هيئة جودة التعليم والتدريب
Education & Training Quality Authority
Kingdom of Bahrain - مملكة البحرين

Directorate of Higher Education Reviews

Programmes-within-College Reviews Report

B.Sc. in Chemical Engineering

College of Engineering

University of Bahrain

Kingdom of Bahrain

Date Reviewed: 4-7 April 2016

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Table of Contents

Acronyms

ABET	Accreditation Board for Engineering and Technology
AIMS	Assessment Information Management System
BS-CHENG	Bachelor of Science in Chemical Engineering
CILO	Course Intended Learning Outcome
CoE	College of Engineering
DAC	Departmental Accreditation Committee
DHR	Directorate of Higher Education Reviews
ILO	Intended Learning Outcome
MIS	Management Information System
NQF	National Qualification Framework
PIAC	Programme Industrial Advisory Committee
PCAP	Postgraduate Certificate in Academic Practice
PEO	Programme Educational Objective
PILO	Programme Intended Learning Outcomes
QAAC	Quality Assurance and Accreditation Center
BQA	Education & Training Quality Authority - Kingdom of Bahrain
SER	Self-Evaluation Report
UILO	University Intended Learning Outcome
UoB	University of Bahrain

The Programmes-within-College Reviews Process

A. The Programmes-within-College Reviews Framework

To meet the need to have a robust external quality assurance system in the Kingdom of Bahrain, the Directorate of Higher Education Reviews (DHR) of the Education & Training Quality Authority (BQA) has developed and is implementing two external quality review processes, namely: Institutional Reviews and Programmes-within-College Reviews which together will give confidence in Bahrain's higher education system nationally, regionally and internationally.

Programmes-within-College Reviews have three main objectives:

- to provide decision-makers (in the higher education institutions, the BQA, the Higher Education Council (HEC), students and their families, prospective employers of graduates and other stakeholders) with evidence-based judgements on the quality of learning programmes
- to support the development of internal quality assurance processes with information on emerging good practices and challenges, evaluative comments and continuing improvement
- to enhance the reputation of Bahrain's higher education regionally and internationally.

The ***four*** indicators that are used to measure whether or not a programme meets international standards are as follows:

Indicator 1: **The Learning Programme**

The programme demonstrates fitness for purpose in terms of mission, relevance, curriculum, pedagogy, intended learning outcomes and assessment.

Indicator 2: **Efficiency of the Programme**

The programme is efficient in terms of the admitted students, the use of available resources - staffing, infrastructure and student support.

Indicator 3: **Academic Standards of the Graduates**

The graduates of the programme meet academic standards compatible with equivalent programmes in Bahrain, regionally and internationally.

Indicator 4: **Effectiveness of Quality Management and Assurance**

The arrangements in place for managing the programme, including quality assurance, give confidence in the programme.

The Review Panel (hereinafter referred to as 'the Panel') states in the Review Report whether the programme satisfies each Indicator. If the programme satisfies all four Indicators, the concluding statement will say that there is 'confidence' in the programme.

If two or three Indicators are satisfied, including Indicator 1, the programme will receive a 'limited confidence' judgement. If one or no Indicator is satisfied, or Indicator 1 is not satisfied, the judgement will be 'no confidence', as shown in Table 1 below.

Table 1: Criteria for Judgements

Criteria	Judgement
All four Indicators satisfied	Confidence
Two or three Indicators satisfied, including Indicator 1	Limited Confidence
One or no Indicator satisfied	No Confidence
All cases where **Indicator 1** is not satisfied	

B. The Programmes-within-College Reviews Process at the University of Bahrain

A Programmes-within-College review of the programmes offered by the College of Engineering at the University of Bahrain was conducted by the DHR of the BQA in terms of its mandate to review the quality of higher education in Bahrain. The site visit took place between 4 to 7 April 2016 for the academic programmes offered by the college; these are B.Sc. in Civil Engineering, B.Sc. in Mechanical Engineering, B.Sc. in Process Instrumentation and Control Engineering, B.Sc. in Chemical Engineering, B.Sc. in Architecture, B.Sc. in Interior Design, B.Sc. in Electrical Engineering and B.Sc. in Electronic Engineering.

UoB was notified by the DHR/BQA on 22 October 2015 that it would be subject to a Programmes-within-College review of the programmes offered by its College of Engineering with the site visit-taking place in April 2016. In preparation for the review, UoB conducted its college self-evaluation of all its programmes and submitted the SER(s) with appendices on the agreed date on 10 January 2016.

The DHR constituted a panel consisting of experts in the academic field of Engineering and in higher education who have experience of external programme quality reviews. The Panel comprised (15) reviewers.

This Report provides an account of the review process and the findings of the Panel for the B.Sc. in Chemical Engineering based on:

(i) analysis of the Self-Evaluation Report and supporting materials submitted by the institution prior to the external peer-review visit
(ii) analysis derived from discussions with various stakeholders (faculty members, students, graduates and employers)
(iii) analysis based on additional documentation requested and presented to the Panel during the site visit.

It is expected that the UoB will use the findings presented in this Report to strengthen the B.Sc. in Chemical Engineering programme. The DHR recognizes that quality assurance is the responsibility of the higher education institution itself. Hence, it is the right of UoB to decide how it will address the recommendations contained in the Review Report. Nevertheless, three months after the publication of this Report, UoB is required to submit to the DHR an improvement plan in response to the recommendations.

The DHR would like to extend its thanks to UoB for the co-operative manner in which it has participated in the Programmes-within-College review process. It also wishes to express its appreciation for the open discussions held in the course of the review and the professional conduct of the faculty and administrative staff of the College of Engineering.

C. Overview of the College of Engineering

The College of Engineering, at the University of Bahrain, owes its roots to the Gulf Technical College which was established in 1968 and which later became the Gulf Polytechnic in February 1981. In 1986, Amiri Decree No. (12) was issued to establish the University of Bahrain by a merger of the Gulf Polytechnic and the Bahrain University College. Following this decree, the new organization plan of the University of Bahrain was issued in November 21, 1987. The College of Engineering currently comprises five departments; namely the Department of Chemical Engineering, Department of Civil Engineering, Department of Electrical and Electronics Engineering, Department of Mechanical Engineering and Department of Architecture and Interior Design. The College is currently running a total of (11) academic programmes (8) at Bachelor and (3) at Master levels. The vision of the College of Engineering is to be among the leading colleges in the region and to maintain a respectful international status and reputation by sustaining a high quality of engineering education and scientific research. During the 2015-2016 academic year, there were (143) full time and (23) part-time faculty members supported by (60) administrative staff. The total number of students enrolled in the College at the time of the site visit was (4,113) students. The College obtained ABET accreditation for six of its bachelor programmes in 2008 and 2014, these are the B.Sc. in Chemical Engineering, B.Sc. in Civil Engineering, B.Sc. in Electrical Engineering, B.Sc. in

Electronics Engineering, B.Sc. in Mechanical Engineering and B.Sc. in Process Instrumentation and Control Engineering. In addition, the B.Sc. in Architecture obtained National Architectural Accrediting Board (NAAB) accreditation in 2014. Moreover, the College is in the process of obtaining accreditation by the Council for Interior Design Accreditation (CIDA) for the B.Sc. in Interior Design programme

D. Overview of the B.Sc. in Chemical Engineering Programme

The Bachelor of Science in Chemical Engineering programme is offered by the Department of Chemical Engineering. The programme was first implemented in September 1993 and (16) students graduated in the academic year 1995-1996 as the first batch of graduates. During the academic year 2015-2016, there were (17) full time faculty members supported by (4) technicians and (2) administrative staff members. At the time of the site visit, the total number of students enrolled in the programme was (694) students, and the total number of graduates to date was (429) graduates. The Programme obtained ABET accreditation in 2008 and 2014. The Programme was also subject to Academic Subject review by the UNDP-Regional bureau for Arab state-Enhancement of QA in Institution Planning at Arab Universities in 2008.

E. Summary of Review Judgements

Table 2: Summary of Review Judgements for the B.Sc. in Chemical Engineering

Indicator	Judgement
1: The Learning Programme	Satisfies
2: Efficiency of the Programme	Satisfies
3: Academic Standards of the Graduates	Satisfies
4: Effectiveness of Quality Management and Assurance	Satisfies
Overall Judgement	**Confidence**

1. Indicator 1: The Learning Programme

The programme demonstrates fitness for purpose in terms of mission, relevance, curriculum, pedagogy, intended learning outcomes and assessment.

1.1 The University of Bahrain's vision statement embodies the values of 'excellence in student learning, innovative research, and community engagement', and the College of Engineering mission statement further states a commitment to 'educate students for positions of leadership and innovation in engineering, widen the horizon of engineering knowledge through original research, and develop and transfer technologies to serve the local and regional needs'. It is within this context that the Bachelor of Science in Chemical Engineering (BS-CHENG) programme was developed from a set of predetermined University Intended Learning Outcomes (UILOs) and departmental Programme Educational Objectives (PEOs). The BS-CHENG programme aims to produce graduates who 'can engage in productive careers in a broad range of the chemical engineering profession in both the public and private sectors'. The BS-CHENG PEOs are clearly stated in the SER and the Panel finds them to be consistent with the University and College strategic statements, and appropriate to a Bachelor in Chemical Engineering programme. The Panel notes that the PEOs provide the focus for the development of the Programme as well as individual Course Intended Learning Outcomes (PILOs and CILOs), as evidenced from the detailed mapping and interrelation of CILOs, PILOs and PEOs to each other and to the University's Mission and Strategic Goals. The Panel appreciates that there is a sound academic planning framework for the BS-CHENG programme with clear aims that are aligned to the college and institution mission and strategic goals.

