Directorate of Higher Education Reviews

Programme Review Report

University of Bahrain
College of Information Technology
Bachelor of Science in Computer Science

Kingdom of Bahrain

Site Visit Date: 7–9 December 2020

HA007-C3-R007

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Acronyms

ABET	Accreditation Board for Engineering and Technology
ACM	Association of Computing Machinery
ACM/IEEE	Association for Computing Machinery /Institute of Electrical and Electronics Engineering
AI	Artificial Intelligence
APRs	Academic Programme Reviews
BQA	Education & Training Quality Authority
CAC	College Accreditation Committee
CAR	Course Assessment Report
CILO	Course Intended Learning Outcome
CIT	College of Information Technology
CS	BSc Computer Science
DCS	Department of Computer Science
DHR	Directorate of Higher Education Reviews
HEC	Higher Education Council
HEIs	Higher Education Institutions
IEEE	Institute of Electrical and Electronics Engineers
IQR	Internal Quality Review
NQF	National Qualification Framework
PEO	Program Educational Objective
PI	Performance Indicator

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PIAC	Advisory Committee
PILO	Program Intended Learning Outcome
PSAC	Advisory Committee
QAAC	Quality Assurance & Accreditation Center
QAAEC	Quality Assurance and Accreditation Executive Committee
QAC	Quality Assurance Committee
RPL	Recognition of Prior Learning
SER	Self-Evaluation Report
SES	Senior Exit Survey
SIS	Student Information System
SITL	Science & IT Library'
UILO	University Intended Learning Outcome
UoB	University of Bahrain

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I. Introduction

In keeping with its mandate, the Education & Training Quality Authority (BQA), through the Directorate of Higher Education Reviews (DHR), carries out two types of reviews that are complementary. These are: Institutional Reviews, where the whole institution is assessed; and the Academic Programme Reviews (APRs), where the quality of teaching, learning and academic standards are assessed in academic programmes within various colleges according to specific standards and indicators as reflected in its Framework.

Following the revision of the APR Framework at the end of Cycle 1 in accordance with the BQA procedure, the revised APR Framework (Cycle 2) was endorsed as per the Council of Ministers' Resolution No.17 of 2019. Thereof, in the academic year (2019-2020), the DHR commenced its second cycle of programme reviews.

The Cycle 2 APR Review Framework is based on four main Standards and 21 Indicators, which forms the basis the APR Reports of the Higher Education Institutions (HEIs).

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

Standard 1: **The Learning Programme**

Standard 2: **Efficiency of the Programme**

Standard 3: **Academic Standards of Students and Graduates**

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

The Review Panel (hereinafter referred to as 'the Panel') decides whether each indicator, within a standard, is 'addressed', 'partially addressed' or 'not addressed'. From these judgments on the indicators, the Panel additionally determines whether each of the four standards is 'Satisfied' or 'Not Satisfied', thus leading to the Programme's overall judgment, as shown in Table 1 below.

Table 1: Criteria for Judgements

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

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The APR Review Report begins with providing the profile of the Programme under review, followed by a brief outline of the judgment received for each the indicator, standard, and the overall judgement.

The main section of the report is an analysis of the status of the programme, at the time of its actual review, in relation to the review standards, indicators and their underlying expectations.

The report ends with a Conclusion and a list of Appreciations and Recommendations.

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II. The Programme's Profile

Institution Name*	University of Bahrain (UoB)
College/ Department*	College of Information Technology Department of Information Systems
Programme/ Qualification Title*	Bachelor of Science Computer Science
Qualification Approval Number	University Council Decision No.(99/2014) of 2014
NQF Level	8
Validity Period on NQF	5 years
Number of Units*	132 Units
NQF Credit	553
Programme Aims*	1. Pursue a successful IT career in industry, government, academia or entrepreneurship. 2. Engage in life-long learning, graduate-level studies, or professional development. 3. Add valued contributions to society through responsible and ethical practice within the IT profession.
Programme Intended Learning Outcomes*	1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions. 2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline. 3. Communicate effectively in a variety of professional contexts. 4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles. 5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline. 6. Apply computer science theory and software development fundamentals to produce computing-based solutions.

* Mandatory fields

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III. Judgment Summary

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The Programme's Judgment:
Confidence

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Standard/ Indicator	Title	Judgement
Standard 1	**The Learning Programme**	**Satisfied**
Indicator 1.1	The Academic Planning Framework	Addressed
Indicator 1.2	Graduate Attributes & Intended Learning Outcomes	Addressed
Indicator 1.3	The Curriculum Content	Partially Addressed
Indicator 1.4	Teaching and Learning	Partially Addressed
Indicator 1.5	Assessment Arrangements	Addressed
Standard 2	**Efficiency of the Programme**	**Satisfied**
Indicator 2.1	Admitted Students	Addressed
Indicator 2.2	Academic Staff	Partially Addressed
Indicator 2.3	Physical and Material Resources	Addressed
Indicator 2.4	Management Information Systems	Addressed
Indicator 2.5	Student Support	Partially Addressed
Standard 3	**Standard 3: Academic Standards of Students and Graduates**	**Satisfied**
Indicator 3.1	Efficiency of the Assessment	Addressed
Indicator 3.2	Academic Integrity	Partially Addressed
Indicator 3.3	Internal and External Moderation of Assessment	Partially Addressed
Indicator 3.4	Work-based Learning	Addressed

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Indicator 3.5	Capstone Project or Thesis/Dissertation Component	Partially Addressed
Indicator 3.6	Achievements of the Graduates	Addressed
Standard 4	**Effectiveness of Quality Management and Assurance**	**Satisfied**
Indicator 4.1	Quality Assurance Management	Addressed
Indicator 4.2	Programme Management and Leadership	Addressed
Indicator 4.3	Annual and Periodic Review of the Programme	Partially Addressed
Indicator 4.4	Benchmarking and Surveys	Partially Addressed
Indicator 4.5	Relevance to Labour market and Societal Needs	Addressed

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IV. Standards and Indicators

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Standard 1

The Learning Programme

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

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Indicator 1.1: The Academic Planning Framework

There is a clear academic planning framework for the programme, reflected in clear aims which relate to the mission and strategic goals of the institution and the college.

Judgment: *Addressed*

- The Bachelor of Science in Computer Science (CS) programme is delivered by the Department of Computer Science in the College of Information Technology (CIT) at the University of Bahrain (UoB). The CS programme was accredited by the Accreditation Board for Engineering and Technology (ABET) in 2010 and in 2016. In 2015, it was placed on the National Qualification Framework (NQF). The SER states that the CS programme follows UoB's academic planning framework, which is detailed in the 'Regulations for Offering/Developing Academic Programs and Courses at the University of Bahrain'. Evidence of undertaking a planning process for the CS programme was provided to the Panel, including evidence of benchmarking and gap analysis during 2014–2016, departmental minutes of meetings from 2014–2015, etc. From the evidence provide, the CS programme has clear planning process to ensure the programme relevance and fitness for purpose. However, CS is a fast-moving area and the Panel suggests that planning for incremental updates in the CS curriculum could occur more often (e.g., annually).

- The SER states that the Curriculum Committee and the Accreditation Committee are responsible, on the departmental level, for addressing possible risks. Minutes for a departmental meeting provided to the Panel demonstrated discussion of teaching load, as a potential risk, but with no evidence of action on this. The Panel was provided also with the CS Department Recruitment Planning Report of 2018–2019, with 16 out of 25 faculty reported to have overloads of teaching, as an evidence of the identification of a risk. However, the Panel did not find any evidence on addressing this problem. Overall, the Panel was not provided with convincing evidence of explicit risk assessment (e.g., a risk register) that is handled formally and effectively. Hence, the Panel recommends that the

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College should develop and maintain a plan for the identification of risks to the CS programme, as well as an analysis of these risks and their mitigation.

- The SER states that the CS programme was placed on the NQF in 2015. It is not clear in the SER how (if at all) that the CS programme has changed since then, especially changes that could affect NQF requirements. Interviews with faculty did not indicate any more recent substantial changes, so the Panel is of the view that the NQF requirements still hold. See the suggestion for annual incremental updates above.

- The formal CS programme title is Bachelor of Science in Computer Science. This is a standard degree title. The Panel was provided with a sample certificate in Arabic and an associated letter in English, which reflect accurately the title of the degree. For evidence, a rather long web address is provided for the CIT website, together with a CS Academic Programme Specification Form. The Panel notes that the CIT website leads to the CS Department website (where the name of the Department is not in the main title) and then to CS programme information, where the CS programme is called 'B.Sc. in Computer Science', an acceptable short form of the full title. The Panel suggests that UoB uses shorter URLs for important web pages associated with the CS programme.

- The SER describes that UoB has an overall framework, which includes broad aims an objectives of the CS programme. The CS programme has three clear Program Educational Objectives (PEOs) with various mappings. The Panel notes that PEO-1 has been revised to omit 'computing' but retain 'IT' after a review with stakeholders. The Panel suggests that the appropriateness of this for a CS programme as opposed to an IT programme should be considered. There are four major stakeholders: faculty, employers represented by the Program Industrial Advisory Committee (PIAC), students represented by the Program Students Advisory Committee (PSAC), and the alumni. It is stated that the PEOs are reviewed with respect to stakeholder feedback, survey results, and the requirements of the job market. No evidence for this is referenced and the regularity of the reviews is unclear in the SER. Evidence of a PEO review with proposed revisions and relevant recent CS Departmental Meeting and Quality Assurance Committee (QAC) minutes were provided. Based on this, the Panel is of the view that reviews occur, but evidence of the implementation of revisions is lacking. Therefore, Panel suggests that implemented revisions of CS programme aims are better documented in the future.

