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 Mathematics

College of Science

University of Bahrain

Kingdom of Bahrain

Date Reviewed: 12-16 March 2017

HC100-C2-R100

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Acronyms

AIMS	Assessment Information Management System
ASIIN	Akkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik - German accreditation body
BQA	Education & Training Quality Authority
BS Math	Bachelor of Science in Mathematics
CILO	Course Intended Learning Outcome
CILOs	Course Intended Learning outcomes
CGPA	Cumulative Grade Point Average
DHR	Directorate of Higher Education Reviews
DQAAC	Department Quality Assurance and Accreditation Committee
HEC	Higher Education Council of the Ministry of Education, Kingdom of Bahrain
MIS	Management Information Systems
NQF	National Qualification Framework
PAC	Program Advisory Committee
PCAP	Postgraduate Certificate in Academic Practice
PEOs	Programme Educational Objectives
PILO	Programme Intended Learning Outcome
QA	Quality Assurance
QAAC	Quality Assurance and Accreditation Centre
SAC	Student Advisory Committee

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 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 five programmes offered by the College of Science at the University of Bahrain (UoB) 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 on 12-16 March 2017 for five academic programmes offered by the College, these are B.Sc. in Biology, B.Sc. in Chemistry, B.Sc. in Mathematics, B.Sc. in Statistics and Operational Research and B.Sc. in Physics.

UoB was notified by the DHR/BQA on 13 October 2016 that it would be subject to a Programmes-within-College reviews of programmes offered by the College of Science with the site visit-taking place in March 2017. In preparation for the review, the College of Science at UoB conducted a self-evaluation of these programmes and submitted the Self-Evaluation Reports (SERs) with appendices on 25 December 2016.

The DHR constituted a panel consisting of experts in the academic fields of the programmes under review and in higher education who have experience of external programme quality reviews. The Panel comprised 10 reviewers.

This Report provides an account of the review process and the findings of the Panel for the B.Sc. in Mathematics 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 UoB will use the findings presented in this Report to strengthen its B.Sc. in Mathematics 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 Department of Mathematics.

C. Overview of the College of Science

The College of Science, at UoB, was originally established as a part of the University College of Science, Arts and Education, which was founded by the Amiri Decree number 11 in 1978. In 1986, Amiri Decree No. (12) was issued to establish the University of Bahrain by a merger of the Gulf Polytechnic and the University College of Science, Arts and Education. In 1990, the Board of Trustees of UoB issued a decision to divide the College of Arts & Science into two separate colleges: The College of Arts and the College of Science. Currently, the College of Science under the UoB has four academic science departments: the Department of Biology, Chemistry, Mathematics, and Physics. These departments offer undergraduate programmes of study in natural sciences that lead to Bachelor of Science (B.Sc.) qualifications as well as Master of Science programmes. At the time of the site visit, the College was employing 83 faculty members, including five part-time, and 58 administrative staff. The total number of enrolled students was 1,165 students.

D. Overview of the Bachelor of Science in Mathematics

The B.Sc. in Mathematics was first offered in the academic year 1982-1983 and to the date of this review has 1,215 graduates. Currently the programme is offered by the Department of Mathematics of the College of Science at UoB, which also offers a Bachelor of Science in Statistics and Operational Research programme. The department's faculty members also deliver mathematics service courses to the rest of the programmes offered at UoB. At the time of the site visit, there were 35 academic

staff in the Department involved in teaching both service and speciality courses, supported by three administrative staff. There are currently 214 students in the B.Sc. in Mathematics programme. The programme has not been subjected to professional accreditation yet. However, the College is in the process of undertaking quality accreditation for all programmes offered by the College of Science through the German Accreditation body 'Akkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik' (ASSIN).

E. Summary of Review Judgements

Table 2: Summary of Review Judgements for the BSc. in Mathematics

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 There is a clear planning framework for the B.Sc. in Mathematics (BSMath) programme that is defined within the Programme Quality Assurance and Enhancement policy. The policy explains the details of the development, monitoring, enhancement, modification and periodic reviews for all academic programmes offered by UoB. Moreover, there are clear statements of vision and mission at the college and department levels that the programme aligns with and these are made available to staff and students *via* noticeboards. The Panel studied the documents provided and notes that the Programme Educational Objectives (PEOs) reflect the department's aims of delivering graduates who will be prepared to work successfully in mathematics related careers, or enter a graduate programme in mathematics or related fields. In addition, there is an active Strategic Planning Committee that is responsible for setting the department's strategy in alliance with the college and the university's strategy. Interviews with faculty members indicated that they are well-informed about the aims of the programme and how it contributes to the achievement of the college and the university's vision and mission. The Panel appreciates that the BSMath programme has a clear academic framework and is aligned with the strategic goals of the College and University and that the PEOs reflect the department's aims.

1.2 The SER states that the curriculum of the programme is based on similar programmes in the USA, for example, Florida State University, Arizona State University and Texas A & M University. The core courses in the programme were benchmarked according to the core courses at the Ohio State University. The curriculum is well organised, both year-on-year and course-by-course. The BSMath programme comprises 127 credit hours distributed as follows: 11 credit hours for university requirements, 27 credit hours for college compulsory requirements, 59 credit hours for department compulsory requirements, 15 credit hours for department elective courses, nine credit hours for other elective courses with a hands-on element that can be taken from the College of Science and six credit hours for general electives. In addition, there is a set of pre-requisites that ensures a smooth progression from one level to another. The Panel met with the senior management of the programme who provided a clear explanation of the rationale behind credit hours' distributions and their relevance to the local and regional needs. In addition, the use of an Individual Senior Project (MATHS 499), together with a good variety of high-level courses, provide a good balance between practice and theory. There is also an active Curriculum Committee that is responsible for developing the programmes offered by the Department and looks into new courses suggested by faculty members and communicates with the college and the university's curriculum committee to ensure the currency of the

programme. Moreover, the provided study plan delineates an acceptable workload per semester; ranging from 15 to 18 credit hours, which corresponds with international norms. Furthermore, students who were interviewed during the site visit confirmed that the BSMath curriculum is well designed and provides an appropriate workload distribution. The Panel appreciates that the curriculum is well organised to provide suitable workload and a balance between theory and practice, and matches that of similar programmes in other international universities. In interviews conducted during the site visit, the Panel was informed that the Department had made several attempts to introduce minor track courses in business or information technology into the curriculum to improve the employability opportunities of programme graduates. However, the issue is yet to be approved. The Panel is of the view that these changes will enrich the curriculum with topics that can be contextualised to meet local and regional needs. Hence, the Panel recommends that the College should incorporate 'minors' or 'double majors' from other fields of study to enhance graduates' employability opportunities locally and regionally.