1.2 The BS-CHENG curriculum includes a well-balanced mix of courses totalling (137) credit hours distributed as: General Education Courses (21 credits), Mathematics and Basic Sciences Courses (36 credits), and Engineering Topics Courses (80 credits). The (80) credits of Engineering topics include: Engineering Science Courses (38 credits), Required Engineering Courses (10 credits) Chemical Engineering Design Courses (17 credits), Chemical Engineering Project Courses (4 credits), Industrial Training Courses (2 credits), and Chemical Engineering Electives (9 credits). The curriculum does not include tracks or concentrations and adopts an international standard model, fulfilling all requirements of a typical B.Sc. in Chemical Engineering. The curriculum shows a clear progression path with an even distribution of credits over the four academic years. Students interviewed by the Panel confirmed that they find the workload to be appropriate to achieve the programme's stated outputs. The pre-requisite courses cannot be overridden, and are clearly stated in the pre-requisite chart. The Panel notes that students gain knowledge and skills from basic science, engineering courses and other complementary courses, as well as specialized skills from a range of design related courses such as utilizing computer applications, modelling and simulation of

unit operations, numerical analysis and well-known engineering software packages. During interviews with faculty members, the Panel learned that the courses are developed specifically for the BS-CHENG programme and comprise inputs from academics and industry specialists. The Panel appreciates that the B.Sc. in Chemical Engineering curriculum provides a balanced workload with a well-planned year-on-year academic progression.

1.3 From the review of provided evidence, including course syllabi, the Panel finds that the curriculum strikes an appropriate balance between theory and practice; and equips the students with the engineering knowledge and skills required in the chemical engineering industry. During interviews, alumni informed the Panel that the curriculum provided them with essential knowledge and skills, particularly analysis and design skills, which prepared them for successful careers in chemical engineering and related professions. Employers interviewed by the Panel concurred with the alumni's views with regards to the skills developed in the curriculum, and highlighted that both the Industrial Training courses and the Capstone Senior Project add value to the programme and help to address the needs of employers. The Panel appreciates that the BS-CHENG curriculum ensures a sound balance between knowledge and practical experience, and between design and analysis skills.

1.4 With regards to the skills developed in the curriculum, the Panel notes that areas such as technical and design skills, and teamwork are well catered for, whereas written communication needs to be enhanced. The Panel acknowledges the Department's efforts to incorporate oral and written communication skills in several courses to achieve the programme learning outcome-g 'an ability to communicate effectively'. These include three English language courses, Communication Skills I (ENGL 101), Composition and Reading II (ENGL 102), and Report Writing and Presentation (ENGL 242), in addition to an Arabic Language Skills (ARAB 110). Moreover, students are required to submit a written technical report and make PowerPoint presentations in several courses including, Junior Project course (CHENG 290), Senior Project course (CHENG 490), and Plant Design Project (CHENG 423). However, upon examining samples of project reports during the site visit, the Panel finds that the written communication skills are in need of honing. The Panel's views were also confirmed by the alumni and external stakeholders interviewed by the Panel. The Panel recommends that the College should revise the existing mechanisms for developing the students' written communication skills, in order to achieve the programme's learning outcomes.

1.5 The BS-CHENG curriculum was designed in alignment with the ABET criteria for engineering degree programmes and the specific requirements set by the American Institute of Chemical Engineers (AIChE). Moreover, the National Qualifications Framework (NQF) level descriptors were used as a guide. In addition, internal

reference points were followed, mainly the guidelines outlined in the *IDEAS* Handbook, Programme Development and Review Policy and the Programme Quality Assurance and Enhancement Policy. In line with internal regulations, a 'Course Syllabus Form', developed by the Quality Assurance and Accreditation Centre (QAAC), is followed in the preparation of the course specifications to ensure unified documentation of the BS-CHENG programme syllabus. During interviews with faculty members, the Panel learned that course coordinators are responsible for the development of the course outlines, which are then approved by the academic committee, and consequently by the Department Council. From the review of course files during the site visit, the Panel noted that the course syllabus forms are overall well-designed and include all relevant aspects of the course, including the course description, pre-requisites, CILOs and the corresponding mapping against the PILOs, teaching and assessment methods, weekly lecture topics, key textbooks, references, as well as other resources used (e.g. e-Learning, field visits, periodicals, software, etc.). The Panel also acknowledges that there is a relevant reference to recent professional practice and published research findings and their use in syllabus planning is appropriate. In its interviews with senior management, the Panel was informed that an ABET accreditation was recently completed in 2014, concluding that the BS-CHENG syllabus is specifically aligned with the ABET criteria for such a programme. The Panel also learned that the QAAC recommendations, as well as those from the Programme Industrial Advisory Committee (PIAC), students and alumni are also implemented. In the view of the Panel, all these inputs ensure the syllabus breadth, depth and relevance to the professional practice. The Panel appreciates that the syllabus is overall well documented, and is aligned to internal and external criteria to ensure that it meets the international norms of a bachelor degree in chemical engineering. However, the Panel notes that, in few courses, (e.g. CHENG 290, CHENG 301, CHENG 314), the textbook information is not updated. Students indicated during interviews that they make use of the library e-books and that they have the latest books and information technologies available. The Panel encourages the Department to ensure that the list of assigned textbooks is updated in the course files.

1.6 The BS-CHENG programme has (11) Programme Intended Learning Outcomes that are clearly expressed in the programme specification and are precise and measurable. During interviews with faculty members, the Panel learned that the PILOs were developed in line with ABET's criteria for 'Student Outcomes' (a-k) to describe the three categories of outcomes (generic or transferrable skills; knowledge and understanding; and practice: applied knowledge and understanding). The Panel was also informed that both internal and external stakeholders were involved in the PILOs development process. The descriptions of the PILOs were examined by the Panel and found them to be clear and appropriate for a bachelor degree in Chemical Engineering. The Panel also found the PILOs to be well-aligned to the Programme Educational Objectives and the University Intended Learning Outcomes. The Panel appreciates

that PILOs appropriate to the level of the degree are in place and are well-aligned with the BS-CHENG programme aims and objectives.

1.7 The SER indicates that the Course ILOs should be developed in line with the university's internal quality assurance policies and guidelines, and be made available to students in the Course Specification document. During interviews, the Panel learned that all teaching staff are required to reference the programme learning outcomes and graduate profile when developing the course learning outcomes. Faculty members emphasized that the development of intended learning outcomes is the starting point in the design of all BS-CHENG courses, as they constitute the basis for all learning and assessment activities. From examining a wide selection of course files during the site visit, the Panel confirmed that there is a set of clearly stated CILOs for each course, documented in the course specifications. The Panel also notes that all CILOs are appropriately mapped to the PILOs as set out in the SER. The Panel appreciates that the BS-CHENG courses have clearly expressed intended learning outcomes which are appropriately aligned with the programme learning outcomes to ensure the effectiveness of the academic programme. However, the Panel noted that a few courses have an exaggerated number of CILOs, with examples being 'Separation II' (CHENG 313) which contains 26 CILOs and 'Heat Transfer' (CHENG 314), in which the CILOs statements are exaggerated, containing long and numerous sentences. The Panel encourages the Department to review these courses' ILOs to ensure they are more concise and succinct.

1.8 The curriculum includes work-based learning in the form of two compulsory courses: Industrial Training I (CHENG 299) and Industrial Training II (CHENG 399), during which students are placed in a work environment in government or private establishments for eight weeks. These courses aim at exposing the students to real work environments and enabling them to apply the theory, knowledge and practical experience they acquired in other courses. In its interviews with faculty members, the Panel learned that students must acquire fundamental knowledge and skills before they can commence these courses. A minimum of (45) and (85) credit hours must be completed before students can register in 'Industrial Training I' and Industrial Training II, respectively. The Panel is of the view that the first Industrial Training course (CHENG 299) is offered early in the programme. During interviews, some students indicated that they are not adequately prepared to start training at the end of the second year. The Panel is pleased to learn, from its interviews with faculty members, that the Department is aware of this issue and is working on addressing it. There is a clear and appropriate assessment and grading scheme, and achievement is recognised through the award of (1) credit hour for each course. The final grade for the course is distributed as: Company Assessment (20%), Attendance (40%), Academic Supervisor Assessment (10%) and Training Report (30%). The Panel was provided with adequate evidence on the implementation of the Student Assessment Forms (by

the industrial supervisor and the academic supervisor) as well as samples of industrial training report. Students interviewed by the Panel indicated that industrial training provides them with opportunities to adapt to local work environments and acquire the necessary professional skills for their specializations. During interviews with external stakeholders, including members of the PIAC, employers and external project examiners, the Panel learned about how relevant and valuable these opportunities are for the hosting organization as well, as it provides them with the opportunity to select potential future employees. The Panel appreciates that work-based learning is integrated in the BS-CHENG curriculum and contributes effectively to the achievement of the programme outcomes.

1.9 According to the SER, the CHENG department emphasizes the importance of adopting a variety of teaching and learning methods to support the achievement of the courses and programme learning outcomes. During interviews, faculty members indicated that they are free to implement the teaching approaches that are most appropriate for type and level of courses delivered; these include interactive lectures, case studies, projects, group work, laboratory experiments, computer software, as well as e-learning using Blackboard. From the review of course outlines, the Panel confirmed that a wide range of teaching and learning methods are used by the faculty in the delivery of the BS-CHENG courses to enhance teaching and learning. The effectiveness of these methods is reflected in the results of the Senior Exit Survey which indicate a high level of satisfaction (97.5%) with the variety of implemented teaching methods and approaches, as well as the use of computer technology to support learning (90%). This was confirmed during interviews with current students and recent alumni. The Panel is pleased to note that 'Improvement in teaching' is an ongoing initiative in the programme's improvement plan, and includes training of faculty members in new teaching methodologies as well as the communication of teaching and learning policies to all faculty and students. The Panel appreciates that a wide and innovative range of teaching methods are employed to ensure the attainment of the BS-CHENG courses' learning outcomes.