- With respect to missions and strategic goals, it is stated that the CS programme PEOs are reviewed with respect to the UoB mission and strategic plan, the CIT mission, and the CS Department mission. The CS programme has three PEOs, mapped to the UoB/CIT mission, UoB strategic goals, and University Intended Learning Outcomes (UILOs). Research issues are included in the mapping to PEO-2, although this does not explicitly mention research. The Panel is of the view that the CS programme aims contribute to CIT

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and UoB's mission and strategic goals but suggests that research could be explicitly included in PEO-2.

Indicator 1.2: Graduate Attributes & Intended Learning Outcomes

Graduate attributes are clearly stated in terms of intended learning outcomes for the programme and for each course and these are appropriate for the level of the degree and meet the NQF requirements.

Judgment: *Addressed*

- Graduate attributes are defined at the institutional level in the six UILOs. In addition, these attributes are embedded in the Programme Intended Learning Outcomes (PILOs) at the CS programme level. These PILOs follow ABET student outcomes closely, including the move from earlier ABET outcomes (a–k) to the latest ABET outcomes (1–6), available on the ABET website. CS programme PILOs are mapped to UILOs. Overall, the Panel acknowledges that the CS programme PILOs reflect UoB's UILOs.

- The CS programme has six clear PILOs. These are linked to CS programme PEOs. Since these are international ABET student outcomes, the Panel is of the view that these are appropriate in an international context, meet international norms and are measurable. The Panel examined the provided evidence of Course Intended Learning Outcome (CILO) scorecards against NQF requirement and CILO/PILO mappings and found that there are measures in place to help ensure that CS PILOs meet the NQF requirements. However, the Panel suggests that UoB could undertake a more direct comparison of NQF requirements with the CS programme PILOs.

- The SER describes the process of developing and revising the CILOs by course instructors and their subsequent approval. It states that the CILOs are consistent with the NQF level through mapping CILOs to the relevant award. During the visit, completed CILO/PILO assessment forms for three courses were provided, demonstrating mechanisms to ensure the appropriateness of CILOs. An NQF report spreadsheet for the CS programme was also provided with Mapping Score Card forms for individual courses and an NQF Re-Validation of Placed Qualification Application Form for the CS programme dated 23 November 2020, demonstrating a mechanism for NQF compliance. The checking of CILOs was discussed satisfactorily with faculty and overall, the Panel appreciates the mechanisms in place to ensure the appropriateness of CILOs.

- Regarding CILO mappings, there are CILO/PILO mappings in CS programme course syllabi. Samples of CILOs and their mappings were viewed by the Panel. Some are not measurable, e.g., due to poor or ambiguous phrasing. For example, CILO 7 in ITCS 416 'Develop, design and implementation skills for constructing OS components and utilities

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under various platforms' is not measurable and its meaning is unclear. 'Design of …' should be 'Design …' in CILO 4 of ITCS 321. Some multiple verb CILOs are likely to be problematic in coverage of skills/knowledge. For example, in CILO 3 of ITCS 321 'Analyze, develop, modify, and test …', it is unclear assessment instruments cover all of these and how is this ensured. Although most CILOs are acceptable, the Panel found that few are problematic, even in the small sample checked. The Panel recommends that the College should check the CILOs and their mappings for the whole CS programme, to remove any problems with respect to measurability, grammar, mapping, etc.

Indicator 1.3: The Curriculum Content

The curriculum is organised to provide academic progression of learning complexity guided by the NQF levels and credits, and it illustrates a balance between knowledge and skills, as well as theory and practice, and meets the norms and standards of the particular academic discipline.

Judgment: *Partially Addressed*

- The Panel examined the provided B.Sc. in CS programme Study Plan for 2016, which the Panel confirmed that it is the latest study plan. The Panel notes that the CS programme is little changed since 2016, as confirmed in interviews with faculty. The CS programme is a 4-year (8-semester) programme. Prerequisites are included for courses, with appropriate progression. As per the study plan, the individual course hours are appropriately listed in terms of lectures and credit hours. There is no mention of NQF in the study plan itself, but NQF requirements are in two documents: A long 'Mapping Scorecard' for individual courses and a summary document. Noting that the CS programme has received NQF approval previously, the Panel is of the view that this is acceptable with regard to progression. Overall, the Panel is of the view that this is a relatively standard 4-year Bachelor's programme, with a total of 132 credit hours, which has appropriate progression and student workload.

- The Panel was provided with evidence on regularly updating the curriculum, which include: Benchmarking from 2014 to 2016, several Departmental Curriculum Committee meeting minutes from 2014 to 2015, a CS programme plan for 2016, and an External Moderation Form with no suggested changes in 2020. The Panel notes that although there are evidence on reviewing the curriculum, little has changed in the CS programme since 2016. This was confirmed during interviews with faculty members and senior management. However, the Panel is of the view that CS is a fast-moving field; accordingly, the curriculum needs to cope with the recent development. For example, cloud computing is a recent area of interest at UoB, as indicated during interviews, which could be added to the CS programme. Artificial Intelligence is another rapidly developing area of computer science. See the suggestion for more timely updates to the CS programme under Indictor 1.1.

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- It is stated in the SER that all courses in the CS programme conform to the Association for Computing Machinery /Institute of Electrical and Electronics Engineering (ACM/IEEE) recommended model curriculum to ensure a suitable balance between theory and practice. It is also stated that courses include laboratory/tutorial sessions. The Panel examined the course syllabi and programme study plan and found that there is a balance between theory and practice, and between knowledge and skills in the curriculum in general. However, the mechanisms for ensure conformance in the case of changes are not clear and no evidence is referenced for this aspect in the SER. Evidence was requested before the visit and six course syllabi with lectures and laboratories were provided. The issue of balance was discussed satisfactorily with senior management and faculty. The Panel is of the view that the CS programme is appropriately balanced but suggests that mechanisms to ensure this could be better documented.

- The Panel examined samples of course portfolios and noted generally that the courses in the programme are a relatively standard set of computer science courses. The Panel notes that the ITCS course portfolios, for example, do not include teaching material, thus, making completeness of delivery more difficult to check. Not all course syllabi were present. The issue of ensuring that the entire course is delivered was discussed with faculty, but no formal process for this was evident. The Panel recommends that the College should better formalize checking of the completeness of course portfolios to ensure their completeness and that the entire course syllabus is covered. Also, The Panel suggests that course teaching material should be included in course portfolios to help enable better checking.

- The Panel examined textbooks and references in course syllabi and found that in some cases they are outdated. For example, in the ITCS 113 course, the textbook was given as the 7th edition, with the title and author, but without a publication date, publisher, or ISBN. The date is 2014 and there is a more recent 8th edition published in 2017. The date on the ITCS 113 syllabus is given as 15 September 2016. The 'Approved by' box is empty. The issue of currency of course textbooks and materials was discussed with faculty in the interviews, but no evidence of ensuring this was provided. In interviews with administrative staff, there was no evidence provided of explicit checking of the currency of course textbooks and materials. The Panel is of the view that any up-to-date CS programme needs to be checked and updated at least annually or upon each course delivery. The Panel recommends that the College should introduce a formal mechanism for regularly ensuring the currency of course textbooks and references.

Indicator 1.4: Teaching and Learning

The principles and methods used for teaching in the programme support the attainment of programme aims and intended learning outcomes.

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Judgment: *Partially Addressed*

- UoB has Teaching and Learning Policy, approved on 25 April 2018. There is brief mention of teaching approaches being reviewed/developed continuously and being informed by current research. Learning environments are mentioned briefly, for example with respect to being virtual or physical. There is no explicit mention of newer teaching methods such as blended learning (e.g., the flipped classroom approach). Overall, the Panel is of the view that this policy alone is inadequate as a useful guide of teaching and learning on a programme such as the CS programme. The Panel recommends that the College should develop and implement a more specific policy, guideline, or strategy document for the specific needs of teaching and learning on its programmes.

- It is stated in the SER that teaching and learning methods on the CS programme follow the UoB teaching and learning policy. Some different teaching methods are discussed. These are appropriate although none are novel in terms of current research. Generally, these include interactive teaching, problem solving and practical and laboratory learning but not additional current teaching and learning methods. Each course syllabus includes a 'Course Teaching Methods' section with appropriate teaching methods and mappings to CILOs. The Panel acknowledges that workplace learning is a worthwhile aspect of the CS programme through its internship, as discussed with employers during interviews. However, the Panel suggests that current research findings on teaching and learning methods should be considered more in terms of achieving intended leaning outcomes.

- E-learning is not explicitly mentioned in the UoB Teaching and Learning Policy, although mention of a virtual learning environment is included. Programme learning outcomes and course learning outcomes are mentioned briefly at the start of the policy, but support of these through e-learning is not explicitly covered. Use of e-learning to support learning outcomes was discussed satisfactorily with faculty in the interviews, including the use of online teaching facilities such as Blackboard, which is now used widely. The Panel recommends that more on e-learning should be added to the teaching and learning policy, or as part of a CIT policy/guideline/strategy document.

