



ASIIN Seal Accreditation Report

Bachelor's Degree Programme
Statistics

Provided by
Sultan Qaboos University

Version: 24 September 2024

Table of Content

A About the Accreditation Process.....	3
B Characteristics of the Degree Program.....	4
C Expert Report for the ASIIN Seal	6
1. The Degree Program: Concept, Content & Implementation	6
2. Exams: System, Concept and Organization.....	23
3. Resources	26
4. Transparency and Documentation.....	31
5. Quality management: quality assessment and development	34
D Additional Documents	37
E Comment of the Higher Education Institution (12.08.2024)	38
F Summary: Expert recommendations (22.08.2024)	44
G Comment of the Technical Committee 12 - Mathematics (09.09.2024)	46
H Decision of the Accreditation Commission (24.09.2024)	47
Appendix: Programme Learning Outcomes and Curricula	49

A About the Accreditation Process

Name of the degree program (in original language)	(Official) English translation of the name	Labels applied for ¹	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC) ²
Statistics	Statistics	ASIIN	ASIIN 07.12.2018 – 30.09.2024	12
<p>Date of the contract: 30.08.2022</p> <p>Submission of the final version of the self-assessment report: 13.02.2024</p> <p>Date of the onsite visit: 24.–25.06.2024</p> <p>at: Campus Sultan Qaboos University main campus</p>				
<p>Expert panel:</p> <p>Prof. Dr. Wolfgang Härdle, Humboldt University Berlin (Germany)</p> <p>Prof. Dr. Mohammad Al-Rawwash, Yarmouk University (Jordan)</p> <p>Dr. Erhard Quebe-Fehling, Novartis Pharma AG (Germany)</p> <p>Jarif Bin Nafiz, student from the German University of Technology Oman</p>				
<p>Representative of the ASIIN headquarter: Dr. Andrea Kern</p>				
<p>Responsible decision-making committee: Accreditation Commission for Degree Programmes</p>				
<p>Criteria used:</p> <p>European Standards and Guidelines as of May 15, 2015</p> <p>ASIIN General Criteria, as of December 10, 2015</p> <p>Subject-Specific Criteria of Technical Committee 12 – Mathematics as of December 9, 2016</p>				

¹ ASIIN Seal for degree programs.

² TC: Technical Committee for the following subject areas: TC 12 - Mathematics.

B Characteristics of the Degree Program

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF ³	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Statistics	B.Sc.		6	Full time	-	8 Semester	122 Omani credits / 244 ECTS credits ECTS	twice a year & 1995

The Sultan Qaboos University (SQU) is one of two state universities in Oman. It was established in 1986 in al-Seeb (approximately 45 km from Muscat) and provides full scholarships to students for their higher education. SQU's strategic plans lists as their mission "to excel in teaching and learning, research and innovation and community service by promoting the principles of scientific analysis and creative thinking and to participate in the production, development and dissemination of knowledge and interact with national and international communities."

SQU promotes campus-wide projects to improve its study programs and research agendas. One of these main projects aims to implement active learning. Moreover, all study programs integrate new developments and future technologies in their study programs. Both initiatives intend to prepare students for the job market of the future. In addition, SQU promotes applied, interdisciplinary and multidisciplinary research projects, focusing on cooperation and partnership projects with international higher education institutions and the local industry.

SQU is divided into the following nine colleges (1) Agriculture and Marine Sciences, (2) Art and Social Sciences, (3) Economics and Political Science, (4) Education, (5) Engineering, (6) Law, (7) Nursing, (8) Medicine and Health Science and (9) Science.

The bachelor program Statistics is managed by the Department of Statistics, which is one of the seven departments at the College of Science (COS). In total, the College of Science has more than 2,500 students whereas the Department of Statistics has 71 enrolled students currently. It offers the bachelor program in Statistics, as well as one master and one doctoral program in Statistics.

³ EQF = The European Qualifications Framework for lifelong learning

The Department of Statistics was formed in 2018 by split off from the Department of Mathematics. According to the Per representatives of the rector's office, the intent to divide was to strengthen both, the Department of Statistics and its programs and the Department of Mathematics an it's programs. On its webpage, the Department of Statistics has the following mission and vision [accessed 08.05.2024]:

"Vision

To offer quality statistics education that produces life-long learners, creative problem-solvers, productive employees and responsible citizens.