1.10 The Panel also notes with appreciation that the Department incorporates different approaches to encourage students' participation in learning; these include interactive teaching, problem-based learning, project-based methods, as well as project design courses, all of which require independent learning from the student. From provided evidence and interviews with faculty members, it was evident to the Panel that self-learning is encouraged and students interviewed by the Panel confirmed that opportunities for independent learning are increased as they progress through the programme. Moreover, the involvement of professional bodies is particularly strong and a good relationship exists between the Department and Industry. Students are provided with adequate opportunities for professional practice, mainly covered in the two industrial training courses and the senior design projects, in addition to the

professional workshops, field trips, and seminars by invited speakers from industry. Whilst the Panel appreciates the Department's efforts for improving the teaching and learning, it is of the view that these efforts need to be included within a documented policy framework. In its interviews with senior management, the Panel learned that while there is no explicit teaching and learning policy; there are common institutional policies and regulations that are applied to unify the good practices in teaching and learning in the CHENG Department. These include the 'Regulations of Study and Examinations at University of Bahrain', the 'Programme Quality Assurance and Enhancement Policy' as well as the IDEAS Handbook. The Panel recommends that the College should build on these policies and regulations to inform the development of explicit departmental guidance on teaching strategies that best support the educational objectives of the BS-CHENG programme.

1.11 The Department of Chemical Engineering implements suitable mechanisms for the design and administration of formative and summative assessment of students' achievements. These mechanisms are clearly detailed in the institutional assessment policies and procedures; including the Study and Examination Regulations at the University of Bahrain, Assessment and Moderation Policy, QAAC Assessment Strategy, Anti-plagiarism Policy, the Programme Quality Assurance and Enhancement Policy and the IDEAS Handbook. From the review of these policies, the Panel notes that they appropriately address essential aspects of student assessment including: assessment guidelines, alignment of student assessment and learning outcomes, grading guidelines, prompt feedback to students, moderation and grade distribution guidelines, as well as the fair and consistent application of assessment regulations. From the review of course files and site visit interviews, it is clear to the Panel that suitable assessment procedures are in place, including both formative and summative assessments methods, and that these are discussed in departmental council meetings. Students interviewed by the Panel confirmed that, at the beginning of each semester, they are provided with the course syllabus, including information on the assessment methods used and their weights. The Panel appreciates that a comprehensive system is in place for the reliable and transparent assessment of student achievements. In its interviews with academic staff, however, the Panel noted that some faculty members have insufficient knowledge of some recently developed policies (e.g. external examiners policies). The Panel encourages the Department to enhance the communication of new policies *via* departmental meetings and induction programmes (see recommendation in section 4.1).

1.12 Appropriate mechanisms are also in place for grading the students' achievements with fairness and providing them with prompt feedback on their performance. The Assessment and Moderation Policy stipulates that 'prompt and objective feedback should be provided to students on their assessment results within two weeks from the date of the assessment activity'. During interviews, students informed the Panel that

they receive prompt feedback, as well as the grading criteria and model answers, to ensure fairness of the grades being allocated. An appeals process is in place should a student not be satisfied with certain outcomes, and may appeal to have the assessment re-checked. This was confirmed by the Panel from the review of some appeal cases provided as evidence. The Panel appreciates that appropriate arrangements are in place for providing students with prompt feedback on their achievements as well as the opportunity to appeal their grades.

1.13 In coming to its conclusion regarding The Learning Programme, the Panel notes, *with appreciation*, the following:

- There is a sound academic planning framework for the BS-CHENG programme with clear aims that are aligned to the college and institution mission and strategic goals.
- The BS-CHENG curriculum provides a balanced workload with a well-planned year-on-year academic progression.
- The curriculum ensures a sound balance between knowledge and practical experience, and between design and analysis skills.
- The syllabus is well-documented, and is aligned with internal and external criteria to ensure that it meets the international norms of a bachelor degree in chemical engineering.
- Programme Intended Learning Outcomes appropriate to the level of the degree are in place and are well-aligned with the BS-CHENG programme aims and objectives.
- The courses have clearly expressed intended learning outcomes which are appropriately aligned with the programme learning outcomes to ensure the effectiveness of the academic programme.
- Work-based learning is integrated in the curriculum and contributes effectively to the achievement of the programme outcomes.
- A wide and innovative range of teaching methods are employed to ensure the attainment of the courses' learning outcomes.
- The Chemical Engineering Department implements different approaches to encourage students' participation in learning; as well exposure to professional practice.
- A comprehensive system is in place for the reliable and transparent assessment of students' achievements.
- Appropriate arrangements are in place for providing students with prompt feedback on their achievements as well as the opportunity to appeal their grades.

1.14 In terms of improvement the Panel **recommends** that the College should:

- revise the existing mechanisms for developing the students' written communication skills, in order to achieve the programme's learning outcomes
- build on existing policies and regulations to inform the development of explicit departmental guidance on teaching strategies that best support the educational objectives of the BS-CHENG programme

1.15 **Judgement**

On balance, the Panel concludes that the programme **satisfies** the Indicator on **The Learning Programme.**

2. Indicator 2: Efficiency of the Programme

The programme is efficient in terms of the admitted students, the use of available resources - staffing, infrastructure and student support.

2.1 Admission to the B.Sc. in Chemical Engineering programme is determined by the institutional policies and procedures for admission in undergraduate programmes. In terms of these policies, the prospective student must have a high school grade of at least 70% and pass a personal interview as well as an aptitude test conducted by the University. Although there are no minimum English language requirements such as TOEFL/IELTS; students who have a secondary school grade of less than 90% are required to complete an Orientation English Program - consisting of non-credited (9) hours per week course (ENGLR 015) - before joining the programme. The Panel notes that as part of the special requirements for the College of Engineering, students coming from private schools must pass a standard international examination (IGCSE, GCSE) of at least a grade of (C) particularly in English, mathematics, any two courses from physics, chemistry, biology or any other scientific subject. During interviews, the Panel confirmed that currently there are no additional admission requirements for the B.Sc. in Chemical Engineering programme. The Panel notes that the admission policies and procedures, including those for transfer students, are clearly stated in the Study and Examination Regulations and are published on the university website as well as in university catalogues. The Panel also notes that the admission policies are periodically reviewed, in light of analysis of students performance and in alignment with international standards. This is evidenced from the introduction of the Aptitude Test as an admission requirement in the last review. The Panel appreciates that clear admission policies are in place and are periodically revised to recruit students with appropriate profiles for the BS-CHENG programme.

2.2 According to the SER, during the academic year 2014-2015, there were (432) students registered in the BS-CHENG programme (57% males and 47% females). The majority of students (74%) are Bahraini, and all students are enrolled full time in the programme. During interviews, the Panel learned that whilst there are no specific examinations designed for admission to the BS-CHENG programme, the university entrance examination, the admission interviews, the aptitude test are considered adequate to recruit appropriate students for the programme. From provided evidence and site visit interviews, the Panel acknowledges that overall, the profile of admitted students matches the BS-CHENG programme aims and available resources. However, the Panel notes that over recent years the number of students admitted to the BS-CHENG programme has been increasing, with the total registered students increasing from (158) in 2010-2011 to (432) in 2014-2015. At the time of site visit, the total number of registered students was (694). The Panel finds the students' number to be too high for the current employed staff (see section 2.4). In its interviews with senior

management, the Panel learned that the University is aware of this problem, and is working on plans to mitigate its impact. The Panel recommends that the College should lead rapid action to manage the number of students admitted to the BS-CHENG programme, to match staff capacity and programme resources.

2.3 The BS-CHENG programme is offered and managed by the Chemical Engineering Department. Clear lines of accountability are in place and a well-managed structure exists with well-defined responsibilities at the department, college and university level. The Dean is responsible for assuring the effectiveness of the educational processes in the College, whereas the Departments' Chairpersons, are in-charge of the programmes management. The Department Chairperson oversees assigned responsibilities, supported by a comprehensive structure of departmental committees. The Department has nine permanent committees, which include the Academic Committee, Department Accreditation Committee, (DAC), Department Activities, Seminar, & Website Committee, Laboratory and Safety Committee, Library, Textbooks, & Software Committee, Postgraduate Committee, Promotion & Conference/Seminar Attendance Committee, Research & Equipment Committee and the Timetable Committee. From provided documents and interview session, the Panel found strong evidence that all the committees have clear mandates related to the management of the programme and prepare proposals in their respective for the chairperson. The Panel also confirmed that the decision-making process follows the hierarchy from the Department Council to the College Council and University Council, with the relevant Council having ultimate responsibility for decision-making. The Panel appreciates that a well-managed structure is in place for the management of the BS-CHENG programme, with well-defined responsibilities and reporting lines.

2.4 The Department of Chemical Engineering has a total of (28) full-time faculty members (7) of which hold managerial positions inside and outside the university, with little or no teaching workloads, and (4) currently teach on the Process Instrumentation and Control Engineering (PICENG) programme. The BS-CHENG programme is therefore delivered by a total of (17) full time academic staff comprising: (3) full Professors, (1) Associate Professor, (11) Assistant Professors, in addition to (1) Senior Lecturer and (1) Lecturer. In addition, there are (6) administrative/technical staff members to support academic activities. From provided CVs and site visit interviews, the Panel notes with appreciation that overall, the faculty members' qualifications and expertise are appropriate to the BS-CHENG programme objectives and its delivery needs. Most of the faculty members have academic experience with only three having more than five years of industrial (or government) experience. A matter of concern to the Panel is the fact that the Student to Staff Ratio (SSR) has deteriorated over the past few years, from (25:1) in Semester I of academic year 2013/2014 to (44:1) in Semester I of academic year 2014/2015. The Panel finds this ratio to be high according to international norms and to the (35:1) standard set by UoB. The Panel recommends that the College should take

urgent action to reduce the SSR to an appropriate level, in alignment with institutional and international standards. With regards to staff workload, the SER states that the average distribution of activities is (55%) in teaching, (23%) in research or scholarship and (23%) in other programme/departmental activities. During interviews with faculty members, the Panel was informed that about (50%) of academic staff spend (100%) of their time on Teaching and Learning and the lack of research time is a concern to them. The Panel finds that with this high teaching load, there is less opportunity for staff members to engage in research and self-development activities. Although the College supports research by providing grants for those travelling to conferences and staff who publish their work in refereed journals, the research outcome remains modest and it is furthermore limited to a small number of the staff members. The Panel recommends that the College should lead action to ensure that faculty members are supported to engage in scholarly and scientific research activities to underpin the B.Sc. in Chemical Engineering programme.