1.3 The syllabus meets the norms and standards of an undergraduate mathematics degree, based on its comparability with international universities and the numerous course files examined by the Panel. The Panel notes the use of a standard template for course syllabi that is consistent across all courses. The template presents the Course Intended Learning Outcomes (CILOs) and their mapping to the Programme Intended Learning Outcomes (PILOs) and contains basic information needed, such as teaching methods, assessment methods, timetable and learning resources to be used. The Panel studied the provided course contents in terms of breadth and depth and notes that the course contents are relevant to the degree of the BSMath programme and its expected outcomes and meet local and regional needs. During interview sessions, the Panel was informed that minor alterations to course contents are introduced by individual faculty members to keep the syllabus up-to-date. There is also a Textbooks and Library Committee that is responsible to coordinate with the bookstore regarding textbooks for courses offered by the Department, arranging with the publishers for newer editions of textbooks and arranging with the library for new books to be added. The Panel studied the course files provided and confirmed that course contents and textbooks are in general recent and up-to-date. Overall, the Panel appreciates that the syllabus is appropriate for the programme and provides the depth and breadth needed for a bachelor degree in mathematics. Notwithstanding the above, the Panel notes that there is currently no work-based learning component for the BSMath programme, and as a result, it is not clear how the PILO 'understand ethics, responsibility, legal and social issues within professional practice' can be achieved by the students. Hence, the Panel recommends that the College should provide students with a real life opportunity to demonstrate their ability to integrate knowledge from across a range of mathematical areas and facilitate the achievement of the PILO 'understand ethics, responsibility, legal and social issues within professional practice'.

1.4 The BSMath programme has a clearly stated set of PILOs that were last revised in October 2016 to improve the programme outcomes. The revised PILOs are expressed in the programme specification and there is evidence of aligning the PILOs with the PEOs. There are 10 PILOs divided into four categories: knowledge and understanding; subject-specific skills; thinking skills; and general and transferable skills. The Panel studied the PILOs and notes that in general, they are aligned with the college and department's mission and are appropriate for the degree type and level. Moreover, the PILOs are properly stated in a measurable format. Students and faculty members have access to the PILOs through the Quality Assurance and Accreditation Centre (QAAC) website and programme specification. Furthermore, evidence was provided to the Panel of faculty members attending in-house workshops on writing and mapping courses to programme outcomes. Moreover, interviewed faculty members were well-aware of the defined PILOs and how these contribute to the delivery of the programme. Therefore, the Panel appreciates the clearly stated PILOs that are written in a suitable and measurable way and are appropriate for the type and level of the programme.

1.5 There is a set of CILOs that are stated for each course. The CILOs are well-documented and are mapped to the PILOs using a mapping matrix, as evidenced in the submitted course profiles, the biennial reports to the QAAC and the SER. During interviews with faculty members, the Panel found that they are knowledgeable about both the procedures for developing CILOs and the rationale for the approach. The Panel studied the sample of course files provided during the site visit and acknowledges that, in general, the CILOs are well written, measurable and suitable for the content and level of the course. Moreover, the Panel acknowledges the care taken by the faculty members to ensure that the CILOs are appropriate for the programme through the mapping with the PILOs. In meeting with students, the Panel learnt that faculty members explain the CILOs at the beginning of each semester to students registered in their courses and make them aware of course outcomes and what is expected from them. The Panel appreciates that the CILOs are appropriate to the course content and level and are effectively mapped to the PILOs to indicate how each course contributes to the achievement of the desired programme outcomes.

1.6 The policy covering teaching and learning is stipulated in the 'Study and Exam Policy' document, with further information in the 'Assessment, Grading and Exam Moderation Guidelines' and the 'Programme Quality Assurance and Enhancement Policy' documents. However, these documents do not specify the range of appropriate teaching methods. In interviews with faculty members, the Panel learnt that each individual faculty member decides on the type of teaching methods appropriate for the course they are delivering, which are then included in the course specification. Evidence provided indicates that teaching and learning methods utilised typically include lectures, problem solving sessions, in class exercises and computer

laboratories exercises. The Panel views these methods as appropriate, but is concerned with the limited use of the available online learning management system (Blackboard). At the time of the Review, only 15 of the 50 courses in the Department had an e-learning component, however the approach to the design of the material was not consistent. In addition, while the student evaluations of course and faculty members are regularly collected, they are used mainly for academic promotion and contract renewal and not efficiently explored for continuous teaching and learning improvement. Nevertheless, there was evidence during interviews with faculty members and students, that students are encouraged to become independent learners through assignments and project work as well as class participation through delivery of project results. The programme encourages the application of theory through the Independent Senior Project and some hands-on elements associated with high-level courses. Students and staff see these courses as valuable. Evidence provided indicates that students' written and oral communication skills are developed through report writing and presentations, while teamwork occurs out of class and there is no evidence of this skill being developed within the classroom. Overall, interviewed students indicated their satisfaction with the range of teaching methods used. On balance, the Panel appreciates that the principles and methods used for teaching in the programme support the attainment of aims and intended learning outcomes. Nonetheless, the Panel recommends that the College should enhance the utilization of the e-learning platform as an available tool that enriches students' learning experience.

1.7 There is an institutional assessment framework and college guidelines, which include policies appropriate to the programme and are accessible by both staff and students. The 'Assessment, Grading, and Exam Moderation Guidelines' document encourages staff to include a variety of assessment methods, with formative assessment being a way to provide prompt verbal or written feedback to students. Interviewed students confirmed that they in general are provided with feedback on their work in a timely manner. Moreover, in interviews with students and faculty members and from evidence provided, the Panel confirmed that the grading system is transparent and consistently applied for all courses, where the final grade for the course constitutes 40% of the total marks and 60% is assigned for other assessment activities, depending on the nature of the course, as decided by the course instructor and approved by the Department Council. Furthermore, information and warnings about plagiarism are covered in the anti-plagiarism policy, which is disseminated to students and prominently displayed in all the college's premises. A review of a selection of course files confirmed that the assessment methods of each category of the CILOs are clearly identified and that all assessments have clear criteria for marking. Moreover, the assessment policies and procedures clearly state the appeal process that students should follow if they are not satisfied with their grades. The Panel appreciates that a well-defined assessment system, which faculty members and students are

knowledgeable of, is in place for a reliable evaluation of students' achievement of learning outcomes.