- The UoB teaching and learning policy includes aspects of student participation in learning briefly. However, exposure to professional practice/application of theory is not explicitly covered in this policy but is appropriately included in the CS programme. The internship in the programme does cover this in practice. Further evidence was requested before the visit and information on CIT events, seminars, and CS programme courses was provided. The Panel suggests that the CIT could incorporate student participation information in its own teaching and learning policy/guideline/strategy document, building on and compatible with the UoB policy, but customized to include more specific information relevant to computing-related degree programmes such as the CS programme.

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- The SER states that the majority of CS programme courses have practical and project components that motivate students to create and innovate. Four Senior Project reports are provided as evidence. These are largely development-oriented rather than research-oriented, but are of reasonable quality, and they do include literature reviews. The Panel notes that Senior Projects are joint projects, developing collaborative skills, but to a lesser extent an individual's creative skills. In the Panel's experience, this is not unusual for final year degree work in the region but does make marking of this important component of the programme more difficult, especially since it can have a significant impact on a students' degree classification. During interviews with senior management, creative and innovative aspects of students were discussed.

- It is stated in the SER that most of the CS programme courses have practical/projects components that support lifelong learning; however, formal, informal, and non-formal learning are not explicitly covered. The Panel acknowledges that the internship on the CS programme is, in practice, helpful as an introduction to lifelong learning, as discussed in interviews with employers. The UoB Teaching and Learning Policy includes a bullet point mention of lifelong learning, without elaboration. The Panel suggests that more specific guidance on lifelong learning could be included in a CIT teaching and learning policy/guideline/strategy document.

Indicator 1.5: Assessment Arrangements

Suitable assessment arrangements, which include policies and procedures for assessing students' achievements, are in place and are known to all relevant stakeholders.

Judgment: *Addressed*

- The SER clarifies that UoB has established assessment policies and procedures, citing the 'Regulations of Study and Examinations at the University of Bahrain' (dated 23 October 2013), which is available on the UoB website. Searching for the title on the UoB website reveals an updated version, dated '30 December 31, 2018'. The document emphases examinations, although homework, projects, laboratories are covered as well, but in less detail. Indeed, homework and laboratories, for example, are only mentioned briefly in the SER. A 'CIT Assessment Policy for the Second Semester of 2019-2020. 'During the Precautionary Period' document and other information on the senior project and internships were provided. However overall, the Panel is satisfied that the UoB regulation along with the related guidelines on the CIT level offer an appropriate assessment framework.

- As per the SER, the 'Regulations of Study and Examination at the University of Bahrain' are available on the UoB website. A description of objectives governing assessment and evaluation of student performance is given, but without any reference as to how such

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information is disseminated to relevant stakeholders. Access to policies and procedures was discussed in interviews with faculty satisfactorily and this is mainly online. Interviews with students confirmed appropriate dissemination too. Overall, the Panel is of the view that dissemination is not an issue in practice.

- The SER confirms that a variety of assessment methods are used to cover both formative and summative assessment, with some discussion. A sample marked examination papers with student answers written on the examination paper is provided, stating that the criteria for marking are normally provided on the first page of examination papers. The marks for each question are included in the sample, but not the criteria for awarding them. It is stated that feedback to students is prompt but without evidence or the mechanisms for ensuring this. Four examples of written feedback on student work are included. Further evidence on prompt feedback was requested before the visit. Evidence of marking was provided, but without information on the promptness. The issue of prompt feedback was discussed with senior management, but no formal mechanism for ensuring this was evident. During the interview with the students, they reported a variable rate of feedback on different courses, depending on the instructor, with up to several weeks delay in some cases. The Panel recommends that a formal mechanism for ensuring prompt feedback should be introduced.

- The main research-oriented aspect of the CS programme is the Senior Project. There is an Antiplagiarism Policy and a Regulation of Professional Conduct Violations document. Ethical issues in assessment were discussed with senior management during the interviews and there is a reliance on software such as Turnitin, especially for projects.

- The SER claims that the 'Regulations of Study and Examination at the University of Bahrain' are implemented transparently. Transparency of grading for non-examination assessment is less well covered. Regarding grading and moderation of examinations, a significant amount of evidence is provided: CIT Assessment Strategy/Assessment, Grading, and Exam Moderation Guidelines; University policy for the Assessment Moderation Regulation; Internal pre-moderation form; Internal post-moderation form Sample of External Moderation of Assessment Forms 2018–2019; Sample of graded examinations by many instructors for multi section and Request for Reviewing Examination Result. Six graded project reports were provided as evidence on transparency, but with no specific information on transparency of the grading. The issue of monitoring non-examination assessment in grading student achievement was discussed with Academic staff. Overall, the Panel notes that there is significant evidence for transparent mechanisms regarding grading student achievement in examination assessment, including internal and external moderation, but less evidence for non-examination assessment. The Panel recommends that College should improve the transparent mechanisms for grading non-examination work.

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- Regarding provisions for academic misconduct and appeals by students, much evidence is provided. A Student Misconduct Committee in CIT investigates incidents. An example of an 'Ethics Project' when the student has committed plagiarism was provided. The SER also describes the appeal process, citing a blank Request for Reviewing Examination Result Form. Some statistics on student appeal for 2018–2019 were included. The Panel acknowledges that there is significant evidence of addressing academic misconduct and the provisions for this.

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Standard 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.

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Indicator 2.1: Admitted Students

There are clear admission requirements, which are appropriate for the level and type of the programme, ensuring equal opportunities for both genders, and the profile of admitted students matches the programme aims and available resources.

Judgment: *Addressed*

- The 'Regulations of Study and Examinations at the University of Bahrain' includes admission information. The CS programme has a clear admission policy; however, the Panel notes that there is no obvious information about the admission on the college's page at the university's website. During the virtual visit, the Panel learned that clear admission requirements are stated in the CIT booklet, which is available online, but making it difficult to find. The Panel suggests that the CIT admission policy could be made easier to find on the UoB website. As per the statistics provided in the SER, there is a preponderance of male students admitted during 2016–2018 (Table 2.1-1), which is a common issue for CS programmes, and the Panel found no evidence of unfairness. The Panel is of the view that the admission policy is applied consistently.

- The SER includes general admission criteria and states that accepted students should be from the science or technical track at their high school for the CS programme. This is a very general criterion. There is mention of the applicant's high school GPA with a minimum 70% grade, entrance examination marks, and an interview, in overview. There is no obvious admission information on the CS Department website. There is a CIT booklet, that includes admission information for the CS programme. Before the virtual visit, additional admission information was provided in a 'University Required Appendices' document, but at UoB rather than CS Department level. The Panel suggests that the CS Department should provide its admission policy in a more easily accessible manner, especially online.

- Remedial support measures for inadequately prepared students are in place. Table 2.1-2 in the SER provides numbers of students admitted to orientation in the CS department at different levels, including 'orientation/foundation'. The proportion for the latter is

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decreasing from a half in the academic year 2016–2017 to around a quarter in the academic year 2018–2019. The issue was discussed with senior management during interviews, although with no specific conclusion. The Panel suggests that the CS Department investigates the reasons for changes in orientation/foundation student numbers and takes action if appropriate.

- Progression and internal/external credit transfer are described in the SER. Recognition of Prior Learning (RPL) is not mentioned. The Panel confirmed during interviews that RPL is not covered for the CE programme. The Panel is of the view that there are no significant issues.

- Evidence of regular revision of the CS admission policy with consultation of relevant stakeholders was provided, covering admission benchmarking, approval of the recommendations of the standing committee for admissions, and an admissions committee decision. The Panel is satisfied that these demonstrate that a mechanism is in place to revise the admission policy regularly, with evidence provided over several years.

Indicator 2.2: Academic Staff

There are clear procedures for the recruitment, induction, appraisal, promotion, and professional development of academic staff, which ensure that staff members are fit-for-purpose and that help in staff retention.

Judgment: *Partially Addressed*

- With regard to recruitment, the Panel was provided with various evidence, including: a formal document that covers Recruitment and Appointment, various CS Department Meeting minutes, though no mention of recruitment in the most recent 2019 minutes and a Recruitment Planning Report for the academic year 2018–2019. With respect to induction, there is a short document on an orientation workshop for new academic staff and brief information for part-time faculty. The appraisal process is described in the SER, referencing a UoB Faculty Appraisal Form. Completed Appraisal forms were also provided. Based on examining all these evidences, the Panel is satisfied that appropriate procedures are in place. There is a substantial Regulations and Appendices of Academic Promotion document. The SER clarifies that the CS Department follows these and provide a description of the process. Suitable evidence of implementation was provided. Consistency and transparency are not mentioned anywhere in the SER for Indicator 2. Additional evidence was provided before the visit including blank forms and a brief overview of consistency and transparency in academic recruitment, induction, appraisal, and promotion. While there are forms and described processes, the Panel is not convinced that there is enough evidence of consistency and transparency in their implementation. The issue was discussed in interviews with senior management and while no specific

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concerns were raised, specific procedures covering these aspects were not evident either. Thus, the Panel recommends that UoB should better demonstrate and document its consistency and transparency in academic recruitment, appraisal, and promotion.