2.5 The University of Bahrain has a well-established, systemic approach for recruitment, selection, appointment and retention of staff. Policies and guidelines are in place and the recruitment process is detailed in the SER showing the steps undertaken both by the Department and the College for recruiting new staff members. During interviews, the Panel learned that vacancies are advertised on the university website after which received CVs are studied by the Department Recruitment Committee for a thorough scrutiny and ranking of candidates. The Committee's recommendations for appointment are then discussed in the Department and College Council Meetings, with final approval of selected candidates being made in the University Council. This was confirmed by the Panel from the study of provided evidence. The Panel appreciates that recruitment procedures are implemented in a transparent manner in alignment with institutional policies and procedures. According to the SER, there are no formal approaches with regards to the retention of academic staff. During the interviews, the Panel was informed that retention is encouraged through incentives and participation in international conferences. Moreover, the Panel learned that induction of new staff is performed informally at a programme level. The Panel recommends that the College should develop formal mechanisms for the induction of newly-appointed academic staff, as well as for the retention of high performing faculty members.

2.6 There are comprehensive 'Academic Promotion Regulations' with a set of criteria including research, community service, in addition to the teaching and learning activities. However, faculty members interviewed by the Panel indicated that the processing of promotion applications was very lengthy and slow. Some staff also indicted that they are unable to fulfill the current promotion criteria due to increased teaching load which slows the promotion process on the average. In its interviews with senior management, the Panel was informed that the University is working towards

streamlining the promotion process. The Panel notes, from provided data, that only one faculty member has been promoted in the CHENG Department over the past five academic years. The Panel recommends that the University review the promotion procedures to significantly shorten the time required to process promotion applications. With regards to staff appraisals, the Panel notes that the process currently involves student evaluation *via* student surveys at the end of each semester. During interviews, the Panel was informed that a comprehensive evaluation of academic staff performance is only conducted at the time of promotion, and contract renewal for non-Bahraini staff members. The Panel confirmed that there is no provision for annual staff appraisals that are linked to staff professional development. The Panel recommends that the College should develop and implement an annual comprehensive appraisal system for all academic staff that identifies and supports areas for professional development.

2.7 The College of Engineering utilizes the institutional Management Information System (MIS) to guide informed decision-making in the management of its academic programmes. The SER provides details of the system's major sub-components including: Online Registration, Timetable Preparation, Academic Advising, E-learning, Human Resources, Training and Quality Assurance. During the site visit, the Panel confirmed the MIS is efficiently maintained by the University Information Technology (IT) Center to ensure availability of the system's components to all stakeholders. In its interviews with academic and administrative staff, the Panel learned that the CHENG Department makes use of the MIS to provide up-to-date information about the students and faculty members of the programme. For example, the Department has access to a wide range of data such as student records, advising records, faculty records, examination marks, tracking ordered laboratory equipment, and quality assurance reports. Students interviewed by the Panel confirmed that the system allows them to download the necessary forms required for online registration and other aspects related to the management of their learning. The Panel notes that access to the MIS is subject to password compliance, whereby staff and students have restricted access to the system *via* a secured login protocol. During interviews, the Panel heard several examples of the use of reports generated by the MIS for decision-making in the Department. The Panel appreciates that an effective Management Information System is utilized by the Chemical Engineering Department to support the BS-CHENG programme functions and decision-making processes.

2.8 Appropriate policies and procedures are in place to ensure the security of learners' records, and the accuracy of results. At University level, it is the responsibility of the Deanship of Admission and Registration to secure and safeguard all student related records, in both electronic and hardcopy. At college level, academic departments are responsible for keeping records of all examinations, project reports, student grades, attendance as well as related policies and procedures. During interviews, the Panel

learned that academic staff are responsible for the retention of marked assessments and for submission of students' grades to the Department Chairperson. The Department Chairperson is responsible for confirming grades and submitting these to the Dean of College, for confirmation and submission to the Deanship of Admission and Registration. The SER describes the procedures in place to ensure the security of learner records. During the site visit interviews and the campus tour, the Panel confirmed that copies of all critical records are maintained at different levels by the Deanship of Admission and Registration and in the Department of Chemical Engineering. The Panel notes that a robust system is in place for the backup and disaster recovery of student records, with clearly prescribed periods for retention and back-ups. In addition, an electronic backup is executed every semester by the IT Center. From its interviews with the IT Centre staff, the Panel is satisfied that the security of records is ensured through clearly defined mechanisms for authorization, storage of data, privacy of information, and the use of appropriate security tools. The Panel appreciates that a robust system, including effective policies and procedures, is consistently implemented, to ensure security of learner records and accuracy of results.

2.9 The College of Engineering is currently located in the UoB Isa Town Campus. During the site visit, the Panel toured the departmental and college facilities including the teaching classrooms, specialized laboratories, computer laboratories, library, staff offices, food court, and venues for extra-curricular and sporting activities. The Panel observed that there is a sufficient number of classrooms, all of which are equipped with computers and smart boards for use by instructors, with internet connectivity provided in every office and laboratory in all the college buildings. The Department of Chemical Engineering has six specialized laboratories; these are the Process Analytics Laboratory, Unit Operations Laboratory I, Unit Operations Laboratory II, Research Laboratory, Process Control Laboratory and Process Measurement & Instrumentation Laboratory. The departmental laboratory infrastructure is further supported by (13) College Computer laboratories equipped with a total of (290) computers and one multimedia projector in each laboratory. Excellent software packages are also available to all: ASPEN HYSYS, Control Station, Matlab, Polymath in addition to MS Office, Labview, MPLAB IDE etc. Guidance is provided in the laboratories concerning laboratory manuals and safety directives, which are supervised by a safety officer and training is offered several times a year. Blended learning is facilitated by the extensive multimedia facilities and installed Ethernet, Fibre Optic and Wi-Fi networks. Major maintenance of the laboratories and laboratory equipment is carried out by specialised personnel. The SER states that, since 2008, the Chemical Engineering Department's facilities have undergone major improvements including the upgrading of laboratories and the renovation of classrooms. This was confirmed during interviews with faculty members. Students interviewed by the Panel also indicated that they are satisfied with the currently available facilities in the

Department. The Panel notes with appreciation that the available facilities are sufficient in number and specifications to meet the needs of the BS-CHENG programme staff and students.

2.10 In addition to the Central University of Bahrain Library located in the Sakhir Campus, the Isa Town Campus has a library devoted to the College of Engineering faculty and students. The visit to the library confirmed that an appropriate range of textbooks, journals and e-resources are available for the BS-CHENG programme and are to international standards. The number of printed books related to the Chemical Engineering programme is about (590) in English. In addition, students have access to (438) fully-searchable e-reference books and e-journals in the field of Chemical Engineering from the digital library portal. The online catalogue (Sirsi Dynix) enables students to locate and request books for borrowing. The presence of a digital library also makes it possible for students to remotely access journals and e–books. Students interviewed by the Panel expressed their satisfaction with the library services such as the online system, the study rooms, and the common study area. The Panel appreciates that the library is fit for purpose with a range of resources and services that meet the needs of the staff and students of the BS-CHENG programme.

2.11 A tracking system is in place to determine the usage of laboratories, classrooms, and library resources. A laboratory engagement timetable and an 'enrollment list' is provided by the registration office for each semester, to enable the Department to manage the utilisation of laboratories and classrooms for the programme. During interviews with administrative and academic staff, the Panel learned that the laboratory technicians keep a daily schedule of their laboratory usage as they are normally used for laboratory sessions of most of the courses. With regards to the library e-learning and e-resources, the Panel was informed that the library and e-learning center are mainly responsible for tracking the usage of these resources and tracking reports are provided for the department upon request. Samples of e-learning tracking reports were provided to the Panel. During the site visit tours, the Panel noted the timetabling and attendance sheet system displayed in the department's teaching facilities. In addition, Computing Usage Timetable were displayed in all college computer laboratories. During interviews, the Panel heard several examples of how tracking records are utilized for the evaluation of the usage of the Department's resources; for example, determining the need for opening new sections or purchasing new laboratory equipment. During interviews, the Panel learned that some improvements are being considered to enhance the efficiency of the current tracking system, for example by providing an electronic system for reservation of examination rooms. The Panel notes that the Department's improvement plan includes a goal relating to 'Improvement in usage tracking system'. The Panel encourages the implementation of this initiative. The Panel acknowledges that an adequate tracking system is utilized for the evaluation of the usage of the Department's resources.

2.12 The University of Bahrain provides student support activities at many levels; these include: laboratory support, library support, e–resources, guidance and counselling, as well as health care. A description of the extensive array of student support activities available to the programme's students is reported in detail in the SER. During the site visit, the Panel confirmed that laboratories have dedicated technicians who are responsible for resolving any problems encountered by students in the use of laboratory equipment and hardware. The Zain e-Learning Centre also provides a range of services and courses to support students in use of learning technologies. The Library provides a range of services and support for students, both generic and through subject librarians. Support for students includes: Library induction; information literacy training; and workspaces in the Library, including some for students with special needs. General guidance and support come within the responsibility of the Deanship of Student Affairs, with support organised in service areas: Student Activities; Student Services and Developments; Students Advice and Guidance; and Training and Development. The Panel acknowledges the impressive range of workshops organized for students on a wide range of topics including: leadership development, computer literacy, scientific report writing, life skills and psychological skills development. The Panel also notes that the Career Counselling Office provides a range of support services for students: student career guidance; professional liaison; training, supporting students' practical skills; and marketing students to the job market, including job-shadowing and professional workshops. The University Health Clinic provides comprehensive on-campus healthcare to students. The appropriateness of available support, as documented in the SER, was confirmed by the Panel in interviews with administrative staff. Students interviewed by the Panel also expressed their satisfaction with the range of support services available to them and indicated that with the planned move to the new campus, they will benefit more from full, easy access to all the University facilities. The Panel appreciates that an extensive range of support services is provided to the programme students to enhance their learning experience.