Mission

To contribute to the overall objectives of Sultan Qaboos University through excellence in statistics education, research and service to the university community and society at large."

Furthermore, the webpage lists the following targets in teaching, research and community service for the Department of Statistics:

1. "Fulfill the role of Sultan Qaboos University (SQU) as the reference and national house of expertise in the theory and application of Statistics,
2. Open wider the doors for interdisciplinary research of direct relevance to the Sultanate of Oman,
3. Impact and invigorate the Sultanate Qaboos University's statistics academic programs,
4. Pursue cutting edge research, as well as support it through collaboration
5. Enhance statistical consulting and community services' involvement, and
6. Inspire new ways to work together with the community"

For the bachelor program Statistics, SQU has presented the following profile on the webpage [accessed 08.05.2024]:

"The specialization of statistics is an important discipline that is indispensable for all areas of human knowledge, especially in understanding the complexity of information arising from scientific, social and economic research in a convincing and clear way. The primary task of statisticians is to collect, organize, present and analyze data and draw conclusions, conclusions and inferences."

C Expert Report for the ASIIN Seal

1. The Degree Program: Concept, Content & Implementation

Criterion 1.1 Objectives and Learning Outcomes of a Degree Programme (Intended Qualifications Profile)

Evidence:

- Self-assessment report
- Webpage SQU <https://www.squ.edu.om/>
- Webpage COS <https://www.squ.edu.om/science/>
- Webpage BSc Statistics <https://www.squ.edu.om/science/Departments/Statistics/BSc-in-Statistics>
- Objective Matrix
- Member list of the Statistics Advisory Board
- Discussion during the audit

Preliminary assessment and analysis of the experts:

SQU describes in its self-assessment report that the objectives and learning outcomes of the bachelor program Statistics are improved since the last accreditation considering the academic qualification of an EQF 6 program as well ASIIN subject-specific criteria (SSCs). Regular reviews of the study programs take place involving relevant stakeholders.

SQU has defined the following program objects for the bachelor program Statistics according to the submitted documents:

- To provide graduates with a coherent knowledge of Statistics, both in breadth and depth, on the principles and practice of the subjects;
- To produce graduates who can apply their mathematical knowledge effectively in interdisciplinary areas;
- To produce graduates with good communication skills;

- To produce graduates who are able to apply their acquired knowledge and skills in Statistics to solving real life problems;
- To produce graduates prepared for life-long learning and subsequent graduate studies;
- To produce graduates who can think analytically and critically.

In addition, the following program outcomes are mentioned in the self-assessment report:

1. The ability to apply the knowledge and skills acquired in mathematics and statistics in solving real life problems.
2. The ability to identify, formulate and solve mathematical and/or statistical problems.
3. The ability to communicate effectively with a range of different audiences.
4. The ability to collect, organize, analyze and interpret data in statistical settings.
5. The ability to write reports clearly and legibly and systematically.
6. The ability to function effectively as a team player to accomplish a common goal.
7. The recognition of the need for self-improvement, and to seek more knowledge and skills in mathematics and/or statistics.
8. The ability to reach out and cope with complexities of interdisciplinary applications.
9. An understanding of professional responsibilities.
10. The ability to think analytically and critically, and to engage in innovative applications of mathematics and statistics in diverse areas.

The program coordinators (Head of Department, chairs of committees) further describe to the experts during the on-site visit that graduates are able to work in various occupations in local organizations, Omani governmental ministries and private companies.

The experts question the representatives of the rector's office and the program coordinator how the split of the Department of Mathematics and the Department of Statistics has impacted the study program and its graduates. They explain that the initiative to divide these two departments was to strengthen the profile of the Department of Statistics as well as the profile, which should benefit also its graduates. They highlight that the occupations of graduates in the bachelor program *Statistics* is different from graduates of mathematics; therefore, the split allowed them to develop the study program independently focusing on the integration of applied approaches. The program coordinators emphasize that this resulted in new courses inside their study program. In addition, the entire department had to develop its own mission and vision and create its own committees, which strengthen them as a team. They could further place their own interests and strategies for the departments and its study programs. In addition, they strongly consider the requirements and

recommendation of the previous international accreditation to continue to develop the study program. Furthermore, they appreciate the accreditation for promoting their visibility on the international landscape of higher education.