- UoB has a clear policy for conducting research titled 'Scientific Research Framework'. In addition, the Panel was provided with a document about the UoB Research Charter, the UoB Research Plan and recent CIT Strategic Plan. The Deanship of Graduate Studies and Scientific Research provides key information about research, which are available on the UoB web page. The SER explains that the Scientific Research Council and University Council ensure the quality of scientific research conducted by faculty members and also the alignment with the research plan of CIT and UoB. The issue was discussed in interviews with senior management. The Panel is of the view that the applied policies and procedures are appropriate and aligned with the UoB's research plan and the CIT strategic plan.

- As per the SER, one to five courses for teaching are assigned to each faculty member, with an average of around three courses each semester. Five courses in a semester is high by international standards for a research-oriented university. There is no detailed information on the special needs of women; however, evidence was provided of reduced laboratory load for a laboratory assistant due to pregnancy. The issue was discussed with senior management during interviews. The Panel is of the view that the teaching load in the CS Department is on the high side. The Panel advises the College to reduce the teaching load, as this would help to improve time available for research and community engagement activities.

- The SER states that there are 21 full-time faculty members in the CS Department for the academic year 2018–2019. The faculty to student ratio is not explicitly provided, but 497 students were admitted during 2016–2019, according to Table 2.1-1. Thus, the number of faculty should be sufficient for a Bachelor's programme. Brief faculty CVs demonstrate appropriate qualifications and experience in general. There are 20 assistant professors, three associate professors, and one full professor in the CS Department. While more senior personnel would be beneficial for research directly and the CS programme indirectly, this is a reasonable balance.

- Professional development is described in the SER and evidence on conducting a range of workshops was provided to the Panel. However, the Panel was not provided with sufficient evidence on monitoring and evaluation. Professional development provision was discussed with senior management and faculty members. Although no specific issues were raised in practice, the Panel recommends that the monitoring and evaluation of professional development should be more formalized.

- Staff retention is described in the SER and said to be very high; this was confirmed in interviews with faculty members and senior management. It is stated in the SER that slight

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salary increases of up to two steps can be provided to retain highly qualified faculty. Academic staff statistics during 2015 to 2020 was made available before the visit. Although staff leaving and joining dates are not included, it is evident from the reasonably stable numbers that staff turnover is unlikely to be a major issue, although faculty numbers were 29 in 2015–2016, dropping to 24 in 2017–2018, and rising again to 27 in 2020–2021. The Panel notes that there is a significant skew to male staff, with only 4 of the 27 staff being female. The Panel suggests that the gender skew in the CS Department should be investigated and measures to address this considered. Research support funding is also mentioned in the SER, which could help in encouraging retention of research-active staff. Incentives for remaining at UoB were discussed with faculty during interviews. The low staff turnover is an indication that incentives are sufficient at UoB in practice. Overall, the Panel is of the view that there are no significant staff retention issues in the CS Department but suggests that monitoring of staff turnover could be improved, for example with exit interviews and analysis.

Indicator 2.3: Physical and Material Resources

Physical and material resources are adequate in number, space, style and equipment; these include classrooms, teaching halls, laboratories and other study spaces; Information Technology facilities, library and learning resources.

Judgment: *Addressed*

- As per the provided evidence, there is information on laboratories and classroom facilities in the CS Department, dated 30 April 2018. The information provided is now 2½ years old. Facilities were viewed on a video tour. Before the visit, CS Department laboratory/classroom facilities and a software list were provided, which are undated. Students did not raise specific concerns about classroom and laboratory facilities during the interviews. However, there was some concerns about the consistency of laboratory availability outside formal teaching hours, varying depending on the available staff. The Panel suggests that the availability of laboratories for use outside formal teaching sessions should be more consistent and better communicated.

- As per the SER and the provided evidence, the CS department has adequate IT facilities that cater for students' needs. The Panel noted from the provided evidence that the CS computer laboratories run the Windows 10 operating system, released in 2015, this was also noticed in the video tour. The software installed on PCs is not detailed, but this is important for a programme like CS. The SER states that free Wi-Fi is available for all staff and students from the IT Centre via a username/password and that each student is provided with an email account. Students and faculty did not raise any issues with this during interviews. Overall, the Panel is of the view that the IT equipment in CS laboratories is adequate.

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- UoB has a central library and a separate 'Science & IT Library' as shown in the UoB website, which is devoted to serve the College of Science and CIT. A report dated May 2018 provides information on Information Provision issued by the Library & Information Services to the CIT, including information on study places. A previous survey from 2014 is mentioned and book loans during 2015–2017 are covered. Access to the online ACM Digital Library IEEE Xplore Digital Library is mentioned among many other resources. A spreadsheet provides some brief information about the library, with numbers of printed/electronic books, databases, etc., and web locations of online resources, oriented towards CIT. The Panel is of the view that library facilities are appropriate with respect to study spaces and accessibility at UoB, as noted from the video tour.

- As described in the SER, the computing services at the CIT are managed, maintained, and controlled by the IT Centre staff and the department technicians. The technicians at the Department are handling minor technical problems, while major problems are handled by the IT Center. Maintenance of equipment on warranty is done by the vendors. Although it is stated in the SER and related UoB policy that PCs replacement and upgrades 'may' be done after 3-5 years, the Panel found that the laboratory report includes equipment older than this (2011). The Panel also noted that some PCs dating back to 2007. Hence, the Panel recommends that the College should implement the university's policy of IT equipment replacement in a systematic organized manner and ensure using the latest version of operating system in all CS laboratories. Concerning measuring the adequacy of the facilities, the Panel was provided with the 2019 Senior Exit Survey results concerning facilities, in the form of percentage scores for 13 questions. The Panel noted an analysis of results, with quantitative results and reasonably high scores in general. During interview with administrative staff, examples were provided. However, how formal the mechanism for maintenance is as a direct result of surveys was less clear. The Panel suggests that implementation of improvements from surveys should be better recorded.

- A discussion on health and safety matters is provided in the SER. Supporting evidence includes an Emergency Handbook and laboratory safety information for students. From the information provided, UoB considers health and safety in an appropriate manner. The virtual video tour of laboratories indicated the provision of safety and emergency notices, as did additional video evidence, including photographic evidence of signs. The issue was discussed with administrative staff during interviews and the Panel is satisfied that there is appropriate health and safety provision at UoB.

Indicator 2.4: Management Information Systems

There are functioning management information and tracking systems that support the decision-making processes and evaluate the utilisation of laboratories, e-learning and e-resources, along with policies and procedures that ensure security of learners' records and accuracy of results.

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Judgment: *Addressed*

- UoB has a centralised Student Information System (SIS). This is accessible online via a password-protected website. Examples of SIS-supported decision making are described in the SER. A demonstration of the SIS by the CS Department was provided to the Panel remotely during the site visit. There were occasional delays in operation, but in general the SIS is generally fit for purpose and impressive in its facilities. The use of the SIS for decision making was discussed satisfactorily with senior management, demonstrating its use. Improvements in the SIS were discussed with administrative staff. Additional facilities could usefully be added, such as enabling better cohort analysis and monitoring of retention/graduation rates. Overall, the Panel appreciates that the SIS is a sophisticated decision-making aid at UoB but suggests that additional facilities such as improved cohort analysis would be worthwhile. See also comments under Indicator 3.6.

- The SER states that laboratory reports are generated on a weekly basis, such reports are used for decision-making. Before the visit, three completed, signed and dated, sample reports were provided. Tracking reports on the utilization of laboratories, e-learning facilities, etc., were discussed with senior management, providing addition evidence of reporting for those in management positions, such as the CIT Dean and Head of the CE Department. Overall, the Panel is of the view that reporting is in place and appropriate.

- Specific policies and procedures to ensure the security of learners' records and accuracy of results are not citied in the SER. However, the UoB Information Technology Center Cyber Policies & Procedures document and other associated documents, including procedures regarding requests for revising examination results, were provided to the Panel. The Panel examined these evidences and found that IT security is covered, but there is no explicit mention of accuracy, although it can be argued that security leads to accuracy. Security and accuracy of learners' records was discussed during interviews. An example of an inaccurate examination result being corrected was discussed during interviews with faculty, so there are mechanisms in place to help ensure accuracy in practice. There were no issues raised by students during interviews. However, the Panel suggests that UoB should develop a formal procedure to help ensure accuracy of learner' records more explicitly.

- As per the SER, the Directorate of Registration prepares and verifies a student's transcript on graduation, with approval and signature from the CIT Dean and the Dean of Admission and Registration. The Directorate of Admission and Graduate Affairs receives a list of approved graduates and prepares the certificates. The certificates are printed, signed, and stamped by the CIT Dean and the UoB President. A one-page sample graduate certificate was provided. During interviews with administrative staff, the Panel learned that degree certificates themselves are not available in English, but that instead associated transcripts and confirmatory letters are available in English and provide an appropriate

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record of student achievements. The SIS is used during the verification process by advisors and the Head of Department. The SER provides a detailed description of the certification process, but it is unclear which policy/procedure is being followed. A short document on the procedures for graduation certification issuance was provided before the site visit. The Panel assesses that these are standard procedures for preparing certificate and transcripts. The timeliness is not covered in the SER, but during interviews, the Panel was reassured that this is not an issue in practice. However, the Panel suggests that timeliness should be more explicitly specified in the certificate/transcript preparation procedures.