2.13 At the beginning of each academic year, the Deanship of Students Affairs and the Deanship of Admissions and Registration organize an induction day for all newly admitted students at UoB. During this induction, students are informed about the academic facilities and services at the University, as well as the academic rules and regulations. In addition, an overview of the different educational and social activities is also provided to students, along with orientation programme publications. During interviews, the Panel was informed that different student bodies also participate in the induction of new and transferred students to familiarize them with the activities of students' clubs and societies. In addition to the general university orientation, the College of Engineering organizes an induction day during which students meet with the academic and administrative staff members of the Department. During its interviews with staff members, the Panel learned that college induction includes an

overview of the college and departments by the Dean and Chairpersons, the introduction of academic programme plans by academic advisors, as well as touring of college facilities. The Panel appreciates that a comprehensive induction programme is provided for newly admitted students at university, college and department levels. However, the Panel notes, from provided evidence, the low number of students who attended the induction day in the academic year 2013-2014, constituting only (49%) of total students admitted in the College of Engineering. During interviews, the Panel learned that currently the induction programme is not compulsory and that the College is working towards addressing this issue. The Panel notes that the Department has identified, in its programme improvement plan, an improvement goal to 'improve the student induction' with clear action steps including that: (1) the induction programme should be made compulsory to all students (2) the induction programme should be held more than once at the beginning of the semester to accommodate all the new students. The Panel concurs and recommends that the College should enhance students' attendance during orientation and implement appropriate provisions for those students who cannot attend the induction day.

2.14 An institutional Academic Advising Framework that details the responsibilities of academic advisors and the processes for tracking the students' academic progress is in place. In line with this framework, students are required to meet their advisors at the beginning of each semester to guide them in selecting courses that ensure the successful and timely completion of their studies. The Panel notes the elaborate scheme that has been put in action to allow effective implementation of the advising system; this includes the Academic Advising website, Advising Tool, as well as the appointment of a Chief Departmental Advisor who provides guidance to other faculty advisors. During interviews with academic advisors, the Panel was informed that tracking the students' progress is a collaborative effort between the department and the Deanship of Admission and Registration. The Academic Warning & Academic Dismissal roles are clear and widely published on the University's website. The online Academic Advising System includes an electronic tracking system which enables advisors to record the advice information for each student. With regards to at-risk students, the Panel acknowledges that there are appropriate policies and procedures to identify students at risk of academic failure and enable timely interventions. A new feature has recently been introduced in the advising system to block at-risk students (with GPA of less than 2.0 out of 4.0) from registration unless they meet their academic advisors. During interviews, the Panel learned that a range of academic and social support is provided to students under probation, in collaboration with the Deanship of Student Affairs' Counseling and Guidance Unit. The Panel noted from its interviews with students that the peer-mentoring scheme and related programs - such as Life Learning, Steps to Success, Generation Teaching - provide students with opportunities to improve their academic performance. The Department obtains students' feedback on the advising system every semester *via* the Senior Exit Survey. From the results of

the 2014-2015 senior exit survey and interviews with students, the Panel notes that students are in general satisfied with academic advising. The Panel appreciates that an appropriate system for academic advising has recently been developed, including processes to identify and support at risk students.

2.15 The SER details the extensive range of informal activities provided for students to expand their knowledge and experience outside the classrooms and laboratories; these include student societies and clubs, cultural and social activities, as well as sporting events. In addition, students are encouraged to attend workshops and conferences conducted locally and internationally. This was confirmed during interviews with faculty members, as well as administrative staff from the Deanship of Student Affairs. Students interviewed by the Panel were very positive about these wider opportunities, and indicated that they appreciate arrangements made by the College for them to participate in competitions and obtain professional certificates. The site visit revealed to the Panel that the general environment in the College and Department is conducive to informal learning. The Panel appreciates that the wider learning environment, including the comprehensive range of activities and resources, enable the BS-CHENG programme's students to effectively engage in informal learning experiences.

2.16 In coming to its *conclusion* regarding the Efficiency of the Programme, the Panel notes, *with appreciation*, the following:

- Clear admissions policies are in place and are periodically revised to recruit students with appropriate profiles for the programme.
- A well-managed structure is in place for the management of the programme, with well-defined responsibilities and reporting lines.
- The faculty members' qualifications and expertise are appropriate to the BS-CHENG programme objectives and its delivery needs.
- Recruitment procedures are implemented in a transparent manner in alignment with institutional policies and procedures.
- An effective Management Information System is utilized by the Chemical Engineering Department to support the BS-CHENG programme functions and decision-making processes.
- A robust system, including effective policies and procedures, is consistently implemented, to ensure security of learner records and accuracy of results.
- The available college facilities are sufficient in number and specifications to meet the needs of the programme staff and students.
- The library is fit for purpose with a range of resources and services that meet the needs of the staff and students of the BS-CHENG programme.
- An extensive range of support services is provided to the programme students to enhance their learning experience.
- A comprehensive induction programme is provided for newly admitted students at university, college and department levels.

- An appropriate system for academic advising has recently been developed, including processes to identify and support at risk students.
- The wider learning environment, including the comprehensive range of activities and resources, enable the programme students to effectively engage in informal learning experiences.

2.17 In terms of improvement, the Panel **recommends** that the College should:

- lead rapid action to manage the number and profile of students admitted to the BS-CHENG Programme, to match staff capacity and programme resources
- take urgent action to reduce the Student to Staff Ratio to an appropriate level, in alignment with institutional and international standards
- lead action to ensure that faculty members are supported to engage in scholarly and scientific research activities to underpin the B.Sc. in Chemical Engineering programme
- develop formal mechanisms for the induction of newly-appointed academic staff as well as the retention of high performing faculty members
- review the promotion procedures to significantly shorten the time required to process promotion applications
- develop and implement an annual comprehensive appraisal system for all academic staff that identifies and supports areas for professional development.
- enhance students' attendance during orientation and implement appropriate provisions for those students who cannot attend the induction day.

2.18 **Judgement**

On balance, the Panel concludes that the programme **satisfies** the Indicator on **Efficiency of the Programme.**

3. Indicator 3: Academic Standards of the Graduates

The graduates of the programme meet academic standards compatible with equivalent programmes in Bahrain, regionally and internationally.

3.1 Generic graduate attributes are defined at the university level as University Intended Learning Outcomes (UILOs), and include communication, technical competence, critical thinking and analysis, information literacy, responsibility and integrity and life-long learning. The BS-CHENG programme has clearly stated learning outcomes (or graduate attributes) in alignment with the UILOs. The Programme ILOs (11 in total), are effectively mapped to the programme educational objectives; and accordingly, the achievement of these outcomes leads to achievements of the graduate attributes of the BS-CHENG Programme. From the review of site evidence and course files, the Panel notes that each course is designed to achieve the course learning outcomes with itemized contributions to PILOs which in turn are mapped to different levels of ILOs, PEOs and UILOs. The assessment tools employed by the Department for the achievement of learning outcomes by students are detailed in the SER and include direct assessment methods using performance indicators in addition to indirect assessments through the mapping of surveys and evaluation results to the PEOs and the PILOs. The Panel finds these assessment tools to be overall valid and reliable. The Panel appreciates that the BS-CHENG programme graduate attributes are clearly stated, and that their attainment is ensured through the strong link between the types of assessments and learning outcomes.

3.2 The SER states that the Chemical Engineering Department utilizes internal reference points - namely the QAAC guidelines outlined in the IDEAS Handbook and the University's Programme Development and Review Policy - as well as external reference points and mainly the National Qualifications Framework (NQF) level descriptors and ABET criteria for engineering programmes accreditation, to verify the equivalence of the BS-CHENG programme's academic standards with other similar programmes in Bahrain, regionally and internationally. During interviews with senior management, the Panel learned that benchmarking activities have recently been formalized through the development of an institutional Benchmarking Policy which clearly states the policy purpose, scope, procedures statements and support procedures, as well as management and implementation responsibilities. In line with this policy, the QAAC in collaboration with the university Vice Presidents and Deans are responsible for the management of various aspects of benchmarking. The Panel was also informed that the Department of Chemical Engineering has embarked on external benchmarking exercises to achieve ABET accreditation of the BS-CHENG programme in 2008 and 2014. The Panel notes that the outcomes of the ABET accreditation process have resulted in programme improvements, particularly in terms of learning outcomes, curriculum and courses syllabi. The Panel appreciates that

formal processes are implemented to ensure that the BS-CHENG programme's standards are comparable to national and international standards and to promote improvements in its delivery. The Panel notes that the Benchmarking Policy states that 'The University evaluates itself against national and international peers and partners through benchmarking activities, enabling it to evaluate its performance, monitor standards, compare best practices and make quality improvements.' The Panel concurs and recommends that the College should benchmark the BS-CHENG programme against similar programmes in reputable regional and international institutions.

3.3 As indicated earlier (see section 1.11), the university-wide assessment strategy is defined by a range of appropriate policies and procedures for the evaluation, grading and moderation of students' assessments. These policies are made available to students *via* the course specifications at the beginning of each semester, the university intranet, college publications and Blackboard. Procedures for ensuring the consistent implementation and monitoring of these policies are clearly stated in the 'Moderation of Examinations and Assessment' policy. During different interviews, the Panel learned that the implementation of assessment policies is monitored by the departmental 'Examination Moderation Committee' and 'Grade Distribution Committee' – under the supervision of the Department Chairperson - to ensure that these policies are followed and their assessments meet the required standards. In addition, a departmental Quality Assurance Committee conducts regular reviews of the course files, to ensure that faculty members are adhering to the assessment guidelines, and use the findings for improvement purposes. The implementation of these processes was confirmed by the Panel from the review of these committees' reports, as well as course portfolios, including samples of moderated assignments and examinations. The Panel appreciates that appropriate mechanisms are, overall, implemented to ensure the consistent implementation of assessment policies, and their regular monitoring to inform improvements in programme academic standards. The details of the implementation of assessment policies will be further discussed in upcoming sections.

