



هيئة ضمان جودة التعليم و التدريب
Quality Assurance Authority for Education & Training

Higher Education Review Unit

Programme Review Report

**Master of Information Technology and Computer
Science**

Ahlia University

Kingdom of Bahrain

Date Reviewed: 13 - 14 October 2010

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1. The Programme Review Process

1.1 The Programme Review Framework

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

Indicator 1: Curriculum

Indicator 2: Efficiency of the programme

Indicator 3: Academic standards of the graduates

Indicator 4: Effectiveness of quality management and assurance

Conclusions reached are in terms of minimum standards, and the summative judgment falls into one of three categories:

- (i) *The programme satisfies all four indicators and gives confidence, or*
- (ii) *There is limited confidence because up to two indicators are not satisfied, or*
- (iii) *There is no confidence in the programme because more than two indicators are not satisfied.*

1.2 The programme review process at Ahlia University

The programme review of the Master of Information Technology and Computer Science at Ahlia University (hereinafter referred to as 'AU') was conducted by the Higher Education Review Unit (HERU) of the Quality Assurance Authority for Education and Training (QAAET) in terms of its mandate to review the quality of higher education in Bahrain. This Report provides an account of the HERU programme review process and the findings of the Review Panel based on the Self-Evaluation Report (SER) and appendices submitted by AU, the supplementary documentation made available during the site visit, as well as interviews and observations made during the review site visit, which was conducted on 13-14 October 2010.

AU was notified by HERU/QAAET in February 2010 that it would be subject to a programme quality review of its Master of Information Technology and Computer Science programme during 2010. AU conducted its programme self-evaluation and submitted a SER with appendices on the agreed date in July 2010. It is expected that AU will use the findings presented in this Report to strengthen its Master of Information Technology and Computer Science programme.

AU is licensed by the government of the Kingdom of Bahrain under the Cabinet Decision No. 03-1626 dated 25 March 2001. The University accepted its first cohort of

students in the Master of Information Technology and Computer Science (MITCS) programme in the second semester of the 2002-2003 academic year. At the time of the site visit the University comprised six Colleges offering both Bachelor and Master degrees. The MITCS programme is offered by the Department of Information Technology which is part of the College of Information Technology.

At the time of the review the total number of students registered in the programme was 39, 22 of which were full-time students and 17 were part-time students with an average number of credits registered in a single semester of less than nine credit hours. The programme graduated its first student in the academic year 2004-2005. At the time of the site visit there were 37 graduates from the programme, with a mean length of study of 2.05 years. The total number of full-time faculty members involved in the teaching of the programme is six from the College of Information Technology, and seven from other Colleges.

2. Indicator 1: Curriculum

The programme complies with existing regulations in terms of the curriculum, the teaching and assessment of students' achievements; the curriculum demonstrates fitness for purpose.

- 2.1 The Review Panel examined the aims and Intended Learning Outcomes (ILOs) of the Master of Information Technology and Computer Science (MITCS) programme and found that the MITCS programme has clear aims and ILOs that match international practice for an MITCS degree.
- 2.2 A standard template for course syllabi is in use which clearly labels each course's ILOs, how these outcomes would be assessed and how the grade would be distributed across the various work required from students. These syllabi also represent standard international education practice. However, the Review Panel found that not all listed learning outcomes are measurable. The Panel encourages the College to ensure that all the ILOs are specific and measurable.
- 2.3 Generally, the course portfolios are complete and the Review Panel was able to examine the teaching plan for the course, sample lecture notes and sample student assignments. It would have been useful to see the highest and lowest performance by students in the assignments and examinations, but this may not have been possible because of low enrolment numbers in courses.
- 2.4 The curriculum is well structured and matches the ACM / AIS recommended curriculum for graduate courses in this degree. It has four possible tracks which in the new version of the programme are reflected in the dissertation focus of the student more than in course work. Some students are still enrolled in the older programme which contained more course work and a 3 credit project thesis. External advice has led to a major change in the programme that took place a year ago. Thus, a subset of students is enrolled in the old version of the programme and more recent student admissions take the new version. The old version of the programme directs students into specializations through coursework and allows a project thesis of three credit hours for graduation. The new version of the programme requires a 12 credit hour dissertation to graduate with the dissertation focusing on the student's specialization rather than course work. The Review Panel observes that this change is appropriate and in keeping with the sense of a Master of Science degree.
- 2.5 The material in the MITCS courses was found to be, on average, of the intended rigour and difficulty fitting a master's programme in Information Technology (IT) and Computer Science. However, the Information Technology Management (ITMA) courses, e.g., Systems Analysis and Design (ITMA 570) serve a dual purpose at AU being taught both to Business School Students and to students in the MITCS programme. As such, the course provides a very simple introduction to computer systems, covering areas which the computer-oriented MITCS students already know.