Indicator 2.5: Student Support

There is appropriate student support available in terms of guidance, and care for students including students with special needs, newly admitted and transferred students, and students at risk of academic failure.

Judgment: *Partially Addressed*

- There are descriptions of facilities for student support, including references to relevant supporting material: library report; laboratories; e-learning (see Indicator 2.4, e-Learning Centre); e-resources (via the UoB Blackboard website, Microsoft Teams, library and SIS); induction; the Psychological Guidance Division; Careers Counselling Office. The most recent Careers Day booklet was requested, but a 2015 booklet was provided. During interviews, CS students were not aware of all the support facilities available to them. The Panel recommends that UoB should publish the available student support more effectively to students.

- UoB has a Career Counselling Office, providing help with careers, writing CVs, etc. There is a substantial 'Careers Day 17' booklet for March 2017, for an event organized by this office. It is unclear if subsequence similar events have occurred annually, although it is described as an annual event. The Senior Exit Survey indicated a 60% level of satisfaction in benefitting from the 'career counselling center'.

- There is an Induction Day at the start of the academic year for new students, organized by the Deanship of Student Affairs, through the Department of Advice and Guidance, with an associated brief Induction Day overview. Induction for new students took place over two days in September 2018. Before the visit, a substantial CIT PowerPoint presentation was provided. A short Induction Day timetable is available and most recently in 2020 the induction day has been understandably virtual on Microsoft Teams. During interviews, students confirmed that they received induction by UoB/CIT at the start of their studies. Overall, the Panel assesses induction for most students to be appropriate. However, transferred students are not specifically mentioned in any of the documentation provided.

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The Panel recommends that UoB should introduce additional induction information to transferred students, relevant to their needs.

- Two screenshots of sample SIS pages relating to academic advising were available, together with the UoB Academic Advising Regulations, dated 2013. The Advising sheet of the Senior Exit Survey includes quantitative results for seven questions, ranging from 52% to 80%. Lowest was attempting to visit their advisor at least once per semester. Academic advising was discussed with faculty and students during interviews. Students appreciated the availability and helpfulness of advisers in general. While advising in CIT is implemented, and a Senior Exit Survey is undertaken, its explicit support of graduate attributes and learning outcomes, and improvements in this, are less tangible. Therefore, the Panel suggests that minimum academic advising contact could be increased.

- The SER does not explicitly mention equal opportunities for male and female students. It is stated that the student's advisor coordinates with the Disability Division of the Students' Services and Development Department to ensure full support for students with special needs. There is a mention of special transportation arrangements. A long and thus not very accessible web link provides access to brief information on Disabled Student Services on the university's website. Searching for 'special needs' on the UoB website gives access to an additional web page resource on 'Career Counselling for Special Needs Students'. Overall, the Panel is of the view that facilities are adequate.

- As per the SER, at-risk students are identified and notifications to visit their advisors are sent via the SIS. An SIS screenshot for students with an 'Academic Status' of 'Under Probation' is provided. Timeliness of intervention is not explicitly covered in the SER, but the facilities of the SIS and interviews provided reassurance on this in practice. Additional evidence was provided, including a set of CIT PowerPoint slides dated 2017 on 'A procedure to Support Students at Risk', a 2017–2118 action plan and relevant spreadsheets of students; the issue was discussed satisfactorily during faculty interviews. The identification of at-risk students in a timely manner was discussed with staff in one of the main interviews. At-risk students are identified by academic advisors rather than administrative staff. Responsibility is split between academic advisors and UoB student support services, depending on whether the issue is purely academic or if it is a non-academic. While there is no evidence of significant issues in practice, with the SIS providing good monitoring facilities, recent formal monitoring of timeliness is less evident. Although no issues were observed, the Panel recommends that UoB/CIT should implement a more formal procedure regarding ensuring the timeliness of response to at-risk students. A Psychological Division (aka Psychological Counselling Division on the UoB website) is mentioned, providing additional assistance for at-risk students. There is a web link for online information about the Division. The Panel assesses this provision as appropriate.

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- It is stated in the SER, with respect to improvement in student support in the CS Department, that signboards are posted around the Department to inform students about decisions and announcements. Further evidence on student support assessment was provided to the Panel; in particular minutes of a 2018 PSAC meeting with a request for more workshops, seminars, and a hackathon, but no evidence of any specific action being taken. Improvements in student support were also discussed with administrative staff. An improvement in IT services was given as one example but further examples were lacking. Although there is evidence of some improvements in student support, effective formal mechanisms for the implementation of improvements are less apparent. During interviews with staff, an annual survey of students covering each area of student support was discussed. However, there is no process to evaluate the success of improvements. An example of an improvement, although not necessarily as a result of the annual survey, was provided in the planned move from personal to online registration of students for bus services. Overall, the Panel recommends that the College should better formalize the mechanism for evaluating the effectiveness of improvements made to student support by keeping a records/register of improvements made across all student support services provided at UoB.

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Indicator 3.1: Efficiency of the Assessment

The assessment is effective and aligned with learning outcomes, to ensure attainment of the graduate attributes and academic standards of the programme.

Judgment: *Addressed*

- UoB has well-established assessment policies available in the 'Regulations of Study and Examinations' document that is published in 2013. The students' performance evaluation policy is detailed in chapter three, section one. The SER indicates that the assessment in the CS programme includes a variety of assessment methods, which can be summative and formative methods. Summative assessment includes examinations, quizzes, projects, practical examinations, etc. Samples of graded student quizzes and examinations were provided to the Panel. The Panel noted during the interview with faculty members that formative assessment is used in several courses. Hence, the Panel is of the view that the complexity of the assessment is appropriate and depends on the level of the course in the CS curriculum.

- The CS Department has adopted a tool called Course Assessment Report (CAR) in which the CILOs of a course are mapped to different summative tools, such as examination questions, assignments, laboratory exercises, etc. Each CILO is mapped to a set of tools. Based on the scrutiny of the CAR, the Panel notes that each of the mapped tools contributes with equal weight to the achievement of the CILO regardless of the degree of relevance of the tool to the CILO being measured. The SER does not discuss the appropriateness of adopting equal weights for every contributing tool to the measurement of a CILO. Hence, the Panel suggests that the CS Department revises the CAR system to incorporate proportional weights of the tools contributing to the measurement of the CILOs based on relevance. The CS Department has a moderation system of assessment and examinations in place that consists of three types, namely the internal pre-moderation, internal post-moderation and external moderation. These moderations, as confirmed

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during interview with faculty members, provide feedback on the appropriateness of measuring tools of CILOs.

- The CS PILOs are aligned to the PEOs and each of the PILOs is aligned to a set of CILOs in the individual courses in the CS curriculum. Such CILOs-PILOs mapping is documented in the course syllabi. In addition, the PILOs are assessed using Performance Indicators (PIs) in a two-year assessment cycle that is monitored by the University's Quality Assurance & Accreditation Center (QAAC). Each PILO is deconstructed into more PIs. These PIs classify the achievements of the students into four categories: Exemplary, Satisfactory, Developing, and Unsatisfactory. The PIs are measured by faculty by embedding questions in the examinations. Therefore, the Panel is satisfied with the mechanisms followed to ensure that the graduates' achievements meet the PILOs.

- At the course level, individual faculty members analyze the collected data from the assessment tools and document this information in a course portfolio. During interviews, the Panel learned that the QAC at CIT reviews the course portfolios to ensure the consistency, level and quality of assessment. In addition, the Panel found that the PIAC and PSAC provide feedback on improving CS programme in their annual meetings. As provided during interviews, the collected feedback and the outcome of assessment are acted upon to improve the CS programme. The Panel is of the view that QAC reviews and stakeholders' feedback are suitable mechanisms for monitoring the implementation and improvement of the assessment process.

Indicator 3.2: Academic Integrity

Academic integrity is ensured through the consistent implementation of relevant policies and procedures that deter plagiarism and other forms of academic misconduct (e.g. cheating, forging of results, and commissioning others to do the work).

Judgment: *Partially Addressed*

- The CS Department follows the university's regulations related to the academic integrity as described in Regulations of Study and Examinations, Regulation of Professional Conduct Violations, and Anti-Plagiarism Policy. A College Student Misconduct Committee follows up with students' academic misconducts, cheating, and plagiarism cases. Moreover, the Bylaw of Faculty Members describes the academic disciplinary system and disciplinary actions of the University and are published in the Academic and Administrative Bylaws. During interviews with students and faculty members, it was clear that the students and faculty members are aware of the academic misconduct regulations and process. The Panel is of the view that the policies and bylaws are well-disseminated and known by the academic staff and students.

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- The antiplagiarism policy is published on the University website. During interviews, the Panel learned that the faculty members of CS Department request students to submit their work through the available plagiarism detection tools such as Turnitin and Blackboard (SafeAssign) to detect similarity in written submitted assignments and reports. The Panel notes from interviews that the antiplagiarism policy is consistently applied by faculty members. Samples of two similarity reports are included as evidence. As per the SER and from different interviews, the Panel learned that a similarity of 25% is accepted by the College and a percentage beyond 25% will result in zero mark for a submitted report, or assignment. However, no justification was provided on the selection of 25% threshold. Therefore, the Panel recommends that the College should devise an appropriate mechanism to ensure that a student's complete work is his/her own and reconsider the acceptable similarity percentage.