3.4 Institutional assessment policies and procedures, delineated in the 'Regulations of Study and Examinations at UoB' and the 'Moderation of Examinations and Assessment Policy', clearly stipulate that assessment methods should be appropriate for the type and level of learning outcomes being assessed. The SER outlines the main mechanism adopted by the Department of Chemical Engineering to ensure the alignment of assessment with course learning Outcomes to assure the academic standards of the graduates. This was confirmed during interviews, as the Panel was informed that a course assessment matrix is utilized by faculty members in all courses to map the CILOs with the assessment tools indicated in the course specifications. The Panel also noted that faculty members are aware of the concept of 'Constructive

Alignment' as defined by Biggs, as they attended several training courses conducted by QAAC in this regard. From the review of the course files provided during the site visit, the Panel found that assessment items, such as examinations, assignments, projects, etc., are clearly specified to assess the extent to which the students are meeting the Course Intended Learning Outcomes. This alignment is checked by the DAC to ensure that the level of outcomes and assessment is aligned with the expected level of learning outcomes and qualification. The Panel appreciates that effective mechanisms are implemented to ensure that each category of the course learning outcomes is assessed *via* appropriate assessment methods.

3.5 UoB has a well-established internal moderation system for setting assessment instruments and grading student achievement in all programmes across all colleges. The 'Regulations of Study and Examinations at the University of Bahrain' and the 'Assessment and Moderation Policy' stipulate that moderation of assessments, examinations, and grading is conducted to ensure consistency and fairness. The Panel explored the moderation mechanisms with faculty members who indicated that pre-assessment moderation is conducted for all summative assessments to ensure that the assessment design is aligned with article (56) of the 'Regulations of Study and Examinations at the University of Bahrain'. In multi-section courses, the course coordinators oversee the setting of the examination papers, in coordination with other faculty members teaching the course. In single-section courses, however, the course instructor is responsible for preparing the examination paper, and may consult with other faculty members specialized in the same field, as indicated in article (6) of the Assessment and Moderation Policy'. According to the SER, the DAC/QAC committee is responsible for monitoring the implementation of these policies. An Examination Committee is also established at the departmental level to conduct post-assessment moderation of completed students' work to verify the consistent implementation of examination criteria and fair award of students' grades. The Department Chairperson approves the grades before they are recorded into the system. Moreover, the Quality Assurance Office at the college and UoB perform periodic audits of course portfolios including samples of examinations and assessment papers, and audit results are included in the QAAC comprehensive report. The consistent implementation of internal moderation system in the BS-CHENG programme was confirmed by the Panel from the review of course files and site visit interviews. The Panel appreciates that effective mechanisms are implemented to ensure the effectiveness of the internal moderation system - for both the setting of assessment instruments and the grading of students' achievements - in the BS-CHENG programme. However, the Panel notes that formative assessment tools, such as quizzes and presentations, are not subject to a formal internal moderation. The Panel recommends that the College should develop and implement an equally effective system for the internal moderation of formative assessment tools, as well as for single section courses.

3.6 Mechanisms for the external moderation of student assessment were recently developed and are outlined in the 'Assessment and Moderation Policy'. These include (1) the participation of external examiners in the assessment of undergraduate capstone courses and postgraduate theses, (2) accreditation and external reviews by professional organizations. During interviews with faculty members, the Panel learned that only programmes that have not been accredited over the past three years are required to involve external examiners to externally moderate the students' assessments, in line with the 'Assessment and Moderation Policy'. Senior management interviewed by the Panel were of the view that the ABET accreditation process constitutes an external moderation, since the ABET evaluator examined students' graded work for consistency and validity and found them to be at an appropriate level. The Panel confirmed that external moderation is limited to the Capstone Design Course (CHENG 423), Senior Project (CHENG 490) and Industrial training I& II (CHENG 299& CHENG 399), during which industry people are involved as external examiners in the evaluation of the project's final presentation. The Panel acknowledges that the ABET accreditation procedures and reports have helped the programme tremendously in ensuring consistent and appropriate assessment that meets relevant professional and academic standards. However, the Panel is of the view that the College should adopt a formal dedicated external moderation system of assessments in all courses, regardless of whether the programme has recently been accredited or not. The Panel recommends that the College should expand the current external moderation mechanisms to include effective moderation of all courses, as a means of further assuring the BS-CHENG programme's academic standards.

3.7 The Assessment and Moderation Policy requires that 'Assessment items should assess the extent to which the students are meeting the Course Intended Learning Outcomes'. As the CILOs are mapped to the Program Intended Learning Outcomes, the assessment in turn contributes to the achievement of the PILOs. In line with this policy, the Department implements a number of appropriate mechanisms to ensure that the level of students' achievement is appropriate to the level and type of the programme. In its interviews with faculty members, the Panel was informed that a 'Course Assessment Matrix' is employed in all courses to map the students' grades in different course assessment components with the CILOs, and a benchmark of (70%) of students achieving above (70%) is an indication of the students successfully achieving the CILOs. At the end of each semester, a 'CILOs Assessment Report' is prepared for each course to summarize the level of CILOs achievement, and identify the course outcomes which have not been met based on the benchmark set by the Department, as well as propose improvement recommendations. A sample report is shown in the SER in Table 3-11. The SER also indicates that the use of external reference points, such as seeking ABET accreditation, and mapping of BS-CHENG courses against the BQA National Qualifications Framework, is an indication that the course assessments are at an appropriate level. During the site visit, all the course portfolios were made available

for scrutiny by the Panel. An in-depth study of the assessed students' work showed the use of proper assessment tools with a fair degree of complexity covering, in several cases critical thinking. In most cases, assessments were summative; while formative assessments were used in some learning activities, particularly where a report was required. The Panel appreciates that the level of students' achievements is at an appropriate level, in line with international standards.

3.8 According to the SER, the Department ensures that the graduates of the BS-CHENG programme meet the set standards *via* ensuring that the students meet the Programme aims and intended learning outcomes. As indicated earlier, a 'Course Assessment Matrix' is employed to determine the successful attainment of the CILOs. Based on the mapping of CILOs to the PILOs, the level of the achievement of the PILOs is measured and evaluated. Finally, using the Articulation matrix, in which PILOs are mapped to PEOs, the attainment of PEOs is assessed to assure the achievement of the academic standards of the graduates. The SER includes extensive data on the PILOs assessment results which indicate the achievement of programme outcomes. These results go through a fairly robust internal moderation process by the QAAC. In addition, a comprehensive external scrutiny by ABET evaluators indicates international acceptance of the level of PEOs achieved by the students. The overall assessment of outcomes for the 2014-2015 academic year, using CILO mapping, indicates levels of achievements ranging from (73%) (for PILOs a, e) to (93%) (for PILO g). Using performance indicators (PIs) for each PILO, the results indicate that out of the (42) PIs, only (2) PIs scored less than (70%) with (36) PIs scoring above (80%), out of which (15) PIs show (100%) attainment. From the data provided in SER, including the Capstone Design Project results, the Panel finds that the PILOs assessment results clearly indicate the achievement of programme outcomes. Moreover, the final results and grade distributions are at acceptable levels according to regional and international standards. In addition, the alumni and employers interviewed by the Panel were also very satisfied with the knowledge, skills and competence attained by the graduates. The Panel acknowledges that the Department, in the selection and construction of their mapping project for intended learning outcomes, PEOs, etc., aim at the attainment of graduates worthy of the qualification. The SER states that the Department ensures that the graduates meet standards that have been set as Programme aims and intended learning outcomes. The Panel appreciates that the level of graduates' achievement is ensured through effective mechanisms and is comparable with similar programmes in reputable regional and international institutions.

3.9 The SER states that the Chemical Engineering Department, in collaboration with the Registrar's Office, monitors the number of accepted and graduating students, students' dropout rates, as well as average length of study on a regular basis. Statistics provided in the SER indicate that only (8.54%) of students complete their studies within (4) academic years, with the majority requiring 5 to 6 years to graduate. Faculty

members interviewed by the Panel explained that almost one third of students attend orientation programmes which impacts on their length of study in the BS-CHENG programme. The Panel notes that the students' dropout rate over the past three academic years is quite high, ranging from (27.3%) in 2012-2013 to (43.7%) in 2014-2015. During interviews, the Panel learned that the high dropout rate is attributed to the fact that the number of students who transfer from the programme after the first year of study increased with the increase of student intake. The Panel is of the view that the presented student data lacked sufficient critical analysis that would enable informed decision making. The Panel learned during different interviews of the difficulties faced by the Department in obtaining students' data, as these are centralized in the UoB Registration Office. The Panel recommends that the College, in collaboration with the Deanship of Admission and Registration, should conduct a systematic cohort analysis to inform decision-making and enable comparison with equivalent programmes in Bahrain, regionally and internationally.

3.10 A well-managed system is in place for worked-based learning in the form of two compulsory Industrial Training courses (CHENG 299 and CHENG 399). Students are required to register in CHENG 299 and CHENG 399 for a period of two months, after completing (45) and (85) credits, respectively. Guidelines for the management and evaluation of these courses are in place and are detailed in the Industrial Training Manual, including the training objectives, procedures for enrolling in the training programme, as well as criteria for exemption from training for those who have work experience. The implementation of these guidelines was confirmed during site visit interviews during which the Panel learned that Practical Training Office at the College of Engineering is responsible for the allocation of students to various appropriate training placements. The Training Programme is administered and coordinated by a Training Committee. Supervisors are assigned to supervise students and at the end of training, students are required to write a report and make a presentation assessed by the trainer and the supervisor. The Panel was provided with adequate samples of Student Assessment Forms, Industrial Supervisor Assessment Forms and Students Presentations. Interviews with industrial training supervisors and departmental supervisors revealed that these training courses are highly valued as they equip students with attributes which are difficult to attain in other courses; these include work place ethics, professional ethics, punctuality, real work environment. Students interviewed by the Panel also indicated that the internships enabled them to apply theoretical knowledge obtained in courses to real work processes as well as becoming familiar with up-to-date professional package programmes. The Panel appreciates that a well-managed work-based learning programme is in place, and constitutes an essential mechanism for the development of the students' professional skills required by industry.