It was also noted that examinations in the ITMA courses tended to contain true/false and multiple choice questions rather than the problem solving or in-depth questions that would be expected of graduate students. In addition, some of the text books and references used in the courses were out-of-date and thus, did not reflect current understandings of the course topics.

- 2.6 The Panel notes that the only course preparing students for research is an introduction to statistical methods course. The Panel suggests that the College develops a course in research that would teach students the nature of research, the difference between qualitative and quantitative research, how to write a technical paper, and how to form research arguments.
- 2.7 No policy is in place regarding the number of times a student can retake a course except for time limits on the entire course of study. Although students are required to finish all coursework before beginning their thesis, it is possible that a student could be retaking a course at the same time he or she is engaged in dissertation preparation.
- 2.8 The Review Panel found that good collaboration exists amongst the Departments involved in the MITCS programme and that regular meetings take place in order to deal with the coordination of the programme.
- 2.9 In coming to its conclusions regarding the curriculum, the External Review Panel noted, *with appreciation*, the following:
 - The programme aims and outcomes are clearly stated and match standard international practices for a MITCS degree
 - Course syllabi clearly state learning outcomes and assessment practices
 - Course portfolios are complete and kept up-to-date on each course taught
 - The curriculum is well structured
 - The inter-disciplinary selection of courses from several Departments gives students a well-rounded education
 - The material in the courses is, on average, of the intended rigour and difficulty expected for a Masters degree in MITCS
 - The curriculum matches the ACM / AIS recommended curriculum for graduate courses in this degree
 - The University recognized the need for a revision of the MITCS programme and the programme has been redesigned to increase the amount of time students spend on research

- Good collaboration exists amongst the Departments that developed and now run the MITCS programme.

2.10 In terms of improvement, the External Review Panel **recommends** that the College should:

- Revise some of the course ILOs to ensure that all intended course learning outcomes are measureable
- Improve the computer science content and rigour of the Information Technology Management (ITMA) courses taken by students in the MITCS programme, and develop more rigorous assessment mechanisms for these courses
- Periodically review course textbooks and additional references to ensure that they are up-to-date in the subject matter
- Create a course in research methods that is different from the current statistical methods course
- Develop a formalized mechanism for the use of external reviewer / advisor in the periodical internal review of the programme
- Establish an explicit policy for how often a student can retake a course and define a policy that states the quality measures a student needs to achieve before starting his / her dissertation.

2.11 Judgement

On balance, the Review Panel concludes that the programme satisfies the indicator on Curriculum.

3. Indicator 2: Efficiency of the Programme

The programme is efficient in terms of the use of available resources, the admitted students and the ratio of admitted students to successful graduates.