- As per the SER and as elaborated during interviews, the academic misconduct cases are forwarded to the Student Misconduct Committee, which issues the appropriate recommendations of actions to be taken regarding such cases. The CS Department have detected misconduct cases, which were investigated and recorded by the misconduct committee. A cheating case in quiz resulted in the committee's decision of 'Fail in the quiz'. The Panel notes during interviews with the senior management and faculty members that the CIT has a procedure in place to investigate incidents of academic misconduct; however, no evidence was provided to show that academic misconduct cases are recorded. Hence, the Panel recommends that CIT should keep a record of such cases and the actions taken.

Indicator 3.3: Internal and External Moderation of Assessment

There are mechanisms in place to measure the effectiveness of the programme's internal and external moderation systems for setting assessment instruments and grading students' achievements.

Judgment: *Partially Addressed*

- The SER claims that it has a moderation procedure in place that includes three levels of moderations, namely Internal Pre-Moderation, Internal Post-Moderation and External Moderation. The Department has created a course rolling plan to manage the moderation levels and frequency of moderation for the courses. The internal moderator reviews the assessment and key answers to ensure the appropriateness of assessment tasks before it is taken by the students. Once the examination is conducted, a post-moderation committee reviews samples of marked students' answers. The Panel learned, from interviews with faculty members and senior management, that course rolling plan specifies the courses that will be moderated, related assessment tasks chosen for moderation and the internal moderator appointed for each course. During the interviews, the Panel noted that an expert faculty is selected as an internal moderator for the courses with which he/she has

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experience in teaching the course. Internal moderators are appointed by a Moderation Committee and approved by the Head of the Department. In all, the Panel is satisfied that formal and appropriate procedures for the internal moderation of assessment and the selection of internal moderators are appropriate.

- The Department's Moderation Committee is tasked to study and analyse the moderation forms submitted by the internal moderators. The fairness of grading is also investigated by the committee. Based on this analysis, the moderation committee creates an improvement plan called Moderation Audit Plan. The submitted Moderation Audit Plans for 2018-2019 and 2019-2020 present some improvement recommendations, such as a recommendation to improve the mapping between CILOs and questions of the examinations, and so the Panel is satisfied that the internal moderation ensures consistent assessment and fairness of grading, and contributes to the improvement of assessment.

- The Moderation Committee at the Department analyses the semester's moderation activities and creates an improvement plan accordingly. Samples of moderation forms were provided. However, the SER did not discuss any mechanism to evaluate the effectiveness of the CS programme's internal moderation (See the recommendation under bullet 6 of this Indicator).

- UoB has a procedure in place for external moderation, which details the process of conducting the external moderation and the criteria for the selection of external moderators. The Panel is satisfied that the moderation policy and procedure is appropriate. The Panel learned during interviews with external moderators that they review the received documents such as course syllabi, model answers, examination questions and samples of marked answers, then, fills the External Moderation Forms to indicate the clarity of assessment, appropriateness of assessment level, fairness of marking, suitability of feedback, etc. Based on scrutiny of the provided samples of the External Moderation Forms, they contain no comments to most questions of the form except a check mark on the 'Yes' answer indicating a positive agreement to the questions. During the interview with the external moderators, the Panel noted that both external moderators have previous affiliation with the CIT. Therefore, the Panel recommends that the College should evaluate the selection of external moderators to better ensure the impartiality of external moderation, and based on this, improve its external moderation procedure.

- The programme was improved several times in the past as a result of programme review visits, namely, after a national review by BQA in 2013; then, in 2015 a programme revision that placed the CS programme on the NQF took place. However, the SER was silent on the contribution of external moderation to the improvement of courses. The Panel was provided with the course rolling plan, which includes a schedule for external moderation for courses; however, no plan was provided on the justification that external moderation

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is ceased due to COVID-19. Therefore, the Panel recommends that the CS Department should develop a mechanism to evaluate the contribution of external moderation to the improvement of courses and to ensure continuous implementation of external moderation.

- To improve the moderation practice, the CIT plans to arrange for implementing official external moderation based on a memorandum of understanding between the UoB and other universities within the region. No study was found in the submitted evidence, to demonstrate the effectiveness of the external moderation. Based on this and what has been mentioned in bullet 3 of this indicator, the Panel recommends that the College should develop and implement a clear mechanism to evaluate the effectiveness of internal and external moderation.

Indicator 3.4: Work-based Learning

Where assessed work-based learning takes place, there is a policy and procedures to manage the process and its assessment, to assure that the learning experience is appropriate in terms of content and level for meeting the intended learning outcomes.

Judgment: *Addressed*

- The CS programme has a one-credit mandatory internship course 'Industrial Training – ITCS 481'. The ITCS 481 is taken by students during the Summer term between the third and fourth year after finishing 85 credits. The procedure for students' internship work is summarized in the Industrial Training Guidelines. The Panel learned, during interviews with external stakeholders and faculty members, that students are placed in a company or governmental entity with the help of the Professional Training Division at UoB to work full time for two months. To ensure equivalent work experience amongst internship students, the Professional Training Division confirms the suitability of the hosting entity before placing the students; moreover, the CS Department assigns an academic supervisor to monitor the work of students. Depending on the training sites, students will be assigned different types of tasks; however, the Panel is of the view that the training procedure stated in the Industrial Training Guidelines is appropriate.

- The roles and responsibilities of the individuals involved in the industrial training were clearly stated in the Industrial Training Guidelines. The Panel noted from the interviews with the employers and students that the training guidelines are well-disseminated to them.

- The Industrial Training (ITCS481) course syllabus shows that students are evaluated based on two main components: their work at the internship provider site by the site supervisor and the submitted report at the end of the internship courses. The ITCS481

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syllabus clearly maps the assessment of these components to the PILOs. The Panel is of the view that the industrial training contributes to the achievement of PILOs.

- The Internship students are evaluated through multiple assessment tools, namely academic supervisor visit with a weight of 15%, on-site supervisor assessment with a weight of 40%, and the submitted report with a weight of 45%. The Panel is satisfied with the breakdown of the weights of the assessment tools. During the interview with the employers, the Panel noted that internship students are assessed based on a set of criteria that evaluates students' abilities of analysis, design, implementation, teamwork, professional practice, ethics, communication and punctuality. These criteria are prepared by UoB; therefore, the Panel is of the view that the internship assessment is consistently applied and appropriate in terms of content and level to all students. During the interview with the employers, the Panel noted that the type of tasks given to students in their internship are limited in complexity and size due to the short period of the training, which is two months. Therefore, the Panel suggests that the College of IT studies having an option of longer internship period.

- The CS Department claims that most students earn A or A- grades in the Industrial Training course. Based on the Student Exist Survey, 73.3% of the students are satisfied with the training. However, the SER does not discuss any mechanism to ensure the effectiveness of the training to improve the work placements or whether the students achieve the programme objects. Hence, the Panel recommends that the CIT develops a mechanism to evaluate the effectiveness of training to improve the work placement.

Indicator 3.5: Capstone Project or Thesis/Dissertation Component

Where there is a capstone project or thesis/dissertation component, there are clear policies and procedures for supervision and evaluation which state the responsibilities and duties of both the supervisor and students, and there is a mechanism to monitor the related implementations and improvements.

Judgment: *Partially Addressed*

- The Senior Project course (ITCS 499) is a three-credit course registered by students after completing 85 credits. The Senior Project course is a one-semester course and is placed in the last semester of the CS study plan. The CILOs of ITCS499 are clearly mapped to the PILOs as indicated by the course syllabus and demonstrates how the project contributes to the achievement of the PILOs.

- The responsibilities of the senior project committee, supervisors and students are summarized in section 3 of a booklet titled Guidelines for the Senior Project. The booklet is disseminated to all registered students in the course and faculty members during a

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senior project seminar at the beginning of a semester. This was confirmed during interviews with faculty and students. The Panel is satisfied that the Guideline for the Senior Project booklet contains sufficient information regarding the senior projects, which is well-disseminated to all stakeholders.

- During interviews with faculty members, the Panel confirmed that supervisors revise and approve all submitted documents by the students and are available for guiding students in implementing the project specifications. Supervisors are required to submit a progress report in the middle of the semester indicating his/her assessment of the students. It was noted during the interview with the faculty members that one progress report is submitted by a supervisor in the middle of the semester. However, there is no formal mechanism in place to monitor the students' progress in the senior projects. Hence, the Panel recommends that the Institution should devise a mechanism to ensure a regular, and more frequent, monitoring and review of the progress of the students in the senior projects course.

- Several parties conduct the assessment of the different components of the senior projects, the supervisor and the internal and external examiners; however, the supervisor contributes with the highest weight of the total assessment score. The Panel examined the distribution of weights and is satisfied with the weight distribution of the different components of the senior project assessment as clearly depicted in the course syllabus. The SER claims that the CS Department has an implemented assessment mechanism to evaluate the students work from the academic viewpoint and industrial viewpoint; however, no written documentation is provided. Hence, the Panel suggests that clear documentation of such assessment mechanism be published and disseminated to stakeholders.

- An assessment procedure is in place for senior projects. A summary of assessment of four semesters was provided, which includes the average achievement of each of the PILOs from the senior project course. However, the SER is silent on how senior project results are used to improve the monitoring process. This was also not clear during interviews. Hence, the Panel recommends that the CS Department should develop a mechanism to ensure senior projects results used to improve the monitoring process.