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

- The programme has a clear academic framework and is aligned with the strategic goals of the College and University and the programme educational objectives reflect the department's aims.
- The BSMath curriculum is well organised to provide suitable workload and a balance between theory and practice, and matches that of similar programmes in other international universities.
- The BSMath syllabus is appropriate for the programme and provides the depth and breadth needed for a bachelor degree in mathematics.
- The programme intended learning outcomes are written in a suitable and measurable way and are appropriate for the type and level of the programme.
- There are clearly stated intended learning outcomes for each course that are appropriate to the course content and level and clearly indicate how each course contributes to the achievement of the programme intended learning outcomes.
- In general, the principles and methods used for teaching in the programme support the attainment of aims and intended learning outcomes.
- A well-defined assessment system, which faculty members and students are knowledgeable of, is in place for a reliable evaluation of students' achievement of learning outcomes.

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

- incorporate 'minors' or 'double majors' from other fields of study to enhance graduates' employability opportunities locally and regionally
- provide students with a real life opportunity to demonstrate their ability to integrate knowledge from across a range of mathematical areas and facilitate the achievement of the programme intended learning outcome 'understand ethics, responsibility, legal and social issues within professional practice'
- enhance the utilization of the e-learning platform as an available tool that enriches students' learning experience.

1.10 **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 The admission policy is standard for the University, as specified on the university website and is combined with individual college requirements as stated in the SER. From interview sessions and evidence provided, the Panel notes that the admission procedure is well-structured and efficiently implemented and is known to both students and staff. The admission requirements for all undergraduate programmes at UoB include a high school certificate with a minimum Cumulative Grade Point Average (CGPA) of 70%, together with an interview and aptitude test. Depending on the total score achieved and the availability of seats, applicants are accepted to enrol into the programme. During interviews, the Panel was informed that direct entry to the programme is achieved for applicants whom have scored 90% or above in their secondary school certificate and those applicants are exempted from the English language test. Applicants who did not achieve direct entry are admitted to a one semester orientation programme. The orientation programme consists of one non-credited 9 hours per week course, namely, Orientation English Programme. Transfer students are also admitted to the programme and for exemptions to be considered for previously taken courses, a minimum grade of (C+) is required. During the site visit, the Panel learnt that students applying to the College of Science should have a high school certificate from the science or unified track; however, there are no specific criteria at the department level that can enhance the selection of appropriate students to the programme and interviewed faculty members expressed some concerns about the level of mathematics knowledge and skills students entering the programme have. The Panel is of the view that the high dropout rate (see paragraph 2.2) might be linked to students preparedness and should be investigated further. This has been also confirmed by faculty members during interviews. Therefore, the Panel recommends that the College, in collaboration with the University, should revise the admission requirements and include programme specific criteria to assess applicants' capabilities to join the BSMath programme.

2.2 The SER states that UoB keeps a record of the students' profiles that include their CGPA in high school, in addition to their aptitude test and interview scores. Nonetheless, the Department of Mathematics does not keep this information as the admission to all UoB programmes is controlled centrally by the Deanship of Admission and Registration. From the evidence provided, the Panel noted that the number of students accepted into the programme, has increased from 38 in the academic year 2010-2011 to over 50 in the academic year 2015-2016. However, the Panel also noted that there is a high dropout rate reported in the SER (details in paragraph 3.9). Interviewed faculty members of the Department of Mathematics

informed the Panel that this is because admitted students were not identified based on their level in Mathematics, and the Department has no role in identifying the applicability of admitted students to the programme. In meetings with students, the Panel also recognized that many students join the programme with suboptimal English language skills, which hinders their successful or timely completion of the programme. This also raises concerns about the effectiveness of the orientation programme students attend. Hence, the Panel recommends that the College should conduct a thorough study to identify the reasons behind the low progression and retention rates, and develop a plan to mitigate this issue including a full revision of its requirements for English language competencies and the structure and content of the orientation programme.

2.3 There are clear lines of accountability with regard to the management of the programme as evidenced in the SER and during interview sessions. The BSMath programme has a well-managed structure 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 department Chairperson is in charge of the programme day-to-day management. To this end, the Chairperson oversees assigned responsibilities, supported by a comprehensive structure of departmental committees. There are 20 departmental committees, most of which are directly relevant to the programme. These include amongst others, the Promotion Committee, the Timetable Committee, the Scientific Research and Seminar Committee, the Examination Committee, the Evaluation Committee and the Quality Assurance and Accreditation Committee. Each committee has defined roles and responsibilities and samples of minutes of meetings provided to the Panel suggest that the committees actively contribute to the programme management. The committees' recommendations are discussed by the Department Council for approval, which forwards its recommendations to the College Council and the University Council as needed. The Panel appreciates the well-managed structure with clear lines of accountability and defined responsibilities across all levels of hierarchy.

2.4 There are 34 faculty members (4 Professors, 4 Associate Professor, 23 Assistant Professor and 3 Lecturer) contributing to the delivery of the programme. The Panel studied the provided CVs of the faculty members and is highly satisfied with the uniformly high standard of academic qualifications and the appropriate range of specializations. There are 214 students enrolled in the programme, which - with direct calculations - indicates that the students-to-staff ratio is as low as 7:1. However, the Department offers another programme and delivers a large number of service courses to all programmes offered by UoB's different colleges. This has resulted in unacceptably high teaching loads, which exceed UoB's maximum workload policy (15 contact hours for PhD holders and 18 contact hours for those with a lesser degree). From interview sessions with staff, students and alumni, the Panel notes that faculty

members are committed to their work, attentive to students' needs and create a positive collegial atmosphere. Nonetheless, the profile of recent and current academics' research reflects the negative impact of the high teaching loads. In addition, staff have been slow to undertake the educational development required for teaching in an online environment, which as indicated during site visit, is mainly due to their high teaching load. Therefore, the Panel recommends that the College should develop and implement efficient and balanced strategies to lower teaching loads assigned to faculty members in order to promote research and professional development pertinent to modern teaching approaches.

2.5 There are clear policies and procedures for the recruitment, appraisal and promotion of academic staff. The Panel notes that recruitment procedures are implemented in a transparent manner in alignment with institutional policies and procedures. During the site visit, the Panel learnt that the Department of Mathematics has an Appointment Committee that is responsible for the recruitment of new faculty members and renewal of contracts of current expatriates and extension of service for faculty members who are 60 years of age or older. The Committee reports to the department's Chairperson. The committee's recommendations are discussed by the College Council and University Council for final decision. The Panel appreciates that there are clear and transparent recruitment policy and procedure, which are implemented at the department, college and university levels. In interviews with faculty members, the Panel was informed that there are no formal approaches with regard to the retention of academic staff. Nevertheless, retention is encouraged through incentives and participation in international conferences as outlined in the SER, and evidence provided indicates stability of academic staffing over the years, which the Panel appreciates. Nonetheless, the Panel was informed during the site visit that newly recruited faculty members are informally introduced to the university's rules and regulations, and the department's facilities and its staff by the Chairperson. Therefore, the Panel recommends that the College should implement a formal faculty induction policy for the programme and evaluate its effectiveness. Whilst faculty members are evaluated by students at the end of each semester, formal faculty appraisal is conducted only when faculty members apply for promotion or contract renewal. Hence, the Panel urges the College to revise its appraisal practice (see paragraph 4.9). Moreover, there is a 'Regulations and Appendices of Academic Promotion at the University of Bahrain' document that stipulates a clear set of criteria which includes research and community service, in addition to teaching and learning activities. The promotion policy and procedures are subject to regular reviews and revisions, last of which was approved by the University Council in 2012. The Panel acknowledges that the document is comprehensive and that the criteria are fair and in line with international standards. On receiving a promotion application, the Chairperson completes an evaluation form, which rates the candidate's professional conduct, planning of teaching, effective teaching and the assessment of students. The evaluation