- 3.1** The programme requires entering students to have completed a BSc degree in Computer Science, Information Technology or a related discipline at an English-based university with a minimum GPA of 2.5. The admission system allows for students who are not fully prepared for the MITCS programme to take two additional foundation courses. However, the Review Panel was informed that no students at present needed to take the foundation courses. Overall, the admitted students appeared to be sufficiently prepared for the MITCS programme. One exception appears to be English speaking and writing skills, which were found to be low in some students and alumni.
- 3.2** The programme has six faculty members assigned to teach its courses who also teach in the undergraduate BSc programme in Computer Science. All of these faculty members have PhDs in Computer Science or cognate disciplines from reputable universities. The faculty members also represent the spectrum of disciplines taught in the MITCS programme. The programme is currently quite small, graduating on average nine students per year. Because faculty members teach both undergraduate and graduate courses, if the programme increases in size, there will be a need to add faculty members in the future. However, the Review Panel was told that enrolment is satisfactory and that plans are not in place currently for increasing the number of students in the programme. Students indicated some frustration with the unavailability of some courses during a particular semester.
- 3.3** The faculty members were found to be actively conducting research, and submitting and presenting papers to peer-reviewed journals and conferences. Faculty members are encouraged to work in research groups and there are plans in place to pick a single topic area for collaborative research to which multiple faculty members can contribute. At present, the Review Panel notes that research papers are mostly submitted to 2nd tier conferences and journals. It is acknowledged that getting papers into 1st tier conferences and journals is extremely difficult given current competition. However, attendance at such conferences is extremely useful for keeping up to date on current research. There is also a plan to increase research output by 25% in the next year and then maintain this level. The Review Panel was not told exactly how this would be accomplished.
- 3.4** The Review Panel found that research funding is available for faculty members' travel to research conferences. The administration has also recently approved a mechanism for faculty research release time. However, the Panel did not see sufficient evidence on how this would be accomplished. Although both funding and

course release time are available, research needs to be promoted and encouraged. It is not clear what plans are in place for accomplishing this goal.

- 3.5 The Review Panel was informed of plans to apply for international accreditation for the MITCS degree in the near future.
- 3.6 Overall, it was found that faculty members are very supportive and helpful to students, allocating extra tutoring time if students found the course material too difficult. In addition, if students fail a course, they are allowed to retake this course and thus, keep their GPA above the required 3.0 for graduation. The students and alumni were also satisfied with the overall University environment and commented on its friendliness and the high level of support available from faculty members.
- 3.7 Computer laboratories are used for teaching and also available for students for individual project work when not in use as classrooms. The Review Panel found that there was sufficient computer laboratory space for students both for teaching and individual work. From discussions with faculty members, it was found that dedicated laboratories for some specializations were very much desired but on hold because of plans to relocate the University to a new campus. The Panel encourages the College to establish specialized laboratories needed by the MITCS programme, e.g., a multimedia laboratory and a network management laboratory, and equip these laboratories with necessary research-oriented software tools, such as : Opnet; Virtual Reality tools; AI tools.
- 3.8 The Library provides students with access to a wide collection of electronic research publication databases. This access is available to students and faculty members both within the University and at home. A separate study and computer room in the Library is dedicated to graduate student use. However, the overall physical size of the Library is too small to support the AU student body. The Library collection of computer science books is limited but good in quality. However, sometimes only one book is available on a particular subject area. Some books (that are basically manuals for a particular software system) are out-dated. The Library has a budget for purchasing 500 additional books a year. The Review Panel appreciates such planning but is concerned that because this is for all the disciplines covered by AU, the Computer Science collection may take a number of years to increase sufficiently.
- 3.9 The University provides students with copies of the software they need for their assignments. The IT staff provides a service that loads this software onto students' personal laptops, e.g., students can receive personal copies of Adobe Studio, Matlab, XML. The Review Panel noted that IT support is adequate and responsive to both the faculty members and student needs.
- 3.10 Classrooms and laboratories are fully equipped for teaching electronically. The laboratories and the Library are open long enough to serve the student population.

Wireless access is available throughout the campus. During the Review Panel's site visit, students were found to be using the facilities.