The program coordinators highlight in the discussion with the experts that the study program underwent various improvements since the last accreditation. Next to an almost complete switch of the teaching methods to active learning (or student-centered learning), the curriculum was also adapted to implement changes in the field of statistics and in accordance with market needs. This includes, for example, the addition of several new elective courses such as “Introduction to Bayesian Inference”, “Data Mining Techniques”, and “Advanced Programming with R.” Upon the question of the experts, the program coordinators state that for continuing to develop their study program, they compare their program to similar programs globally to identify new trends. Many of their most recent additions intend to bridge between statistics and data science, since this is a new important sector for their graduates. Although titles such as machine learning and artificial intelligence are not represented as single courses in their study program, they teach their foundations such as nonparametric statistics and Bayesian statistics. The experts further discuss with the teaching staff if a clear objectives of machine learning and artificial intelligence would be beneficial for the study program, especially to attract students and external stakeholders. They acknowledge the importance of these topics and confirm that they are already considering several (shared) courses to accommodate these interests. In addition, several instructors from the Department of Computer Science develop similar courses, which are available to the students of Statistics. Moreover, SQU is currently developing a study program on “Data Sciences” within the Department of Statistics. However, such a process at SQU starts with the introduction of new successful courses, before a new study program can be introduced. The experts acknowledge problems of competition and responsibility with the department of Computer Science as well as Mathematics. However, the experts suggest increasing their collaboration with the different departments instead. This would have a positive impact on both sides and the students interested in these fields.

The representatives of the rector’s office describe to the experts that the Department of Statistics has collaborations to universities, research institutes and companies for education, research and quality assurance. SQU manages international collaboration in its international cooperation office. At COS, there are several Memorandums of Understanding with international partners, which also involve the Department of Statistics. They highlight that SQU is keen to support new collaborations; however, it needs to ensure that these are active. SQU further requires that all costs from collaboration projects are split equally between the partners. They clarify that the university provides structures for (international)

collaborations, but the initiative has to come from the departments themselves. The Department of Statistics operates several collaborations, like with the National Center for Statistics and Information (NCSI) in Oman and the Statistical Centre for the Cooperation Council for the Arab Countries of the Gulf (GCC-Stat). The program coordinators highlight that graduates from the bachelor program of *Statistics* work in both institutions as well as in other statistical institutions in the region. They add that graduates are also often employed as statisticians at various ministries, such as the Ministry of Education, the Ministry of Economics or the Ministry of Interior. Others also became entrepreneurs and founded their own companies. The program coordinators further add that the Department has recently initiated its own Advisory Board to increase its connection with the private sector. The industry representatives confirm to the experts that they interact with the study program coordinators. They have previously reached out to them for consultation on new courses and further development of the study program. Although collaboration exists, the experts highlight the importance of a strong collaboration between academia, government and the private sector is necessary to continue the development of the study programs considering developments in the scientific field as well as in the industrial sector. Therefore, the experts encourage the Advisory Board to become active soon and closely work together with the program coordinators to continue to improve the qualification profile of the graduates.

The experts further question the collaboration of the Department of Statistics with other departments and colleges. The program coordinators admit they interact with colleagues from outside but the collaboration takes place on an individual level. However, students have the possibility to take courses from other study programs as electives. Many students attend courses from computer science such as “Data Analysis” and “Visualization with Python.” The experts acknowledge challenges in the interaction between departments and colleges; however, they consider it important to collaborate in education and research within the college and university. Especially, collaboration is key between the Departments of Statistics, Mathematics, and Computer Science. It may be possible to improve sharing lectures (in all three departments) where there is overlapping interest.

The students and alumni inform the experts that they chose to study at SQU due to the good reputation of their study programs in science. In their opinion, all their expectations are met. The alumni add that they were competitive on the job market, leading some to reach leading positions while others formed their own companies. They confirm that their study programs provided them with strong fundamentals, which allowed them to quickly adapt to new areas of expertise and occupations. The experts appreciate their explanations, but consider that several of the alumni have graduated some years ago.

In the discussion with the industry representatives, the experts learn that there is a high demand for graduate of statistics on the Omani job market. In their opinion, the graduates

of SQU are well prepared to meet the requirements for finding good jobs in Oman and neighboring countries. They mention that they are in contact with the Department of Statistics and often request recommendation for graduates to accept for their on-job training program.