form and all the submitted documents by the candidate are evaluated by the Department Promotion Committee. The committee's recommendations are forwarded to the College Promotion Committee and subsequently the University Council for final approval. However, some faculty members interviewed during the site visit indicated that the processing of promotion applications is very lengthy and slow, while others stated that they are unable to fulfil the current promotion criteria due to the impact of the increased teaching load. Evidence provided confirms the lack of promotion from Assistant to Associate Professor over a period of more than five years. The Panel urges the College to take measures that support the promotion of faculty members and provide them with the required time and resources to support the advancement of faculty in academic rank (as recommended in paragraph 2.4). The Panel also recommends that the College, in collaboration with the University, should revise the procedures followed for studying promotion applications in order to significantly shorten the time required to process promotion applications.

2.6 The Panel toured the University Information Technology Centre and was introduced to the functioning Management Information System (MIS) utilised at UoB. The Centre ensures the availability of the system's components to all stakeholders, to support the administration process and to provide appropriate reports to all levels of management for decision-making purposes. In interviews with academic and administrative staff, the Panel learnt that the MIS provides up-to-date information about the students. For example, the Department has access to a wide range of data such as student records, advising records, examination marks, and quality assurance reports. Students interviewed by the Panel confirmed that the system allows them to communicate with their academic advisors and perform 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 relevant to the programme and its management. The Panel appreciates the functioning MIS that supports faculty members and students and enhances programme delivery. Nonetheless, there are several identified opportunities for improving the utilisation of the MIS for executive decision-making that were raised during meetings with senior management. During interviews with senior staff, it was noted that the University is in the process of implementing a new MIS that will provide more functionality, and address the areas for improvements in the current system. The Panel encourages the College to expedite the migration to the new MIS.

2.7 The SER states that at the university level, it is the responsibility of the Deanship of Admission and Registration to secure and safeguard all students' records, in both soft and hardcopy. At the 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 interview sessions, the Panel learnt that academic staff submit students' grades electronically to the Chairperson, who is responsible for confirming grades and submitting these to the Dean of College, for re-confirmation and submission to the Deanship of Admission and Registration. Applications for changing grades are initiated in the Department and require the Dean and University Council's approvals before being processed. The Panel also notes, from evidence provided and the tour to the IT Centre that a robust system is in place for the backup and disaster recovery of students' records, with clearly prescribed periods for retention and back-ups. In addition, an electronic backup is conducted every semester by the IT Centre. From its interviews with the staff, the Panel acknowledges 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 the security of learner records and accuracy of results.

2.8 During the site visit, the Panel toured the department, college and university's facilities at Sakhir Campus including teaching classrooms, common computer laboratory, college and university libraries, staff offices, the food court, and venues for extra-curricular activities. The Panel observed that the classrooms are all equipped with computers to be used by instructors, with internet connectivity provided in every office and laboratories in all buildings. Moreover, faculty members have adequate individual offices, helpful for advising students. The Panel also noted that all open spaces are covered with Wi-Fi services accessible through a secure channel for all staff and students, and students have access to an open area computer laboratory that is housed in the College of IT and in close proximity to the College of Science, which has 220 workstations with varied types of software that are utilised by students. The Department of Mathematics also has two computer laboratories that have a range of statistical and mathematics software available for student use; however, the Panel notes that some major specialist mathematics software, such as Mathematica and Wolfram Alpha, are not available to the programme's students and recommends that the College should address this issue. The e-learning centre provides 'Blackboard' as an e-learning resource for faculty members to host their courses for the programme's students. Furthermore, the University Central Library and the College of IT and Science Library provide access to adequate learning resources comprising books, journals and vast databases of e-books and other electronic materials, many of which can be accessed off campus by students and staff, whom also can take advantage of the inter-library loan service facilitated by the library staff. The Panel appreciates that overall the College of Science has good facilities, which are equipped with adequate physical and material resources that support students' learning experiences.

2.9 There are a number of tracking systems that are employed for the use of the different resources by the programme, some being manually implemented and others electronically. A tracking system is in place to determine the usage of classrooms and computing laboratory resources. During the site visit tours, the Panel noted the timetabling sheets displayed in the department's teaching facilities. In addition, computing usage timetables were displayed in all college computer laboratories. Moreover, the open area computer laboratory technicians keep a daily schedule of their laboratory usage. With regards to the e-learning resources, the Panel was informed that the library and e-learning centre are mainly responsible for tracking the usage of these resources and tracking reports are provided for the Department upon request. Furthermore, the library provides detailed reports on the use of library resources such as book checkouts and renewals, inter-library loan and library visitors. The Panel acknowledges that an adequate tracking system is utilized for evaluating the usage of the department of mathematics' resources; however, no evidence was found that these are being used to inform decision-making at a holistic and strategic level relevant to the programme delivery. Hence, the Panel encourages the College to utilise further the information generated by the tracking systems to enhance its decision-making.

2.10 Support, with regard to the library, computer laboratories, and e-resources' usage is available to students, and administrative staff adopt the same philosophy of being student-oriented as the faculty do. This was evident during the informal and formal interviews conducted with students. During the site visit, the Panel had the opportunity to visit various entities that provide support services and received the views of stakeholders on the effectiveness of these services. The Deanship of Student Affairs is mandated with providing various kinds of support covering students' life to financial support where students can be exempted from tuition fees if they qualify. The Students Services and Development Department provides all students with transportation, special services for students with disabilities, medical treatment, as well as social and psychological guidance through a dedicated social advisor who is based in the College. The Career and Counselling Office provides guidance to students for their future careers, by providing general awareness campaigns as well as individual counselling. Moreover, students and graduates receive mentoring during the process of job application and are helped in writing their resume. Furthermore, an annual Careers Day is organized on a regular basis and students have the opportunity to meet potential employers and seek guidance while at the event. The two libraries are staffed with qualified personnel who provide students and faculty with information and training for effective usage of the resources and the University Central Library opens from 7:00 a.m. to 7:00 p.m., while the College of IT and Science Library opens from 7:00 a.m. to 5:00 p.m. This availability and the library staff's assistance provide adequate support to the learning and research process for both faculty and students. The students who met with the Panel praised the facilities,

support and services offered by the University and its various departments. The Panel appreciates that the College and University provide a comprehensive level of support and guidance to students that enriches their learning experience. Nonetheless, and as noted in the SER, the Panel notes with concern the urgent need for the appointment of permanent laboratory technicians at the department level. Interviews with academic staff showed that there is confusion about the responsibility for rectifying the availability of software in these laboratories and students interviewed by the Panel indicated that current laboratory support in the Department of Mathematics is not adequate and only faculty members are there to provide support. The Panel recommends that the College should employ permanent laboratory technicians at the department level and improve the current laboratory support to adequately address the students' needs.