- 3.11** Almost all MITCS faculty members use MOODLE for the delivery and management of their course material making it easy for students to access lecture notes and to know what is expected of them in courses.
- 3.12** New students joining the MITCS programme receive a full day of orientation which is held on the weekend to accommodate working students. In addition, each course begins with an orientation session.
- 3.13** 95 percent of the graduates of the programme are employed and the other 5% are enrolled in PhD programmes. A survey of current students indicates that most of them are already employed in the IT industry. The overall retention rate is 85%. However, the College does not conduct formal exit surveys. The administration was not able to elaborate on the reasons for students leaving the programme. The University is currently developing a plan to address this matter.
- 3.14** In coming to its conclusions regarding the efficiency of the programme, the External Review Panel noted, *with appreciation*, the following:
- The quality and preparation of the students entering the programme is appropriate
 - There is an adequate number of faculty members for current student body and their qualifications support the specializations of the MITCS degree
 - Faculty members are actively conducting research and publishing in peer-reviewed venues
 - Research funding is available to faculty members and faculty members are allowed to apply for course release time in order to pursue their research
 - Computer laboratories and the Library are readily available to serve student needs
 - Students have good access to the internet, software used in their courses and a substantial number of electronic databases
 - Procedures are in place to orient students both generally and specifically for each course
 - The MITCS programme has a high student retention rate plus a high percent employment for its graduates
 - Faculty members are very supportive and helpful to students.

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

- Track faculty members workload to ensure that it is not excessive given the research and accreditation goals of the programme
- Increase the physical size of the Library and its holdings of IT books
- Implement specialized laboratories needed by the MITCS programme and equip them with necessary research oriented software tools
- Develop a formal mechanism to obtain feedback from students who drop out of the Programme and analyse these feedback to inform decision-making.

3.16 Judgement

On balance, the Review Panel concluded that the programme satisfies the indicator on efficiency of the programme.

4. Indicator 3: Academic standards of the graduates

The graduates of the programme meet acceptable academic standards in comparison with equivalent programmes in Bahrain and worldwide.

- 4.1 Attempts have been made to compare MITCS with similar programmes at other universities. The MITCS programme has been compared to five comparable graduate programmes at international universities, three of which are ABET accredited. The University is in the process of looking into more formal benchmarking exercises. The Panel saw evidence of such activities being discussed at University, College and Department levels.
- 4.2 The Panel notes the College's efforts to seek international accreditations. The College stated that initial steps have been taken towards ABET accreditation. Workshops for this accreditation have been attended and some of the faculty members have had previous experience with ABET accreditations.
- 4.3 External dissertation examiners are carefully selected and there is evidence that they play a critical role in maintaining academic standards. The University has developed recently policies and procedures to govern the work of external examiners. External examiners need to have a research record in related fields, be at least at the associate professor level and declare that there is no conflict of interest. University-internal approval processes are followed before a person can act as external examiner.
- 4.4 The enforcement of regular meetings between students and dissertation supervisors every two weeks contributes to the research progress and mentoring of students. Each meeting is followed-up with minutes to document the content of the meeting and the progress made so far.
- 4.5 The Panel studied samples of student works in a number of courses and notes that on average, the courses have a level of difficulty that is appropriate for a Master Programme. There is some concern that ITMA courses in the programme are of lower academic standard than some of the other courses. In addition, there is some indication that academic standards are occasionally being lowered to accommodate weaker students.
- 4.6 Dissertations are found to be of varying quality and effort, some involving the presentation of results from a small survey and others a comprehensive development and investigation of new software.
- 4.7 There is strong evidence that, previously, some students have copied significant portions of their dissertations from published work available on the web. At least two of the five theses provided appeared to be compilations of various sources from the Internet. The Review Panel was surprised that such obvious plagiarism was not detected by the examination committee. However, the Panel saw evidence that currently the College uses more rigorous measures in assuring the originality of the

dissertation submitted such as using software to detect plagiarism. The Panel was informed about a recent case where a student failed his/her dissertation due to copying. The Panel encourages the College to strengthen its efforts in this regard and to monitor and evaluate the effectiveness of the measures used to detect plagiarism.

4.8 In interviewing students, employers and alumni, the Review Panel found that all were satisfied with the quality of the MITCS programme. Students and alumni commented on the difficulty of the programme, but unilaterally indicated their approval because it better prepared them for employment.