In conclusion, the experts confirm that SQU has defined objectives and learning outcomes for the bachelor program Statistics. These are transparently anchored and published and thus are available to students, lecturers and interested third parties. After studying the submitted documents and the interesting discussions during the on-site visit, the experts form the opinion that the objectives and learning outcomes meet the requirements of a bachelor program on the European Qualification Framework level 6 as well as the ASIIN SSCs of the Technical Committee 12 Mathematics. The experts consider that the learning outcomes are feasible and relevant. Moreover, SQU regularly reviews if the objectives and learning outcomes are relevant for the labor market and society. If necessary, the objectives are revised accordingly. This process involves the relevant stakeholders, such as higher education representatives and people from the professional practice. Nevertheless, the experts highlight that the collaboration with industry, customers, and other departments at SQU should be increased to develop the profile of the Statistics study program in relation to interdisciplinary and applications. This should also include an active strong role of the Advisory Board.

Criterion 1.2 Name of the Degree Programme

Evidence:

- Self-assessment report
- Diploma certificate and Transcript of Records
- Webpage BSc Statistics <https://www.squ.edu.om/science/Departments/Statistics/BSc-in-Statistics>
- Discussion during the audit

Preliminary assessment and analysis of the experts:

According to all evidences submitted by SQU, the experts can confirm that the title of the bachelor study program Statistics is consistently used. At graduation, students receive a “Bachelor of Science.”

The experts discuss with the program coordinators why they prefer to use the study program title “Statistics” in favor of more contemporary profiles such as “Data Science.” The program coordinators consider that students and employers accept the title of Statistics.

In their opinion, the academic foundation for the study program is statistics while the trend of data science is more industry-driven. They add that data science is multidisciplinary and requires a stronger collaboration with computer science requiring more content in data management such as MySQL. Therefore, they consider currently, the title *Statistics* is still appropriate for their study program. Nevertheless, they admit that they have these discussions on various levels within the university.

The experts confirm that the title of the study program reflects the intended objectives and learning outcomes as well as the teaching and learning content.

Criterion 1.3 Curriculum

Evidence:

- Self-assessment report
- Webpage SQU <https://www.squ.edu.om/>
- Webpage COS <https://www.squ.edu.om/science/>
- Webpage BSc Statistics <https://www.squ.edu.om/science/Departments/Statistics/BSc-in-Statistics>
- Objective-module matrix
- Module handbook
- Degree and Study plan
- Student handbook on “Undergraduate Academic Regulations”
- Discussion during the audit

Preliminary assessment and analysis of the experts:

Study program structure and content

After reviewing the documents and discussing the content during the on-site visit, the experts learn that students need to complete a non-credited foundation program to confirm their knowledge on basic subjects before they enter a college (see criterion 1.4). After the admission to a college, students complete their pre-major. During this status, students are not assigned with any study program yet, but complete courses required by the university as well as the college. This include for example in the first semester one course in “Arabic” (university requirement) as well as one course on “Communication in Science” (COS requirement). In addition, students need to select specific courses, which determine the major program they are allowed to enter. Once students are accepted in the major “Statistics”, they have to complete the compulsory courses of the bachelor program. Students continue to choose electives in their major, on college level and on university level. SQU considers

eight semester to complete the pre-major and major in *Statistics*. Although SQU offers a study plan with a hierarchical concept, the program coordinators consider that there exists already a high flexibility to take courses in various semesters and from other departments and colleges. The experts confirm that regulations are published in the student handbook on “Undergraduate Academic Regulations.”

According to the degree and study plan, the following credit distribution is presented:

Summary of Credits:		
University Requirements (UR)		6
Foundation Program	NC ⁺	
Arabic	2	
State and People	2	
Oman & Islamic Civilization or Islamic Culture	2	
University Electives (UE)		6
See List A		
College Requirements (CR)		3
See list B		
College Electives (CE)		16
See list C		
Departmental Requirements (DR)		17
See list D		
Departmental Electives (DE)		6
See list E		
Major Requirements (AR)		42
See list F		
Major Electives (AE)		26
See list G		
Specialization Requirements (SR)		
See list H		
Specialization Electives (SE)		
See list I		
Minor Requirements (IR)		
See list J	++	
Minor Electives (IE)		
See list K		
TOTAL		122

⁺ Not credited.