2.11 At the beginning of each academic year, the Deanship of Students Affairs and the Deanship of Admissions and Registration collaborate to organise 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 the orientation programme's publications. During interviews, the Panel was informed that the College of Science also participates in the induction day where students are provided with an overview of the College and the Department by the Dean and Chairperson, an introduction to the academic programme plan by academic advisors, as well as a touring of the college's facilities. The Panel appreciates that a comprehensive induction programme is provided for newly admitted students at the university, college and department level. Nonetheless, the Panel notes that the attendance of students in the induction day is low as indicated by the department's records. Moreover, students who miss the induction are not provided with an alternative and have to rely on information provided in handbooks and on the university website. The Panel recommends that the College should provide students who do not attend the induction day with an alternative provision.

2.12 The SER states that all UoB students are required to meet with their advisors at the beginning of each semester to be guided in selecting courses that ensure the successful and timely completion of their studies. During the demonstrations of the MIS, the Panel confirmed that arrangements are in place to allow effective implementation of the advising system, which includes the academic advising website, and advising tool. During interviews with academic advisors, the Panel was informed that tracking the students' progress is a collaborative effort between the Department of Mathematics and the Deanship of Admission and Registration. The online academic advising system includes an electronic tracking feature that enables advisors to record their meetings with their advisees and the outcomes of these meetings. Moreover, academic

warning and dismissal regulations are clear and are widely published on the university website and students at risk of academic failure are identified *via* the university's online Academic Advising System. Identified at-risk students are blocked from registration unless they meet their academic advisors, and during interviews, the Panel learnt that a range of academic and social support is provided to these students, in collaboration with the Deanship of Student Affairs' Counselling and Guidance Unit. During interview sessions, students expressed their satisfaction with the academic support they receive from their academic advisors and other student services within the University. The Panel acknowledges that there are arrangements in place to identify students at risk of academic failure, however, in light of the low retention and progression rate; the Panel urges the College to evaluate the effectiveness of the support provided to these students (see the recommendation in paragraph 2.2).

2.13 According to the SER, there is a viable informal learning environment that helps to expand students' learning experiences. During the site visit, the Panel learnt that there is an extensive range of informal activities provided for students to expand their knowledge and experiences outside their formal learning involvement. These include student societies and clubs, cultural and social activities, as well as sport events. In interviews with senior management, the Panel learnt that there is an English Clinic Centre at the university level to help students improve their English language skills, in addition to scientific report writing. Moreover, a peer-tutoring programme also provides an opportunity for students to share their knowledge and experience amongst different groups of students. Interviewed students clarified to the Panel how they arrange different activities through the societies and clubs they are members of and expressed their satisfaction with the variety of extracurricular opportunities available for them to expand their learning. The Panel appreciates the conducive environment and the multitude of opportunities available for students to support informal learning.

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

- The management structure of the programme is well-delineated with clear lines of accountability and defined responsibilities across all levels of hierarchy of the programme delivery.
- There are clear and transparent recruitment policy and procedure, which are implemented at the department, college and university levels and there is evidence of stability amongst academic staff over the years.
- There is a functioning management information system that supports faculty members and students and enhances programme delivery.
- A robust system, including effective policies and procedures, is consistently implemented to ensure the security of learner records and accuracy of results.

- Overall, the College of Science has good facilities, which are equipped with adequate physical and material resources that support students' learning experiences.
- A comprehensive level of support and guidance is provided for students to enrich their learning experience.
- A comprehensive induction programme is provided for newly admitted students at the university, college and department level.
- The College provides a conducive environment for learning, and there are multitude of opportunities available for students to support informal learning.

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

- revise, in collaboration with the University, the admission requirements and include programme specific criteria to assess applicants' capabilities to join the BSMath programme
- conduct a thorough study to identify the reasons behind the low progression and retention rates, and develop a plan to mitigate the issue including a full revision of the requirements for English language competencies and the structure and content of the orientation programme
- develop and implement efficient and balanced strategies to lower teaching loads assigned to faculty members, in order to promote research and professional development pertinent to modern teaching approaches and revise the promotion procedures in order to significantly shorten the time required to process promotion applications
- implement a formal faculty induction policy for the programme and evaluate its effectiveness
- ensure that specialist mathematics software, such as Mathematica and Wolfram Alpha, is made available to the programme's students
- employ permanent laboratory technicians at the department level and improve the current laboratory support to adequately address the students' needs
- provide students who do not attend the induction day with an alternative provision.

2.16 **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 The graduate attributes at university level are set by the University Intended Learning Outcomes (UILOs), which are embedded within the programme in terms of the PILOs and the PEOs, as stipulated in the SER. Moreover, each course has a specific set of CILOs, and these are mapped to the appropriate PILOs and UILOs. There is a comprehensive spreadsheet for each course that maps each assessment item within the course to the appropriate CILOs and hence, the PILOs. From interviews conducted with alumni, the Panel observes that the programmes's graduates are characterised by an ability to work successfully in mathematics-related careers, or to enter a suitable graduate programme. The Panel appreciates that the graduate attributes are stated in terms of UILOs, PILOs and PEOs and that constructive and reliable assessment tools are used to ensure their achievement.

3.2 There is a university policy on benchmarking that describes the purpose and scope of benchmarking activities. During interview sessions with senior staff, the Panel was informed that the policy was developed in 2015 to ensure that the university's performance is comparable to national, regional and international standards and as a means for improvement. The Panel finds this policy to be overall appropriate where the purpose is clearly stated, as well as the scope, procedures' statements, support procedures, management and implementation responsibilities. In line with this policy, the QAAC, in collaboration with the Vice Presidents and Deans are responsible for the management of various aspects of benchmarking. However, the Panel notes that the core of the programme's curriculum was informally benchmarked with the Ohio State University programme, where an exercise was conducted by the programme team to map the titles and the brief descriptions of the courses in the programme to those within the benchmarked with programme. Moreover, the Panel was informed during the site visit that as this is the only mathematics programme offered in higher education institutions operating in the Kingdom of Bahrain, no other opportunities exist for national benchmarking. Nonetheless, the Panel recommends that the College should explore regional and international universities for benchmarking opportunities and expand its benchmarking activities to cover all aspects of the programme and its delivery in line with UoB's own policy on benchmarking.