4.9 In coming to its conclusions regarding the academic standards of the graduates, the External Review Panel noted, *with appreciation*, the following:

- Attempts made to benchmark internally the MITCS programme with similar programmes at other international universities
- Faculty members are aware of the importance of maintaining academic standards
- The pursuit of international accreditations which once achieved, will provide external verification of academic standards
- The use of external examiners in maintaining academic standards and the development of policies and procedures that clearly state the role of external examiners and their selection criteria
- Students, alumni and employers are satisfied with the quality of MITCS programme.

4.10 In terms of improvement, the External Review Panel **recommends** that the College should:

- Work towards more consistency in dissertation quality
- Put in place more rigorous steps to detect and penalize plagiarism in dissertations and monitor and evaluate the effectiveness of these steps.

4.11 Judgement

On balance, the Review Panel concludes that the programme satisfies the indicator on academic standards of the graduates.

5. Indicator 4: Effectiveness of quality management and assurance

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

- 5.1 In the area of faculty members' performance evaluation, there are established procedures for review and promotion that match international good practice standards. These procedures are made known to all faculty members through orientation, workshops and the faculty handbook. Although the components used for faculty members performance match international standards, the considerable weight given to student evaluations does not.
- 5.2 The policies on student cheating are made known to all students *via* student orientation and in the orientation session of each course. These policies are followed through by the designated parties involved. However, the Review Panel found that instances of cheating went to a committee for adjudication without a clear indication of what action would be taken given the offence.
- 5.3 There is evidence that the Programme Team conducts internal reviews of the MITCS programme. Moreover, informal advice was given with regard to the programme which led to a readjustment of its curriculum and the lengthening of time required for dissertation research. However, no formal process is in place for facilitating external reviews on a regular basis. Furthermore, it appears to the Review Panel that industry has not been actively involved in providing feedback on the programme. The Panel was informed that the College has recently established an external advisory group. However, it is too early to evaluate the effectiveness of this group.
- 5.4 Faculty members are given training in assessment and how to generate ILOs. However, it is not clear to the Review Panel whether there is a programme in place to determine whether the ILOs are being completely or appropriately assessed.
- 5.5 Relevant processes are in place for changing policies. These changes involve submission and approval through committees or councils at all levels of the University.
- 5.6 Record keeping of student and faculty member statistics is appropriate. Deans and Department heads are able to aggregate and query the data in multiple ways to perform analysis and planning tasks.
- 5.7 There is a programme in place to maintain continued contact with alumni. Graduates are notified of events on campus and continue to be a part of the Ahlia community.

5.8 In coming to its conclusions regarding the effectiveness of quality management and assurance, the External Review Panel noted, *with appreciation*, the following:

- Established procedures exist for reviewing and evaluating faculty members that match international good practice standards
- Students are fully informed on the policies of cheating and a process is in place and followed for handling instances of cheating
- There is evidence that the MTICS programme is subject to internal reviews
- Faculty members have been given training in creating ILOs and generating assessments
- There is a set of procedures in place for changing policies
- The University maintains a full set of databases for helping administration to track performance and adjust policy and plans as needed
- A programme is in place to maintain continued relations with programme alumni.

5.9 In terms of improvement, the External Review Panel **recommends** that the College should:

- Review its over-emphasis on student evaluations in faculty members performance and promotion reviews
- Establish a clear set of rules for the actions that will be taken given a cheating offense or an accumulation of such offenses
- Create mechanisms for industry involvement in recommendations for programme improvement
- Develop and implement a formal process for the usage of external reviewers on a regular basis
- Integrate existing different databases in ways that would help the MITCS programme managers in decision-making. Incorporating data warehousing and data mining tools for such integration is encouraged.

5.10 Judgement

On balance, the Review Panel concludes that the programme satisfies the indicator on effectiveness of quality management and assurance.

6. Conclusion

Taking into account the institution's own Self-Evaluation Report, the evidence gathered from the interviews and documentation made available during the site visit, the Review Panel drew the following conclusion in accordance with the HERU/QAAET *Programme Review Handbook 2009*;

There is confidence in the MITCS Programme offered by Ahlia University.