Indicator 3.6: Achievements of the Graduates

The achievements of the graduates are consonant with those achieved on equivalent programmes as expressed in their assessed work, rates of progression and first destinations.

Judgment: *Addressed*

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- The SER claims that the direct assessment of the PILOs from academic year 2017-2018 to 2018-2019 is an indication that the students have the necessary attributes to enable them to achieve the PEOs upon graduation. The assessment of PILOs is based on the measurement of CILOs of the different courses, while the CILOs are measured based on the students' marks in the courses. Having reviewed student work and based on interviews with the senior management and faculty members, the Panel is of the view that the students' work in the senior design projects and in the industrial training reflect the ability of the students to create and innovate.

- The number of admitted students has increased from 232 students in the academic year 2016-2017 to 255 students in the academic year 2018-2019 and the number of graduated students is following a similar trend. The provided statistics, such as admitted, enrolled, dismissed, transferred, and graduated, were taken at three snapshots. The Panel is of the view that these statistics are consonant with those of equivalent programmes in the region. However, there was no tracking of the admitted batches of students in terms of the graduation percentage, retention, transferred, length of study and dismissed of every batch of students. Hence, the Panel recommends that UoB should enhance the SIS to perform cohort analysis conveniently.

- The CIT tracks the students' progression and graduate destination through surveys that are conducted every three to four years. The result of a Destination of IT Graduates survey that was conducted by QAAC in 2019 on a sample of 40 CS alumni shows that 77% of them are employed, amongst which 64.1% are employed in areas related to CS. The Panel notes that the sample of 40 graduates is relatively small to make any reliable conclusions; hence, the Panel suggests that the CIT should consider running its surveys on a bigger and hence more representative sample of graduates. Based on the interviews with the students and alumni, the Panel noted that they are satisfied with their learning experience at UoB, which is an indication that the academic standards of the programme are met.

- The employer surveys show that 73.3% of the CS employers are satisfied with CS PEOs, which in turn indicates an employer satisfaction of the graduates' profile. These surveys also show that PILOs of the CS programme are achieved according to the responses of the employers. On the other hand, a senior/graduate survey shows that 79.9% of the graduates are satisfied with the CS curriculum. During the interview with the employers, the Panel noted the satisfaction of employers with the CS graduates. Satisfaction of alumni was also apparent during interviews.

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Standard 4

Effectiveness of Quality Management and Assurance Academic Standards of Students and Graduates

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

Indicator 4.1: Quality Assurance Management

There is a clear quality assurance management system, in relation to the programme that ensures the institution's policies, procedures and regulations are applied effectively and consistently.

Judgment: *Addressed*

- Quality assurance processes for the CIT are defined in the UoB Quality Manual, Quality Assurance and Enhancement Policy, and Program Quality Assurance and Enhancement Policy. As indicated in the provided evidence, the policies are revised every four years; although, the Panel notes that they were last reviewed in 2015. The policies are published on the UoB QAAC web pages. Quality processes are implemented by the Quality Assurance and Accreditation Executive Committee (QAAEC) at an institution level. At the College level, quality processes are implemented by the College Accreditation Committee (CAC) and defined in the Quality Manual. The Panel was able to confirm that the processes are appropriate for the CS programme, regularly revised and communicated to stakeholders.

- Quality assurance in CIT is managed by the CAC whose members are the QAC Chairs of the College Departments and the Director for the Quality Assurance Office in the College with the remit to monitor quality assurance activities within CIT, including compliance, assessment, and accreditation activities. The Director of the College Quality Assurance Office is also a member in the QAAEC. On the Department level, quality assurance is managed by the QAC with input from PIAC and PSAC. The functioning of PIAC and PSAC are considered further in Indicators and 4.4 and 4.5. The Panel confirmed during interviews that there is a clear quality assurance process for the programme which is well understood and consistently implemented.

- Terms of reference, membership, and meeting frequency of CIT and CS committee meetings are defined at the institutional level. The College Quality Assurance Office and QAC monitors the consistent implementation of policies and procedures and the CS operational plan which is a plan of annual quality assurance processes to be undertaken by the Department. The QAC combines results of surveys and programme data into an annual programme Self Evaluation Report (SER) which incorporates analysis, discussion and actions based on feedback. It was confirmed during interviews that the quality

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assurance procedures are implemented with an annual audit of the course portfolio and analysis of stakeholder surveys. The Panel is satisfied that there are mechanisms in place to ensure consistent implementation of quality assurance procedures within CIT and DCS.

- The CIT Quality Office conducts capacity building and awareness training events for academic and support staff. The Panel confirmed during interviews that staff have a good understanding of quality assurance processes and their role in ensuring the effectiveness of provision.

- As per the SER and the provided evidence, QAAC conducted an internal review of the CIT quality assurance management system, which focussed on three areas: college performance, evaluation of academic programmes, evaluation of the effectives of quality management. CIT met all the three areas with a recommendation to update market studies to identify annual initiatives to meet the objectives of the College. This recommendation has been completed. The Panel learned during interviews that this system has been introduced in 2018 and the Panel notes that CS programme was reviewed in the Academic Year 2018-2019 but there is not a periodic schedule of review for CS programme. This issue is considered further in Indicator 4.3.

Indicator 4.2: Programme Management and Leadership

The programme is managed in a way that demonstrates effective and responsible leadership and there are clear lines of accountability.

Judgment: *Addressed*

- The CS programme leadership includes the Dean of the College, Director of Quality Assurance Office, Chairperson of the Department, and the departmental committees. The Chair of the Department plus another senior member are representatives in the College Council, which is chaired by the Dean. The Department Council is chaired by the Department Chair and includes in its membership all CS faculty members. The Department of CS has seven committees responsible for aspects of the Department's operation for example quality assurance, curriculum and student affairs. There are good formal communication links and the Panel found that the UoB organisation structure is appropriate for the management of the programme. However, a formal organisation chart was not available and so the Panel advises CIT to develop a formal organisation chart.

- Existing reporting lines for the management of quality assurance at the institution, college and department levels are defined and clear as per the provided evidence. The Panel confirmed that generally ownership of responsibility and reporting lines are clear; however, there was some divergence, during interviews, about who has responsibility for

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committee decisions – the Department Council or QAC. The Panel noted the introduction of a Correspondence Management System which aims to ensure effective communication.

- There are clear terms of reference for the management posts and committees at UoB at an institution level, within the CIT and within the CS Department. These posts for the CIT are the Dean of College, Director of Quality Assurance Office and Chairperson of the CS Department. Committees include the College Council, Department Council, Quality Assurance Executive Committee, PIAC, PSAC and QAC.

- There is a clear description of the function of committees at each level within the institution to assure the academic standards of the programme. The roles and responsibilities of those involved in developing and delivering the programme are clearly identified. The Panel noted that the Department Council, whose membership includes all CS Department faculty members and Chaired by the CS Department Chair is responsible for approving all academic and committee decisions. From interviews, the Panel found that there is a good understanding amongst the faculty of their role to assure quality of the programme.

- There are seven department committees as well as programme committees. The department committees report to the Department Council each semester. The responsibilities of each committee as indicated previously, are clear and demonstrate appropriate division of responsibilities. The Panel found clear reporting lines that support communication and decision-making across the College. Therefore, the Panel is of the view that the current programme management within the Department is appropriate.

Indicator 4.3: Annual and Periodic Review of the Programme

There are arrangements for annual internal evaluation and periodic reviews of the programme that incorporate both internal and external feedback and mechanisms are in place to implement recommendations for improvement.

Judgment: *Partially Addressed*

- The CS Department presented evidence showing that there is a comprehensive self-evaluation process for annual evaluation of the CS programme. The evaluation has been conducted each academic year. The SER includes the profile of the programme, students, faculty, research, course statistics and feedback from a range of stakeholders. There is analysis and discussion related to each element of the report and an 'opportunities for improvement' section identifying recommendations to be taken forward. The Panel appreciates the reporting of course / programme statistics linked to PILO achievement, as provided in the annual self-evaluation report. Retention figures are not included in the report. Students dismissed or under probation is a significant proportion of each cohort

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(50% in 2018-2019). 40% of male students are under probation, and though probation / fail rate are noted in the annual SER, there is no action identified. The Panel noted that previous years actions are not reviewed in the annual SER. (See also under the next bullet).

- The CS Department provided evidence that the QAC has responsibility for monitoring the implementation plan as indicated in the operational plan. The Department also provided evidence claiming QAC monitoring the annual improvement plan and evaluating the success of implemented actions. Whilst this shows actions identified, it does not demonstrate monitoring nor evaluation of success of actions identified in the annual self-evaluation report following implementation. The Panel recommends that the CS Department should review the process for monitoring, review and evaluation of the effects of implementation of actions identified in the annual self-evaluation report.

- UoB specifies the requirement for periodic programme reviews in the University Quality Assurance and Enhancement Policy and a timetable of reviews across the College. In addition, the CS programme is subject to external reviews by ABET, NQF and BQA. The requirements for inclusion in the periodic review are specified. Evidence provided demonstrates a schedule for the first review of CIT programmes including CS but no regular planned internal review of CS. It was claimed during interviews that further internal review would take place if the CS Department requires it. The Panel therefore recommends that UoB should extend the recently introduced internal periodic review process to ensure that there is a regular internal periodic review of CIT and CS.