3.3 UoB has explicit assessment policies and procedures that are adhered to and consistently applied by the faculty of the BSMath programme. These include the 'Study and Examination Regulations at the University of Bahrain', 'Assessment and Moderation Guidelines', 'Anti-plagiarism Policy' and the 'Programme Quality Assurance and Enhancement Policy' documents. These documents include specific

clause that stipulates when they should be reviewed next. Students are provided with relevant extracts of assessment policies in the Student Handbook and on the website, which faculty have access to as well. Moreover, a course specification is distributed to students during the first lecture. The specification comprises assessment criteria and grade distribution for the course, including a schedule of course assessments as well as plagiarism regulations. During interviews, the Panel noted that students are aware of assessment procedures and that instructors post students' marks for students to see their progress throughout the semester prior to sitting for the final examination. Moreover, interviewed faculty informed the Panel that oversight of multi-section courses is undertaken by course coordinators, where internal moderation of examinations and marks are carried out by the course coordinator in conjunction with the instructors. Nonetheless, external moderation of assessment is yet to be implemented for the BSMath programme. In designing assessment tools, a mapping is performed to specific CILOs. During interview sessions with the faculty, the Panel was informed that reviews of assessment tools and their mapping to the CILOs are undertaken by the Course Coordinator and approved by the Curriculum Committee. Based on interviews and provided evidence in the course files, the Panel notes with appreciation that assessment procedures are followed in general by the Department of Mathematics to ensure that there is consistency in assessments and fairness in grades and that students are well-informed and receive prompt feedback. Nonetheless, the implemented procedures are not completely in alignment with the reported UoB's moderation policy. Hence, the Panel urges the College to ensure that the existing university policy on internal and external moderation is consistently implemented (see the recommendations in paragraphs 3.5 and 3.6).

3.4 The Panel notes that there is a formal mechanism to ensure the alignment of assessment to the learning outcomes. The assessment in each course is aligned to both the CILOs and PILOs associated with it. During interviews, faculty members indicated that a 'Course Assessment Matrix' is utilized in every course to demonstrate how each CILO is assessed *via* a range of assessment methods including examinations, quizzes, student presentations, and projects. The Panel reviewed samples of course files during the site visit and noted that each course specification includes information on how each category of the CILOs is assessed *via* appropriate assessment methods. Moreover, all course outlines contain a CILO to PILO mapping. The Panel acknowledges that these mappings are comprehensive as shown in the PILO Assessment Report. The student performance is measured for each PILO and QAAC is the responsible unit to ensure that outcomes are aligned with assessments through portfolio reviews. The Panel studied the provided reports and notes that these provide an effective mechanism for ensuring correct alignment between assessments and CILO/PILO/UILOs and thus graduate standards. The Panel appreciates the mechanisms in place to ensure that the alignment of assessments with learning outcomes is consistently defined and implemented.

3.5 The Panel notes that there are informal and formal mechanisms to ensure that the academic standards of students are maintained. There are internal moderation guidelines for setting assessment instruments and grading students' achievement, as detailed in the SER and the 'Assessment and Moderation Guidelines' document. During interviews with faculty members, the Panel was informed that for multi-section courses, all instructors are involved in setting and correcting examination papers to ensure consistency of grades, while in single section courses, setting examination papers is the responsibility of the course instructor. However, in interviews with faculty members, examples were given of informal pre-assessment moderation, where course instructors consult other staff members in setting the assessment tools and rubrics used. For individual projects, the evaluation is conducted by three academics from the Department to provide consistency in assessment. The Panel acknowledges that the internal moderation of assessment for multi-section courses is conducted consistently and there are some informal activities in relation to the internal moderation of single-section's assessment tools. Nonetheless, the Panel notes that, although institutional policy requires the implementation of pre- and post-assessment internal moderation, the implemented procedures are not completely aligned with the moderation policy and there is no overarching system for monitoring the implementation of the internal moderation of assessment and evaluating its effectiveness. Moreover, some formative assessment tools, such as assignments and quizzes, are not subject to any formal internal moderation. Hence, the Panel recommends that the College should implement a more formal internal pre- and post-assessment moderation process for all major assessment tools and evaluate the effectiveness of its internal moderation process.

3.6 Mechanisms for the external moderation of students' assessment are included in the recently developed 'Assessment, Grading, and Exam Moderation Guidelines' document. Nonetheless, during interviews with senior management, the Panel was informed that the BSMath programme does not involve examiners to externally moderate students' assessments. The Panel is concerned that this is not in line with UoB's moderation guidelines and urges the College to ensure that the assessment practices followed by the Department within the BSMath programme follow the university's policy and procedures. Therefore, the Panel recommends that the College should ensure that assessment within the BSMath programme is subject to external moderation in line with the university's own policy.

3.7 An ample sample of assessed students' work was made available to the Panel during the site visit within the course files. An examination of the course files by the Panel confirmed that a range of assessment tools, including examinations, assignments, projects, is employed in alignment with the type and level of the CILOs. The Panel also notes that the level and quality of students' achievement is satisfactory and aligned with the PILOs and what is expected of a bachelor degree in mathematics. The Panel

concludes that the level of achievement for the assessments is appropriate for this programme. Assessment guidelines published by the University ensure there are a variety of assessment types, which was confirmed through examining the course files. Hence, the Panel concludes that the students' levels of achievement compare favourably with similar programmes elsewhere. The Panel appreciates that the level of students' work, as evident in the examined samples of students assessed work, is appropriate for the type and level of the programme.

3.8 The SER states that the achievement of PILOs is confirmed internally by the university's QAAC, which conducts regular audits of course portfolios. As indicated earlier, students' assessments are aligned with specific CILOs and a Course Assessment Matrix is employed to determine the successful attainment of these CILOs. This is used then to ensure that students achieve the PEOs and PILOs *via* the CILOs. The target success level for the PILOs in each course has been set internally as 70%. This provides a mechanism for internal evaluation of graduate attributes. The Panel examined the course files of the programme and confirmed that a range of assessment tools, including final examinations, tests, assignments, projects, are employed in alignment with the type and level of course learning outcomes, and that the final results and grade distributions are at acceptable levels according to regional and international standards. Hence, the Panel appreciates that the level of graduates' achievement, in general, meets the programme aims and intended learning outcomes. Notwithstanding the above, the SER has identified, as an area of improvement, that 'faculty should be trained to write improvement actions if outcomes are not achieved'. The Panel concurs with this view. In addition, alumni interviewed by the Panel were also very satisfied with the knowledge, skills and competencies attained that prepared them for the workplace. On the other hand, the Panel notes that the external evaluation of graduate attributes is assessed indirectly through collecting feedback from alumni and employers; however, this is not implemented rigorously as the feedback collected is limited in numbers (see paragraph 4.8). Hence, the Panel urges the college to address this issue.

