40		
8.3 INTAKE * Unmanageable * Large * Manageable * Correct	20		

SECTION 'B' (TOTAL SCORE 630)

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
9. ACADEMIC BUILDINGS AND OTHER ALLIED FACILITIES [45]			
9.1 BUILDINGS (Seminar Rooms/Laboratories/Study carrels/workstations) * Inadequate * Adequate * More than adequate	30		
9.2 OTHER ALLIED FACILITIES (Conference Rooms etc) * Not available * Inadequate * Adequate * Equipped with computers / multimedia	15		
10. FINANCIAL SUPPORT TO STUDENTS [20] * Not available * Available (but limited to <60% of cost) * Adequate (available to >60% of cost)	20		
11. OFFICE HOURS FOR ACADEMIC COUNSELING [20] * No counseling at all * Some counseling * Well organized counseling	20		
12. OTHER FACILITIES FOR STUDENTS [40]			
12.1 INSTRUMENTS SHOP * Non existing * Satisfactory * Good	20		

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
12.2 STUDY OFFICES * Non existing * Inadequate * Adequate	20		
13. QUALITY OF PRODUCT [110]			
13.1 ALUMNI'S SATISFACTION * Not available * Unsatisfied * Satisfied * Extremely satisfied	20		
13.2 EMPLOYERS' FEEDBACK * Not good * Reasonably good * Very Good * Excellent	40		
13.3 ACCEPTANCE FOR ADMISSION IN GOOD FOREIGN UNIVERSITIES * Not accepted at all * Accepted with reservations / tests * Readily accepted	20		
13.4 No of research publications by students in international refereed Journals	30		
14. BUDGET [40]			
14.1 OPERATIONAL * Inadequate * Adequate * More than adequate	20		
14.2 DEVELOPMENT * Not adequate (<10 % of operational budget) * Adequate (10-20%) * More than adequate (more than 20%)	20		

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
15. INVESTMENTS AND INTERNAL RESOURCE GENERATION [30]			
15.1 INTERNAL RESOURCE GENERATION * No fund generation * Inadequate fund generation * Adequate fund generation * Industry sponsors for research	30		
16. RESEARCH AND PUBLICATIONS [255]			
16.1 FACULTY RESEARCH GRANTS * Nil * Reasonable * Sufficient	20		
16.2 EFFECTIVE UTILIZATION OF RESEARCH GRANTAND ITS NET OUTCOME * Not used * Reasonably used and outcome * Appropriately used and outcome	30		
16.3 FACULTY PUBLICATIONS IN HEC-APPROVED INTERNATIONAL REFEREED JOURNALS * Nil * Reasonable * Good	80		
16.4 CONTINUITY OF FACULTY RESEARCH * Nil * Moderate * Appropriate	20		

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
16.5 ACADEMIC COLLABORATION * No system of collaboration in research * Weakly established * Inadequately established * Adequately established	20		
16.6 TEXTBOOKS WRITTEN BY FACULTY MEMBERS * No book written * Some manuals but no formal book published * Book(s) published	15		
16.7 BUDGETARY ALLOCATION FOR CONFERENCES, SEMINARS, COLLOQUIUMS ETC. * No provision * Irregular provision * Regular provision	20		
16.8 COMPUTER AND INTERNET FACILITIES * Non existing * Inadequate * Adequate (DSL / IP Provided)	30		
16.9 ACCESSIBILITY OF FACULTY/STUDENTS TO COMPUTER/INTERNET FACILITIES AND INTERNATIONAL DATABASES * Low * Reasonable * Fully accessible	20		

ATTRIBUTES	MAXIMUM SCORE	SCORE OBTAINED	REMARKS / JUSTIFICATION
17. INDUSTRIAL LINKAGE [50]			
17.1 INDUSTRIAL LIAISON OFFICE * Non-existing * Existing but not well-organized * Existing, well-organized but no formal linkage established * Existing, well-organized and some linkage established	10		
17.2 COMMERCIALIZATION OF RESEARCH FINDINGS * No effort made to commercialize research findings * Some efforts made but without success * Some commercialization realized * Significant commercialization realized	40		
18. WEBSITE [20] * Not available * Available but accreditation data are not complete * Relevant accreditation data available and complete	20		

19. TOTAL SCORE OF SECTION A ____ / 970

20. TOTAL SCORE OF SECTION B ____ / 630

21. OVERALL SCORE ____ / 1600 ____ %

22. GENERAL OBSERVATIONS

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23. Accreditation Status

i. Accredited up to three years _____

ii. Pended for Six Months _____

iii. Not accredited _____

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