⁺⁺Minor is optional: total credits to earn a Minor are 18; with no more than 8 credits counting towards the Major degree may count towards a Minor.

Figure 1. Overview of the credit point distribution of the bachelor program „Statistics“ - note 122 Omani credit points represent 244 European Credit Transfer and Accumulation System credit points; see more details in criterion 1.5 on workload (source: Degree and Study plan; appendix 7 to the self-assessment report).

The experts learn that students can choose a minor in addition to their major studies. The program coordinators specify that the minor is optional but that students need to select their minor in the second year. Based on the concept, students should take their minor within the same college as their major (minor courses are part of their college electives)

consisting of at least 18 Omani credit points. If they choose to take a minor at different colleges, they need to seek permission. Students in the bachelor program *Statistics* often select a minor in economics although this is very competitive. For all elective courses, the program coordinators agree that overlap between courses at the different departments at COS can occur; however, they advise the students to select courses with different context to broaden their expertise. The students and alumni confirm that they took courses for 18 credits in their minor. In their opinion, the minor added great value to their education, especially because they could connect statistics to various fields. Making such interdisciplinary connects has a positive impact on their skills on the job, therefore they are in favor of taking a minor.

The experts note that the presentation of the number of students is not consistent across the submitted documents. Especially the number of students on probation remains unclear to the experts. The representatives of the rector's office state that the number of students on probation at COS ranges around nine to 14%, depending on the cohort. Although the program coordinators are not aware of the student numbers in percentage, the remark that within the entire study program, currently there are only three students in probation (out of 71 students). They add that most students fall into probations in the transition from the foundation program to the pre-major; once they enter their majors, they are already adjusted to the system and the learning conditions and often manage to leave the probation status. They add that students be placed on probation when their cumulative grade point average (GPA) falls below 2.0. Students on probation can only take up to four courses with a total workload of 12 credit points in one semester to control their workload. The representatives of the rector's office assure the experts that SQU supports students to improve to be able to move out of their probation status. All students have an academic advisor once they enter the pre-major. If they are at risk to enter probation, they receive additional support by special probation advisor. This person is more experienced to advise on the individual problems of probation students, which often concern learning problems. Once the students officially enter their major, they receive a new supervisor from the study program to give them suitable advice on their bachelor studies. In addition, the program coordinators mention that students who take longer than usual to complete their studies receive a warning.

The experts also discuss the curriculum in depth with the program coordinators. They emphasize that their study program combines applied statistics with theoretical statistics with strong applications. Consequently, they teach strong foundations in mathematics, but also in statistics. One aspect the experts are interested in concerns how students learn to perform quality checks and the development of a statistical analysis plan. The program coor-

dinators explain that these topics are covered in the “Experimental Design” as well as “Survey Methodology.” They add that students need to apply these methods when working on their final year project. During their final projects, students work on real-world local data, which need to be cleaned and processed before applying statistical methods. They continue that students also learn how to test the validity of their model and reproducibility. They describe that students often receive tasks in various courses to reproduce data by using complex models. In many cases, the students have to create the model first by writing their own code. Students have to submit their code in the appendix of their projects. Upon the question of the experts, the program coordinator state that students are slowly introduced to open data and using platforms such as GitHub. They add that currently SQU does not offer the digital infrastructure to store code on their own server. However, they appreciate this idea and want to discuss the possibilities with the university management. In addition, a strong infrastructure would also benefit students to work together on projects. The experts continue and request more information on software and applications. The program coordinator reply that they mainly use R; in addition, integrate WinBugs or Stan (for Python or R). The students and alumni confirm that they design a statistical analysis plan by themselves in the final year project. In their project, they did include data weighting and data sampling. Similarly, they learn model validity and reproducibility with assignments in their studies. The alumni state that they also perform quality analysis for statistical studies in their profession. They consider this as a great advantage, because their study program provided them with strong foundations allowing them to quickly identify sources of error. Nevertheless, the students and alumni discuss that they would consider additional courses important for future jobs, such as business analysis or project management. The experts further rise the importance of modern development and their representation in the curriculum, especially in machine learning and data science. While the program coordinators refer to the newly introduced courses as well as the elective courses students can select from the Department of Computer Science, the teaching staff highlights that many topics are covered in courses such as “Data Mining Techniques” or others. These include random forests and general random forests. Nevertheless, the study program focuses also on theoretical aspects of statistics. The experts approve the teaching staff’s point of view, however, they suggest introducing specific courses in machine learning and increasing the collaboration to the different departments regarding data science. The teaching staff agrees with the experts that the interplay between statistics, computer science and mathematics is important for graduates who want to pursue a career in data science. The experts further describe the need for students to work with platforms such as GitHub. They encourage SQU to establish their own data platform, where they can store the code of students. This would allow them to use code from previous students’ project in the following semesters allowing the students to re-use and improve existing code.