3.9 The Panel notes that, while data on students' progress has been collected, the staff interviews showed this data was not widely distributed and hence has not been used for quality improvement to date. There is no evidence that the rates of progression, retention and year-on-year progression are compared internally within the institution or externally. The recent dropout rates for the programme are high, with academic staff providing anecdotal evidence that the causes are related to student entrance ability and motivation (see paragraph 2.2). The Panel urges the College to conduct a systematic cohort analysis depicting ratio of admitted students to successful graduates, year-on-year progression and first destination of graduates and utilise the outcomes for decision-making (see recommendation in paragraph 2.2).

3.10 The programme has an independent Senior Project course (MATHS 499), which is an elective course that students may opt to register in. The Panel learnt that there is a Senior Project Committee at the department level that is responsible for setting the guidelines for the supervision of the senior projects and monitoring the progress in their implementation. Appropriate guidelines and the supervisory format for the senior project are in place and are clearly documented in the Senior Project Booklet, which is made available to students. During the site visit, the Panel reviewed samples of senior projects and found that the evaluation mechanism is consistently implemented for the assessment of the senior projects using appropriate assessment rubrics. The senior project is assessed by three academics from the Department. However, the supervision of the senior project course is not considered part of the faculty members' workload, and hence some staff do not participate in it. This concern was also raised in meetings with students. The Panel is of the view that the College should recognize and allocate staff workload to supervisors of the Senior Project course (see paragraphs 2.4 and 2.5). Nonetheless, the Panel appreciates that there is a clear mechanism for the supervision and assessment of students' senior projects, which students and staff are well-informed of and is implemented consistently.

3.11 The SER states that there is a Student Advisory Committee in operation and the suggestions its members have made are evidence that it is functioning. In meeting with students from this advisory committee, the Panel learnt that the committee is not operating formally and has limited inputs on improving the programme. The Students Advisory Committee provides only a supporting role for BSMath students and coordination with the department Chairperson to address some students' issues during the semester. Moreover, there is no Programme Advisory Committee to liaise with the market. The Panel recommends that the College should form the Programme Advisory Committee, with representatives from the market, to strengthen the programme review and enhancement processes.

3.12 The SER states that the Department conducts senior students, employer and alumni surveys to gauge their satisfaction with the programme and standard of the graduate profile; and examples of these surveys being carried out were provided to the Panel. Senior Exit Survey is conducted by the QAAC regularly to collect students' feedback prior to their graduation. Moreover, alumni and employer survey were introduced recently and evidence made available indicates that a small number of employers (7) and alumni (8) filled these surveys. Interviewed programme team provided the Panel with examples of improvements introduced as a result of these surveys. During the site visit, the Panel was provided with an opportunity to meet with the programme alumni who indicated a high level of satisfaction with the standards of the programme. However, the Panel notes the lack of an effective and systematic approach in obtaining feedback from employers and alumni and hence urges the College to implement an

effective mechanism to evaluate graduate and employer satisfaction with the standards of the graduate profile (as recommended in paragraph 4.8).

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

- The graduate attributes are stated in terms of university intended learning outcomes, programme intended learning outcomes and programme educational objectives, and constructive and reliable assessment tools are used to ensure their achievement.
- Assessment procedures are followed in general by the Department of Mathematics to ensure that there is consistency in assessments and fairness in grades and students are well-informed and receive prompt feedback.
- There are mechanisms in place to ensure that the alignment of assessments with learning outcomes is consistently defined and implemented.
- The level of students' work, as evident in the examined samples of students assessed work, is appropriate for the type and level of the programme.
- The level of graduates' achievement, in general, meets the programme aims and intended learning outcomes.
- There is a clear mechanism for the supervision and assessment of students' individual senior projects, which students and staff are well-informed of and is implemented consistently.

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

- explore regional and international universities for benchmarking opportunities and expand the benchmarking activities to cover all aspects of the programme and its delivery in line with UoB's own policy on benchmarking
- implement a more formal internal pre-and-post assessment moderation process for all major assessment tools and evaluate the effectiveness of the internal moderation process
- ensure that assessment within the BSMath programme is subject to external moderation in line with the university's own policy
- form the Programme Advisory Committee, with representatives from the market, to strengthen the programme review and enhancement processes.

3.15 **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 Policies and procedures are in place to provide a comprehensive framework for the College and the Department with operational plans for development. Through interviews with the Dean, department's Chairperson and faculty, the Panel concludes that there are clear policies, procedures, and regulations that faculty members are familiar with. The Panel notes that the numerous committees ensure academic staff involvement in the implementation of relevant policies and procedures. During interviews, the Panel learnt that the implementation and continuous revision of these policies is mainly the responsibility of the QAAC. Implementation is managed through clear identification of responsibilities, with key roles at relevant levels. The Panel appreciates that a comprehensive and well-documented set of policies, procedures and regulations is in place. However, the Panel found that the Department of Mathematics has not formed the Programme Advisory Committee yet, although there is a clear university policy on this and the Quality Assurance Manual states that the programme team should seek feedback from the Programme Advisory Committee. In its interviews with senior management, the Panel was informed that this concern was raised several times but no follow-up action was taken to correct this non-compliance. Moreover, the Panel notes that the current staff workload exceeds what is stated by the university's policies. Hence, the Panel recommends that the College should implement a systematic mechanism to monitor the consistent adherence to adopted policies and ensure that actions are taken to address any non-compliance.

4.2 Academic responsibilities are clearly defined at university, college, department, programme and individual courses' levels. The Dean and the department's Chairperson have key leadership roles in managing the programme. 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 recommendations of these committees are discussed at the Department Council, which on the department level has the final role on all key academic decisions. The levels of responsibility are clearly defined in the SER and the relevant documents provided to the Panel. In addition, the interviewed academic and administrative staff and students were well-informed of the line of responsibilities in the Department. Based on information provided, together with interviews with various staff members, the Panel acknowledges that the leadership of the programme is effective and responsible.