3.11 The BS-CHENG curriculum includes a Senior Project Course (CHENG 490) in the final year of studies aimed at developing the student's ability to apply theoretical knowledge and practical skills in solving engineering problems within a professional, team-oriented environment. Policies and procedures for the supervision and management of the project are included in the 'Senior Project Guide'. The Guide includes the course objectives and learning outcomes, guidelines on how to select a topic, student's responsibility and guidelines for preparing the project report and presentation. In its interviews with faculty members, the Panel learned that the departmental Senior Project Committee is responsible for approving the students' proposals and monitoring the progress in the projects' implementation. During interviews, senior students and recent alumni expressed their satisfaction with the arrangements for the management of their senior projects, as well as the support they receive from their supervisors. During the site visit, the Panel reviewed samples of senior projects and found them to be of good quality, with appropriate use of Plagiarism detection software. However, the Panel noted weaknesses in written English communication skills in some projects, an observation confirmed by the industry external examiners during site visit interviews (see recommendation in section 1.4). The Panel notes that evaluation forms are utilized for the assessment of senior projects using appropriate assessment rubrics. The Panel also notes the involvement of external examiners from industry in the evaluation of these projects. Faculty members interviewed by the Panel considered the Senior Project to be a vital element in helping the students achieve the programme's learning outcomes. Moreover, employers indicated to the Panel that they value the Senior Project highly, as it equips the students with essential transferable and engineering skills that prepare them for real life chemical engineering practice. The Panel appreciates that effective mechanisms are consistently implemented for the supervision and evaluation of the senior project, consonant with its vital role in the curriculum.

3.12 The Department of Chemical Engineering has a functioning Programme Industrial Advisory Committee comprising employers and representatives from local industries of both government and private sectors. The PIAC has clear terms of reference outlined in the QAC Director Quality Manual, and meets on a fairly regular basis, at least once a year. During interviews with faculty members, the Panel learned that, in addition to formal meetings, the Department communicates regularly with PIAC members *via* email and the DAC members. According to the SER, the main responsibilities of the PIAC include advising the Department on its strategies for the future development of the BS-CHENG programme. From the review of PIAC meeting minutes, the Panel noted several examples of constructive feedback on the modification of the BS-CHENG curriculum, such as changes in some courses. In addition, the SER includes a summary of the PIAC suggested changes in regards to the programme educational objectives. The Panel also noted that feedback provided by PIAC is discussed in the departmental meetings and incorporated, if appropriate, in the programme

improvement plan. Senior management and advisory board members interviewed by the Panel had very positive views of the role of the PIAC and the support it provides for the CHENG programme development. The Panel appreciates that an active programme advisory committee is in place, and its documented feedback is used systematically to inform programme decision-making.

3.13 The CHENG Department, in keeping with the QAAC requirements, conducts regular alumni and employers surveys in a bid to obtain input on satisfaction of those surveyed regarding the standards of the graduate profile, and to gain insight into possible areas for programme improvements. The latest evaluation of the PEOs by alumni is summarized in the SER, and indicates that the achievement results are well above the threshold of (60%). The average assessment for PEO-1 'Engage in productive careers' and PEO-2 'Engage in ongoing professional development activities' is (87%), whereas PEO-3 'Advance in responsibility and leadership in their careers' had an assessment of (78%). The evaluation of PEOs by employers indicates a high rating of the graduate attributes, as expressed by satisfaction levels reaching (100%) for items such as 'graduates enrolled in training courses' and 'graduates attend short courses and workshops'. Moreover, out of the (10) PILOs, (8) were rated above (80%) by the employers. In addition, the employers' response to 'how much does your establishment trust the quality of graduates' and 'would you encourage others to study at UoB', received a rating of (93.85%) and (100%), respectively. These views are supported by the fact that (75%) of graduates are employed in appropriate jobs in chemical engineering field, as deduced from the recent alumni survey conducted in 2016. In addition, Employers and alumni interviewed by the Panel expressed very high satisfaction and support for the programme. The Panel appreciates that there is strong evidence of alumni and employers satisfaction with the standards of the BS-CHENG programme graduates.

3.14 In coming to its conclusion regarding the Academic Standards of the Graduates, the Panel notes, *with appreciation*, the following:

- The programme graduate attributes are clearly stated, and their attainment is ensured through the strong link between the types of assessments and learning outcomes.
- Formal processes are implemented to ensure that the BS-CHENG programme's standards are comparable to national and international standards and to promote improvements in its delivery.
- Appropriate mechanisms are, overall, implemented to ensure the consistent implementation of assessment policies, and their regular monitoring to inform improvements in the programme's academic standards.
- Effective mechanisms are implemented to ensure that each category of the course learning outcomes is assessed *via* appropriate assessment methods.

- Effective mechanisms are implemented to ensure the effectiveness of the internal moderation system - for both the setting of assessment instruments and grading students' achievements - in the BS-CHENG programme.
- The level of students' achievements in the BS-CHENG programme is at an appropriate level, in line with international standards.
- The level of graduates' achievement in the BS-CHENG programme is ensured through effective mechanisms and is comparable with similar programmes, in Bahrain and internationally.
- A well-managed work-based learning programme is in place, and constitutes an essential mechanism for the development of the students' professional skills required by industry
- Effective mechanisms are consistently implemented for the supervision and evaluation of the senior project, consonant with its vital role in the curriculum.
- An active programme advisory committee is in place, and its documented feedback is used systematically to inform programme decision-making.
- There is strong evidence of alumni and employers satisfaction with the standards of the BS-CHENG programme graduates.

3.15 In terms of improvement, the Panel **recommends** that the College should:

- benchmark the BS-CHENG programme against similar programmes in reputable regional and international institutions
- develop and implement an effective system for the internal moderation of formative assessment tools, as well as for single section courses
- expand the current external moderation mechanisms to include effective moderation of all courses, as a means of further assuring the BS-CHENG programme's academic standards
- conduct a systematic cohort analysis to inform decision-making and enable comparison of the BS-CHENG programme with equivalent programmes in Bahrain, regionally and internationally.

3.16 **Judgement**

On balance, the Panel concludes that the programme **satisfies** the Indicator on **Academic Standards of the Graduates.**

4. Indicator 4: Effectiveness of Quality Management and Assurance

The arrangements in place for managing the programme, including quality assurance and continuous improvement, contribute to giving confidence in the programme.

4.1 Institutional policies, procedures and regulations are published on the university website and made known to the different constituencies. The Panel notes that policies, procedures and regulations are appropriate in scope for the institution, college and programme. During interviews, the Panel learned that the implementation and continuous revision of these policies is mainly the responsibility of the Quality Assurance and Accreditation Centre (QAAC). Implementation is managed through clear identification of responsibilities, with key roles at relevant levels: University - Director of QAAC; College-Dean and Director of College QA Office; Department - Chairperson and faculty teaching specific courses. The Panel appreciates that a comprehensive and well-documented set of institutional policies, procedures and regulations are in place and are applied effectively and consistently in the BS-CHENG programme and across the College. The Panel acknowledges the College's efforts in communicating institution's policies and academic regulations to staff and students during induction programmes and in departmental council meetings. However, the Panel notes that some faculty members interviewed by the Panel were not aware of the recently developed policies. The Panel recommends that the College should enhance the mechanisms for communicating new institutional policies to respective stakeholders to ensure the effective application of these policies.

4.2 As indicated earlier (see section 2.3), the hierarchy of management at the University, College and Department levels is appropriate and adequate to ensure effective management of the programme. Academic responsibilities are clearly defined at appropriate levels: University, College, Department, Programme and individual courses. The Dean of the College of Engineering and the Department Chairperson have key leadership roles. In addition, faculty members are actively involved in decision-making through a comprehensive structure of departmental committees that consider every academic and administrative matter, including curriculum, examinations, recruitment and promotion. The Department has primary responsibility for academic standards, with the Department Council approving all routine academic decisions. Decisions involving radical change or affecting other departments or programmes are referred to College and / or University Council(s). During interviews, the Panel heard several examples confirming that a hierarchy of experienced leadership exists at different levels and that each level is aware of its responsibilities and accountabilities. The Panel appreciates that the B.Sc. in Chemical Engineering programme is managed in a way that demonstrates effective and responsible leadership.

4.3 There is a clear Quality Assurance management system at all levels within the institution. At university level, this includes the role of the Adviser to the President on Academic Quality, and the Academic Accreditation Committee which schedules routine quality audits. At college level, key parts of the system are: the role of the Dean, the College Quality Assurance Office, and the College Accreditation Committee, while at the programme level, the Department Accreditation Committee (DAC) is mainly responsible for implementation of the quality system. The Panel notes that at the department / programme level, there is a very strong focus on assessment of PEOs, PILOs, and CILOs, informed by an appropriate range of inputs including students' grades and stakeholders' views. During interviews, the Panel confirmed that the existing QA structure effectively communicates the information and monitors the implementation of the quality assurance measures set by the University. The QA system is supported by an Assessment Management Information System (AIMS) which houses all the evaluation data and reports of all academic programmes. In addition, a comprehensive Quality Assurance Committee (QAC) Director Manual describes in detail the quality policy, the structure of the committee as well as including all quality forms that are needed for QA, such as meeting agenda forms, different survey forms, course syllabus forms, etc. The QA management system is monitored by systematic reporting upwards through committees, including the Department Accreditation Committee, Department Council, and College Accreditation Committee. The Panel acknowledges that the organization of the QAC and DAC in the College of Engineering involves members with different qualifications that ensure appropriate implementation and monitoring of QA policies. The internal audit function is also a component of the quality assurance management system and it plays an important role in quality assurance monitoring. In its interviews with senior management, the Panel heard about plans to audit the College of Engineering in the future. The Panel appreciates that a comprehensive quality assurance management system is in place and is consistently implemented and monitored.

4.4 According to the SER, several workshops and meetings have been conducted to discuss quality assurance issues, so that all academics have sufficient understanding of their role in ensuring the quality of provision within the department. A list of these workshops as well as evidence of material presented were made available for the Panel. During interviews, faculty members clarified to the Panel their roles in quality assurance including the maintenance of academic standards through achievement of PEOs, PILOs and CILOs; ensuring students' awareness of learning outcomes; and the completion of Course Assessment forms. The Panel also heard from support staff in the laboratories and the library about their roles in supporting student learning. In addition, senior staff interviewed by the Panel emphasised the role of international accreditation (ABET) processes as well as the ongoing review and evaluations by the university QAAC in promoting QA culture within the College of Engineering since 2005. From provided evidence and site visit interviews, it is evident to the Panel that

there is a shared understanding amongst academic and support staff members about the importance of the QA system. The Panel appreciates that the College provides capacity-building opportunities for academic and administrative staff to enhance their understanding of quality assurance concepts.