The experts further learn that the Department of Statistics operates student activity group as an extracurricular activity. This group serves as a voluntary study group, which is advised by a lecturer. Nevertheless, students organize the individual groups and activities. Further student groups are available on college level. In addition, the experts learn that SQU offers a high number of extra-curricular activities. The representatives of the rector's office describe that the university has initiated a "System 1000", in which students can collect points for all their extracurricular activities. Main motivation is to improve the students' soft skills with various courses and activities. Once students have completed more than 250 points, they receive a certificate from the university. Students can collect up to 1000 points only, to limited the time they can spend on extracurricular programs. The alumni appreciate the university's initiative to support the students' soft skills. They highlight that the lack of communication skills in particular pose a challenge on the job market. Thus, they support that students in the bachelor program Statistics gain experience to talk about their field of studies in order to be able to discuss with leadership and colleagues once they enter their professional career. They add that this also should include presentation skills, e.g. PowerPoint support, as well as writing skills (e.g. for reports, projects, proposals). The students explain to the experts that students organize various extracurricular groups to foster the soft skills of the students, like initiatives to practice public speaking on statistics topics. Furthermore, their partners from the Advisory Board of the Department of Statistics offer summer training for students. Others offer collaboration projects for students or internships. The experts appreciate the various possibilities for students to foster their soft skills; nevertheless, they remark that the students should also practice soft skills within the study program. Since all extracurricular activities take place on a voluntary basis, it is necessary to teach basics also within the courses and tutorials.

The expert emphasize that the bachelor program Statistics does not include any internship in the presented curriculum. The program coordinators mention that the previous program Statistics with Health Science specialization contain a mandatory internship (which does not exist anymore), but the general program does not. The program coordinators add that students can organize internships for themselves, for example in their vacation period. In addition, there is a national program named Eidaad, where students can spend one year at a company and receive six credit points. Students apply for this national program, where they are placed in companies according to their study program. During this period, the student has to postpone all their courses. Usually, students should take this before entering their final year. However, none of the bachelor students in Statistics has so far completed this internship program. Students and alumni emphasize that they consider internships as very important to introduce them to working outside university. Although they might not

strongly improve their skills in statistics, they consider the experience in a working environment and being exposed to real-world problems of great value to be prepared for their jobs. The alumni add that an internship of at least two to four months would be sufficient to learn to deal with data and stress in companies. During their job interviews, the recruiters always asked about internships, which increases the chances to be hired. The industry representatives have the same view and highlight the importance of an internship to find jobs. They consider that a module “Internship” in the curriculum would simply the process of organizing internships for the students, even if the module would still be elective. Therefore, the experts highlight that SQU should reconsider its approach towards internships. They support the opinion of students, alumni and industry representatives and highlight the strong benefits of an internship for students/graduates. In their opinion, the best approach is to consider a module “Internship”, which outlines the learning outcomes, benefits and conditions to students and it would not prolong their studies. It could be either elective module or compulsory (experts’ preference). The experts further emphasize that an internship was already suggested in the accreditation in 2018. Although the experts appreciate the opportunity on a national one-year program, they consider that it might be on a strong competitive basis. In addition, it prolongs the students’ graduation for two semesters, which would mean 12 semesters in total including the foundation year. Therefore, the experts consider that this can be done on an optional basis but it places a burden on the students. Thus, the experts favor a module “Internship” which supports students’ experience outside the campus and allows them to stay within the study plan. In addition, the university should remain in charge to observe that the tasks the students perform during the internship contributes to the program learning outcomes of the study program.