4.3 The quality assurance for the university's operations and programmes is well documented in the 'Quality Manual' document and is implemented. For the BSMath programme, there is evidence of this being used for quality improvement. The internal audit function conducted by the QAAC is an important component of the quality assurance management system and it plays an important role in monitoring the quality of the provision. There is evidence that portfolio reviews conducted by the QAAC have resulted in a series of commendations and recommendations for the programme. Many of the recommendations have been implemented and the department's Chairperson is responsible to follow up the progress on addressing these recommendations and identifying any challenges that impede their implementation. The improvement plan developed for the programme further reflects the monitoring of the Quality Assurance (QA) system. During meetings with senior management, the Panel learnt that the QA management system is monitored by systematic reporting upwards through committees, including the Department Accreditation Committee, Department Council and the College Accreditation Committee. The Panel appreciates the clear and effective quality assurance system in place, which is implemented, monitored and evaluated across the College and specifically by the Department of Mathematics.

4.4 The SER indicates that staff have a clear understanding of the quality assurance system and are provided with opportunities to attend various workshops organized by the QAAC. 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 the course assessment forms. The Panel also heard from administrative staff in the library, e-learning Centre, IT Centre, and Student Affairs about their roles in supporting students' learning. In addition, senior staff interviewed by the Panel emphasized the ongoing review and evaluations by the university's QAAC in promoting QA and accreditation culture within the College. Overall, the Panel is satisfied that the staff involved in the management and delivery of the BSMath programme understand and adhere to the quality assurance policies. The Panel appreciates that the University provides capacity-building opportunities for all staff to enhance their understanding of quality assurance concepts.

4.5 The Panel notes that a policy on the development and approval of new programmes and courses, the Academic Programme and Course Development policy, was developed and approved by the University Council in October 2013. The Panel notes that there is a documented process for new academic programmes in the Department. 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. The policy emphasizes the need to scope the labour market and collect internal and external

stakeholders' feedback to align the new programme with current needs in the market and address suggestions by all stakeholders. However, no new programmes have been initiated in the Department of Mathematics since the development of this policy. The Panel acknowledges the policy developed to ensure that newly introduced programmes are relevant and fit for purpose.

4.6 The BSMath programme is evaluated annually and the guidelines for the preparation of internal self-evaluation reports and improvement plans for each programme are outlined in the Quality Manual. The cycle for the annual evaluation is explained in the Programme Quality Assurance policy and comprises assessment of achievement level of the PEOs, PILOs and CILOs. During interview sessions, the Panel learnt that faculty members are required to prepare annual course reports, which include an analysis of students' achievement and grades with reference to the CILOs. 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 of or introduction of a new course. Moreover, examples of internal programme evaluation and implementation of recommendations are stipulated in the QAAC minutes. The Department is also required to submit an internal self-evaluation report, along with an improvement plan to the QAAC, which, in turn, submits a summary report for all academic programmes to the University Council. The Panel was provided with the Self-evaluation and Improvement Plan document of the BSMath programme, for the academic year 2015-2016, and acknowledges that it provides further evidence of quality improvement. The Panel appreciates the appropriate arrangements for annual internal programme evaluation that inform programme improvements.

4.7 The periodic external reviews of programmes are stipulated in the Programme Quality Assurance and Enhancement policy of UoB. The policy requires that 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. Nonetheless, the Panel notes that although a major review of the BSMath programme was carried out by the QAAC in 2012, this review was internal mainly and no external review of the programme has been carried out, which was confirmed during the site visit. The Panel recommends that the College should conduct a periodic review of the BSMath programme that incorporates both internal and external feedback, in line with UoB's stated policy.

4.8 The Panel notes that survey forms are available for employers, faculty, graduating students and alumni. All these surveys are periodically collected and analysed in order to be aligned with the Programme Quality Assurance and Enhancement policy. The Panel notes that the results from these surveys, covering 2009 to 2015, are statistically analysed and considered by academic staff, the department's Chairperson, and the

Dean. The Chairperson has the key responsibility for ensuring that the survey results are included in the department's action plan during the review process and that improvement actions are implemented. Despite the small number of participants, there are examples of improvements made in light of these surveys such as addressing course advising concerns. The Panel appreciates that the structured comments collected from stakeholders' surveys are analysed and that outcomes are used to inform mechanisms for programme improvement and recommends that the College should strengthen the mechanisms used for collecting feedback from alumni and employers.

4.9 The Panel notes that there is evidence of formal professional development provided by UoB in terms of teaching and QA. Moreover, faculty members are encouraged by the College to participate in local, regional, and international conferences and training programmes. Following interviews with senior management, the Panel learnt about the trend at the university level towards increasing provision of continuing professional development for staff, including compulsory development for specific groups. Therefore, newly appointed academic staff can participate in the Postgraduate Certificate in Academic Practice (PCAP) programme, which is aligned to the UK Higher Education Academy Fellowship. During faculty members' interviews, two new faculty members were identified as currently undertaking this programme. There are also several workshops available for staff covering professional development. From the provided list of professional development activities attended by the faculty members, the Panel finds that the topics and number of activities are overall satisfactory, especially the topics on quality assurance and assessment. The Panel acknowledges that the College provides opportunities for the professional development of faculty members. However, the Panel notes with regret that recent budget restraints have meant a restriction on conference travel and sabbaticals. This needs to be addressed. Moreover, as there is no annual faculty members' appraisal process in place, there is no clear system for identifying the staff needs, both individually and collectively. Hence, the Panel recommends that the College should develop and implement a comprehensive staff appraisal system and utilise its outcomes to inform professional development needs.

4.10 While the SER did not provide any information on how the Department of Mathematics scopes the labour market to ensure currency of the programme, in interviews with senior management, the Panel learnt that there is no formal scoping of the labour market undertaken by the Department. However, the Panel was informed that the results of alumni and employers' surveys provide valuable feedback regarding the potential demands of the labour market. Nonetheless, the Panel is of the view that the current practice does not provide the College with a holistic approach towards identifying the market needs, whether in the short-term, nor more importantly, in the long-term. Hence, the Panel recommends that the College should

scope the labour market in a comprehensive and formal manner to ensure that the BSMath programme is current and meets the needs of the market.

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 policies, procedures and regulations is in place.
- A clear and effective quality assurance system is implemented, monitored and evaluated across the College and specifically by the Department of Mathematics.
- Capacity-building opportunities are provided for all staff to enhance their understanding of quality assurance concepts.
- There are appropriate arrangements for annual internal programme evaluation that informs programme improvements.
- Feedback collected from stakeholders' surveys are analysed and their outcomes are used to inform programme improvement.

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

- implement a systematic mechanism to monitor the consistent adherence to adopted policies and ensure that actions are taken to address any non-compliance
- conduct a periodic review of the BSMath programme that incorporates both internal and external feedback, in line with UoB's stated policy
- strengthen the mechanisms used for collecting feedback from alumni and employers
- develop and implement a comprehensive staff appraisal system and utilise its outcomes to inform professional development needs
- scope the labour market in a comprehensive and formal manner to ensure that the BSMath programme is current and meets the needs of the market.

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 Mathematics of the College of Science offered by the University of Bahrain.