4.5 There are structured policies and procedures in place for the development of new academic programmes. The introduction of new programmes is achieved *via* well-defined processes involving the Departmental Curriculum Committee, Department Council, College Curriculum Committee, the College Council, and ultimately the University Council. During interviews, the Panel learned that these processes emphasize several aspects such as: the relevance of the suggested programme for the labour market, graduates' employment, feedback from internal and external stakeholders, as well as alignment with external accreditation benchmarks. The Panel was also informed that the Department of Chemical Engineering has not recently developed new academic programmes. The Panel acknowledges that rigorous policies and procedures are in place to ensure that a newly developed programme is relevant, fit for purpose, and complies with institutional regulations.

4.6 There are clear arrangements for annual internal evaluation of curriculum, teaching and other academic issues. The guidelines for the preparation of internal Self Evaluation Reports and Improvement Plans for each programme are outlined in the 'Quality Manual for DAC Committees'. The cycles for annual evaluations are explained in the Programme Quality Assurance Policy and comprises assessment of Programme Educational Objectives (PEOs), Program Intended Learning Outcomes (PILOs) and Course Intended Learning Outcomes (CILOs). The QAAC coordinates quality assurance activities with other departments and colleges by providing the appropriate templates for the SER and action progress reports. In its interviews, the Panel learned that faculty members are required to prepare annual course reports which include: an analysis of students' achievement and grades with reference to the CILOs; analysis of pre-requisites; and quantitative results from students' evaluation. These reports are submitted through Departmental committees and discussed at the Department Council. The Panel also heard several examples of improvements made in light of these evaluations, including the removal or introduction of new courses, improvement in teaching or changes in course pre-requisites. The Department is also required to submit internal SERs, along with an improvement plan to the university QAAC, which, in turn, submits a summary report for all academic programmes to the University Council. Moreover, the QAAC releases information on key assessment statistics to all programmes in the University. This practice is commendable. The Panel appreciates that appropriate arrangements for annual internal programme evaluation are implemented to inform programme improvements.

4.7 Arrangements for the periodic external and internal reviews of programmes are stipulated in the Programme Quality Assurance and Enhancement Policy. In line with this policy, academic programmes are reviewed every five years *via* a process that incorporates both internal and external feedback, as well as mechanisms for implementing improvement recommendations. During interviews, the Panel learned that preparations for external accreditation by ABET are considered an important catalyst for internal reviews, which promotes improvements in the programme. These reviews have resulted in ABET accreditation of the programme in 2008 and 2014. The Panel notes that the SERs submitted in 2014 clearly deal in a comprehensive way with all aspects of the programme, such as admission policy, registration procedures, learning resources and promotion policy as examples. The Panel also notes that the Department systematically obtains feedback from internal and external stakeholders, including faculty members, students, alumni, as well as members of the PIAC. During interviews, employers and PIAC members indicated that periodic reviews of the programme ensure its relevance to the labour market and alignment with international standards. The implementation of internal and external reviews is monitored by the DAC and QAO to ensure consistency and adherence to the University Quality Assurance Center guidelines. The Panel appreciates that a rigorous system is implemented for the periodic review of the programme to ensure its relevance and continuous improvement. However, the Panel notes that the self-evaluation report submitted for the current review by QQA is in need of improvement. Whilst the Panel acknowledges that some areas for improvement are identified in the SER; the Panel finds the SER to be overall descriptive, rather than reflective. Senior University and College QA staff interviewed by the Panel acknowledged this limitation across the (8) SERs prepared for the Programmes-within-College Reviews of the College of Engineering programmes. The Panel recommends that the College-level QAO and University-level QAAC should develop formal mechanisms to support drafting of self-evaluation reports that emphasise reflective evaluation, and to promote sharing of good practice in developing SERs across the College and University.

4.8 Mechanisms are in place for the periodic collection and analysis of feedback from internal and external stakeholders, consistent with the Programme Quality Assurance and Enhancement Policy. The University QA procedures require that a range of surveys are systematically conducted; these include Student Course Evaluation, Senior Exit Survey, Alumni and Employer Surveys. From provided evidence, the Panel notes that the quantitative results from these surveys are statistically analysed and considered by academic staff, the Department Chairperson, and the Dean. The Department Chairperson has the key responsibility for ensuring that the survey results are included in the Department action plan during the review process, and that improvement actions are implemented. Examples of improvements made in light of these surveys are included in the SER and have been confirmed during interviews with different stakeholders. The Panel appreciates that the structured comments collected

from stakeholders' surveys are analysed, and the outcomes are used to inform mechanisms for programme improvement. Following the interview with external stakeholders, the Panel confirmed that the results of these surveys are conveyed to them through the PIAC meetings. In general, there was a high level of satisfaction amongst stakeholders regarding the mechanism adopted to communicate with the department, getting feedback and implementing recommendations. However, the Panel notes that whilst comprehensive student surveys are performed that deal with every aspect of the learning and teaching operation; the outcomes from these surveys are not currently communicated to students. During interviews, students indicated that, in general, these results are not made public to them and they were not informed about changes resulting from their comments. In its interviews with senior management, the Panel was informed that the University is keen to take this issue forward, and that QAAC is planning an online survey tool to enhance the mechanisms for the communication of survey results. The Panel recommends that the College, in collaboration with QAAC, should enhance the current survey tools to ensure that the students' survey outcomes are transparent and effectively communicated to all stakeholders.

4.9 The SER states that all faculty members are expected to remain current in their discipline through scholarly and professional development activities. During interviews, the Panel was informed that the College of Engineering is committed to provide administrative and academic staff members with adequate opportunities for ongoing professional development. Faculty members interviewed by the Panel confirmed that they are encouraged by the College to participate in local, regional, and international conferences and training programmes. The Training and Development Office at the University is responsible for the identification of workshop topics and their communication to all colleges so that administrative and academic staff select the topics, as appropriate to their needs. From the provided list of professional development activities attended by the programme faculty, the Panel finds that the topics and number of activities are overall satisfactory, especially the topics on quality assurance and assessment. Following interviews with senior management, the Panel learned about the trend at university level towards increasing provision of continuing professional development for staff, including compulsory development for specific groups. Currently there are two 'target' groups. First, newly appointed academic staff, including those returning with PhDs, are expected to complete the Postgraduate Certificate in Academic Practice Programme (PCAP) which is aligned to the UK Higher Education Academy Fellowship. Second, academic staff who were not scoring highly in student evaluations; were mentored and peer reviewed by more qualified and experienced faculty members. The Panel acknowledges that the College provides opportunities for the professional development of faculty members; however, there was insufficient evidence that these activities are linked to formal training needs analysis or staff appraisal. The Panel notes that the Chemical Engineering Department

has an ongoing initiative 'to develop a better monitoring process for the professional development activities, which includes research, teaching and other related activities'. The Panel concurs and recommends that the College should develop and implement staff development policy and procedures, that identify areas for professional development linked to their appraisal.

4.10 In scoping the labour market, the Programme Industrial Advisory Committee (PIAC) comprised of industry experts in the discipline, provides industry input to the curriculum and market needs. The SER also cites references to studies by the Bahrain Higher Education Council (HEC) as another element in scoping of the labour market. In addition, results of Alumni and Employers' surveys provide valuable feedback regarding the contemporary demands and requirements of the labour market. In its interviews with employers; training courses' supervisors; senior project external examiners; and members of the Programme Industrial Advisory Committee (PIAC), the Panel noted the commitment of these external stakeholders in supporting the currency and relevance of the programme to the local labour market, and their enthusiasm to support future development. The Panel acknowledges the responsiveness by the Department to suggestions from PIAC about the introduction of new courses to reflect the developing labour market. The Panel also notes with appreciation the study conducted by a PIAC member in 2015 entitled: 'should there be more chemical engineering graduates?'. The Panel finds these initiatives to be appropriate and beneficial. The Panel encourages the Department to continue conducting specialized scoping studies to ensure that B.Sc. in Chemical Engineering programme remains relevant.

4.11 In coming to its conclusion regarding the Effectiveness of Quality Management and Assurance, the Panel notes, *with appreciation*, the following:

- A comprehensive and well-documented set of institutional policies, procedures and regulations are in place and are applied effectively and consistently in the programme and across the College.
- The BS-CHENG programme is managed in a way that demonstrates effective and responsible leadership
- A comprehensive quality assurance management system is in place and is consistently implemented and monitored
- The College provides capacity-building opportunities for academic and administrative staff to enhance their understanding of quality assurance concepts.
- Appropriate arrangements for annual internal programme evaluation are implemented to inform programme improvements.
- A rigorous system is implemented for the periodic review of the B.Sc. in Chemical Engineering programme to ensure its relevance and continuous improvement.

- Structured comments collected from stakeholders' surveys are analysed, and the outcomes are used to inform mechanisms for programme improvement.
- The Department conducts specialized scoping studies to ensure that the BS-CHENG programme remains relevant.

4.12 In terms of improvement, the Panel **recommends** that the College should:

- enhance the mechanisms for communicating new institutional policies to respective stakeholders to ensure the effective application of these policies
- develop formal mechanisms to support drafting of self-evaluation reports that emphasise reflective evaluation, and to promote sharing of good practice in developing Self Evaluation Reports across the College and University
- enhance the current survey tools to ensure that the students' survey outcomes are transparent and effectively communicated to all stakeholders
- develop and implement a strategy for staff development, linked to staff appraisal, to enhance the professional capabilities of faculty members in the pursuit of their academic careers.

4.13 **Judgement**

On balance, the Panel concludes that the programme **satisfies** the Indicator on **Effectiveness of Quality Management and Assurance.**

5. Conclusion

Taking into account the institution's own self-evaluation report, the evidence gathered from the interviews and documentation made available during the site visit, the Panel draws the following conclusion in accordance with the DHR/BQA *Programmes-within-College Reviews Handbook, 2014*:

There is confidence in the B.Sc. in Chemical Engineering offered by the College of Engineering at the University of Bahrain