In addition, the students and alumni emphasize the need to increase the amount of practical learning within the study programs. They admit that their strong theoretical knowledge of statistics is an advantage, however, the industry and private sector in Oman requires a high demand of applications, case studies and real-world data. In their opinion, this will strengthen the problem-solving skills. The industry representatives support this statement saying that students/graduates need to be aware of working with real-life material before they qualify for respectable professions. Some companies provide job training for one year before they accept new employees to overcome this problem. Nevertheless, they summarize that the training at the university should exceed beyond theory.

The experts summarize that SQU has presented a curriculum during the review, which enables the students to achieve the intended learning outcomes of the bachelor program *Statistics*. The experts observe that learning outcomes are defined for each module, which allow the students to achieve the overarching program objectives at graduation. Each module represents a well-matched unit of teaching and learning. The experts confirm that the

module handbooks give adequate information on which knowledge, skills and competences the students acquire in each module. The experts further appreciate that SQU offers students to select a minor, which seems to have a positive impact on their job opportunities and professional development. Nevertheless, the experts continue to suggest SQU to develop an internship program, which students can take within their study program and does not prolong their studies. They highlight that a bachelor program Statistics today requires containing the fundamentals of machine learning, artificial intelligence and data mining for all students. In addition, the program should clearly present them with strategies to become experts in this field (e.g. through minors, electives, internships, etc.). The curriculum should further significantly cover probability modules, including strong introductions to the basics and objective of models. In addition, SQU needs to ensure that it improve the fundamental knowledge in appropriateness of modules. Finally, they recommend improving the content on (statistical) error control.

Student mobility

The students and alumni describe to the experts that they did not take part in any exchange programs. However, they would find it very helpful for the professional and personal development of the students. They highlight that they are currently not aware of any SQU fellowships to send one semester abroad for studies or research. However, the university management refers to the student handbook on “Undergraduate Academic Affairs” which lists all information and requirements on taking part in exchange programs. It further defines clear guideline for visiting students.

The experts acknowledge that SQU has put regulations in place that allow student mobility. Nevertheless, the experts consider that SQU should continue to promote international student mobility and provide more opportunities for students. In addition, they should increase the communication with their students on existing exchange programs and identify the thresholds keeping students from participation.

Periodic review of the study program

According to the self-assessment report, major curriculum revisions at the bachelor program Statistics take place every five years. The latest revision took place during fall 2021; thus, a new revision will take place during 2025. During these revisions, SQU considers both, the modules and the entire study program. The head of the department will initiate a Department Curriculum Committee to lead the processes of combining observations from

internal revisions, course evaluations, feedback of teaching consultants and other stakeholders (e.g. students, alumni and employers). Different working groups will prepare reports for the Department Curriculum Committee, who will forward their results to the Deanship of Administration and Registration for review. The experts receive documents showing that the latest revision mainly resulted in changes of entire modules.

The program coordinators add that the Advisory Board recommended them to improve the computational skills of the students, especially in R and Python. Therefore, they had introduced several courses such as “Advanced Programming with R” or “Simulation and Modeling.”

Therefore, the experts can confirm that curriculum of the bachelor program Statistics is periodically reviewed with regard to the implementation of the program objectives. All curricular changes are adequately documented.

Criterion 1.4 Admission Requirements

Evidence:

- Self-assessment report
- Webpage SQU <https://www.squ.edu.om/>
- Webpage COS <https://www.squ.edu.om/science/>
- Webpage BSc Statistics <https://www.squ.edu.om/science/Departments/Statistics/BSc-in-Statistics>
- Webpage SQU admission <https://enroll.squ.edu.om/Home>
- Requirements to apply for a major at COS
- Discussion during the audit

Preliminary assessment and analysis of the experts:

According to the self-assessment report, the admission to SQU is centrally managed. Applicants are required to have successfully passed the Omani school-leaving certificate or equivalent certificate/diploma from other recognized institutions. The admission is strictly based on merit. Admission is regulated online via the university webpage.

In the discussion, the program coordinators describe that the admission to the study program is managed by the COS. They explain to the experts that students entering SQU have to complete a foundation program first. To test their qualification, students undergo an entrance test, which places them on a level according to their skills. Qualified students, who reach high scores in the initial test, are able to skip to foundation program completely.

Each semester ends with an exam, evaluation if all qualifications for studying at SQU are reached (“exit exam”). Usually, students spend between one and three semester in the foundation program. The students highlight that they considered the foundation program as very useful for them. They have studied at school only in Arabic, while all programs at SQU are fully managed in English. Thus, this foundation program allows them to adjust to English learning in subject specific classes. In addition, they are getting used to the environment and have time to select their study interests.