- Periodic review requirements for programmes at UoB are specified and include collecting feedback from internal and external stakeholders. The Panel noted that the review process has recently been introduced and so it is not possible to find evidence of an embedded regular review of CS. The Panel did, however, find that the periodic review report was thorough, identifying a number of commendations and a few recommendations including to update market studies to support the identification of annual objectives and to develop an annual department action plan. The review report did not show evidence of feedback from stakeholders and the Panel recommends that UoB should further develop the periodic review reporting to incorporate stakeholder feedback.

- The Internal Quality Review (IQR) policy includes a procedure for the implementation of periodic reviews. This includes the QAAC identifying a schedule of programmes for review; formation of a review panel; relevant departments supplying supporting materials; and following the review: the preparation of a review report; Department preparation of an improvement plan; and the Quality Assurance Office Director monitoring implementation of the improvement plan. The Panel found evidence of an improvement plan for CS which was implemented but did not find evidence of CS Department monitoring of the improvement plan from the internal review AY 2018-19.

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The Panel advises that the CIT formalises the monitoring approach for improvement plans defined in the Internal Quality Review Policy.

Indicator 4.4: Benchmarking and Surveys

Benchmarking studies and the structured comments collected from stakeholders' surveys are analysed and the outcomes are used to inform decisions on programmes and are made available to the stakeholders.

Judgment: *Partially addressed*

- UoB has a benchmarking policy which applies to all benchmarking activities and in accordance with Quality Assurance Manual. The CS Department conducted a benchmarking of the CS programme with ACM. Each ACM core topics was mapped to specific CS 2014 courses. The CS programme was benchmarked against four leading international universities, comparing the courses included in each with those in the CS programme in a short undated report. This ensures a basic subject-level comparability, but not a content-level comparability. The Panel recommends that the College should conduct a more comprehensive benchmarking exercise of the programme, covering different aspects and components of the academic and administrative activities and services it provides.

- The outcome of CS Department benchmarking against ACM / IEEE guidelines and international universities was a redesign of existing courses, the inclusion of new content, inclusion of more practical skills development earlier in the programme and addition of new courses as appropriate. The proposed changes have now been implemented in the programme.

- UoB has an operational plan, which is an annual calendar of quality audit events to be completed. The operational plan includes dates for annual collection and analysis of an alumni survey, an employer survey, a senior exit survey and a faculty survey to be conducted by departments. In addition, courses evaluation survey is conducted by QAAC with results published on SIS. A survey on students experience of services and infrastructure is also conducted, collected and analysed by the University. The Panel is satisfied that there are formal mechanisms for collecting stakeholder comments.

- The CS Department claims in the SER that the results of surveys are analysed to identify improvement plans. An analysis was provided in the SER. Further evidence was provided of responding to a PIAC survey contributing to the redesign of the CS programme. Thus, the Panel is satisfied that collected comments are feeding into decision making.

- The Panel found evidence of actions being identified, in survey analysis reports, and of actions being collected into an action plan. As per the SER, the QAC and Department

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Council monitor the implementation of the improvement plan; however, no evidence was provided on monitoring of actions nor evaluating the impact of changes implemented. For example, students identified assignment overload as an issue which resulted in an action on 'Instructors'; however, there was no evidence of a follow up to ensure implementation. The Panel recommends that the CS Department should implement formal processes, following survey analysis and action identification to monitor implementation and evaluate effectiveness of changes implemented and to communicate these results to stakeholders.

- The Panel noted, from interviews, that the analyses of surveys are made available to stakeholders through SIS. The Panel also noted that actions are communicated to stakeholders through the PIAC and the PSAC. However, interviews with other stakeholders showed that they are not informed with implemented changes based on their feedback (See the recommendation in the above bullet).

Indicator 4.5: Relevance to Labour market and Societal Needs

The programme has a functioning advisory board and there is continuous scoping of the labour market and the national and societal needs, where appropriate for the programme type, to ensure the relevancy and currency of the programme.

Judgment: *Addressed*

- There is a functioning programme advisory board, the PIAC, which has clear terms of reference and includes six employers and alumni. The Quality Manual indicates that PIACs meet twice per year; however, the Panel noted from interviews and evidence that the PIAC and PSAC meetings are conducted once per year. The Panel advises CIT to ensure that PIAC/ PSAC meets every year in line with Quality Manual guidance.

- The feedback from the PIAC is used to feed into the CS Department annual CS programme SER Improvement Plan. This includes, for example, suggestions to include new content in the programme that employers are demanding, addition of more practical skills in the programme, and introduction of more 'real-life' problem solving.

- As per the SER, the CS programme is regularly reviewed by PIAC to ensure that it meets, in the view of the PIAC members, labour market and national/societal needs. Views identified are included in the annual CS programme SER. In addition, the Department has conducted a market analysis, following recommendations of the periodic review of the programme, to help develop the programme and ensure it meets the needs of employers. Accordingly, the Panel is satisfied that there are mechanisms in place for ensuring that the programme meets the labour market, national and societal needs.

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- The SER refers to labour market gap analysis dated 2010, and two Secretariat General of the HEC studies 2012. These reports, whilst thorough were not targeted specifically at the IT sector and provided limited insight for further development of CS programmes. The CIT also presented evidence of a formal study to identify IT skills and CS skills needed in the market in 2018 following a recommendation of the internal quality review. This analysis was targeted specifically at the IT sector. The Panel recommends that the CIT College should regularly perform a targeted market analysis of the IT sector to provide insight into current and evolving requirements of the labour market and employer needs.

- As indicated previously in this report, the Panel is satisfied that there are proper mechanisms to collect feedback from various stakeholders to inform decision making. Also, there is evidence of actions being identified, in survey analysis reports, and of actions being collected into an action plan However, there was no evidence of formal monitoring of actions nor evaluating the impact of changes implemented (See recommendation under bullet 5 of 4.4).

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V. Conclusion

Taking into account the institution's own self-evaluation report, the evidence gathered from the interviews and documentation made available during the virtual site visit, the Panel draws the following conclusion in accordance with the DHR/BQA *Academic Programme Reviews (Cycle 2) Handbook, 2020*:

There is Confidence in the Bachelor of Science in Computer Science of College of Information Technology offered by the University of Bahrain.

In coming to its conclusion regarding the four Standards, the Panel notes, *with appreciation*, the following:

1. The mechanisms in place to ensure the appropriateness of CILOs

2. The SIS is a sophisticated decision-making aid at UoB

3. The reporting of course/programme statistics linked to PILO achievement, as provided in the annual self-evaluation report

In terms of improvement, the Panel recommends that the University of Bahrain should:

1. Develop and maintain a plan for the identification of risks to the CS programme, as well as an analysis of these risks and their mitigation

2. Check the CILOs and their mappings for the whole CS programme, to remove any problems with respect to measurability, grammar, mapping, etc.

3. Better formalize checking of the completeness of course portfolios to ensure their completeness and that the entire course syllabus is covered

4. Introduce a formal mechanism for regularly ensuring the currency of course textbooks and references

5. Introduce a formal mechanism for ensuring prompt feedback

6. Improve the transparent mechanisms for grading non-examination work

7. Better demonstrate and document its consistency and transparency in academic recruitment, appraisal, and promotion

8. Formalize the monitoring and evaluation of professional development

9. Implement the university's policy of IT equipment replacement in a systematic organized manner and ensure using the latest version of operating system in all CS laboratories

10. Publish the available student support more effectively to students

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11. Introduce additional induction information to transferred students, relevant to their needs

12. Implement a more formal procedure regarding ensuring the timeliness of response to at-risk students

13. Better formalize the mechanism for evaluating the effectiveness of improvements made to student support by keeping a records/register of improvements made across all student support services provided at UoB

14. Devise an appropriate mechanism to ensure that a student's complete work is his/her own and reconsider the acceptable similarity percentage

15. Keep a record of such cases and the actions taken

16. Evaluate the selection of external moderators to better ensure the impartiality of external moderation, and based on this, improve its external moderation procedure

17. Develop a mechanism to evaluate the contribution of external moderation to the improvement of courses and to ensure continuous implementation of external moderation

18. Develop and implement a clear mechanism to evaluate the effectiveness of internal and external moderation.

19. Develop a mechanism to evaluate the effectiveness of training to improve the work placement

20. Devise a mechanism to ensure a regular, and more frequent, monitoring and review of the progress of the students in the senior projects course

21. Develop a mechanism to ensure senior projects results used to improve the monitoring process

22. Enhance the SIS to perform cohort analysis conveniently

23. Review the process for monitoring, review and evaluation of the effects of implementation of actions identified in the annual self-evaluation report

24. Extend the recently introduced internal periodic review process to ensure that there is a regular internal periodic review of CIT and CS

25. Further develop the periodic review reporting to incorporate stakeholder feedback

26. Conduct a more comprehensive benchmarking exercise of the programme, covering different aspects and components of the academic and administrative activities and services it provides

27. Implement formal processes, following survey analysis and action identification to monitor implementation and evaluate effectiveness of changes implemented and to communicate these results to stakeholders

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28. Regularly perform a targeted market analysis of the IT sector to provide insight into current and evolving requirements of the labour market and employer needs

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