The experts learn that after completing the foundation program, the students chose a college, where they enter the pre-major phase. In this phase, students need to complete certain basic introduction courses. Moreover, students need to complete the pre-requirements to enter their study program. To select a major, students are required to have completed specific courses with least a grade of C+ and a grade point average (GPA) of more than 2.0. Only after the students have successfully applied for their major, they officially enter the Department of Statistics.

The representatives of the rector’s office describe to the experts that the admission to each college follows a quota, which is determined by SQU. In turn, each college determines a quota for each of its study programs. The entrance criteria quota for each study program are evaluated annually. They add that since they are a governmental university, where students can study without paying tuition fees, their quotas are usually full. The acceptance quota for the bachelor program of *Statistics* is currently defined to 35 students. If the numbers of applications were to increase, the Head of the Department can request an increase of the quota. Each request needs to be carefully evaluated to ensure that the department can adequately accommodate the higher number of students in terms of lecturers, space and equipment. If sufficient resources are available, an increase of the quota is granted.

The experts continue to discuss the issue of transfer students. The representatives of the rector’s office confirm that SQU accepts transfer students. Especially on a pre-major and early major stage, transferring within SQU is common. If the student fulfills the entrance criteria, and there are vacancies in this study program, the transfer can be organized. Additional completed courses of the students are accepted as elective courses. They add that transfer after entering the major is complex and rarely takes place. The experts further confirm that SQU has presented on their webpage the general transfer criteria for students, who are interested to transfer to SQU. The regulations specify criteria for internal and external transfer. Links are provided for online enrollment in each program.

The representatives of the rector’s office further mention that visiting students are accepted at SQU. The university publishes the requirements for transfer students on its webpage. These include an English requirement. The representatives of the rector’s office

describe that they are aware of the fact that no international students are enrolled in the bachelor program Statistics. They describe that SQU is currently finalizing a proposal to internationalize the entire university. This initiative would reserve 10% of the universities students' capacity for international students, who would be accepted on tuition fee basis.

The experts summarize that SQU has issued admission criteria, which are binding and transparent. In case of possible compensation for missing admission requirements, respective rules are defined. The experts see evidences that rules for the recognition of qualifications achieved externally are published. SQU regularly evaluates whether the regulations ensure sufficient (subject-related) prior knowledge of the students.

Criterion 1.5 Workload and Credits

Evidence:

- Self-assessment report
- Modul handbook
- Degree and Study Plan
- Student handbook on „Undergraduate Academic Regulations“
- Discussion during the audit

Preliminary assessment and analysis of the experts:

Based on the Degree and Study plan of the bachelor program Statistics as well as the self-assessment report, the experts observe that SQU has implemented a credit point system based on the students' workload. The module handbook gives clear definition of the workload in credits and working hours for each module, dividing further into contact hours and self-study hours. In the discussion, the program coordinators add that one Omani credit point currently represents four contact hours per week.

The program coordinators add that students can choose their own workload. The minimum requirements per semester is nine credit points. Students on probation are not allowed to take more than 12 credit points per semester, while the average student takes around 15 credit points. Excellent students are allowed to take up to 18 credit points in one semester. These regulations are all based on the students' cumulative GPA. The program coordinators state that the average student, who takes between 12 and 15 credits each semester, is able to finish the bachelor program Statistics within eight semester. The experts confirm that these regulations are part of the student handbook on "Undergraduate Academic Regulations." The experts confirm that the definition of the workload of each semester based on the students' GPA is part of the student handbook; however, they miss a definition of one

credit point in all documents. Although they appreciate the details given in the module handbook, they recommend SQU to also follow a standard definition of the students' workload of one credit point, which should be part of the student handbook to ensure they are aware of the definition. This would also help to provide a more detailed conversion to the European Credit Transfer and Accumulation System (ECTS) credit points. Currently, SQU states that one Omani credit points is equal to two ECTS credit points.

The experts learn that SQU offers summer courses in addition to the regular program during the two semester of one academic year. However, these courses remain optional.

The students confirm that the workload in the bachelor program *Statistics* is very high but manageable. However, the alumni also consider this very useful as they learned time management and resourcefulness.

The experts conclude that the credit point system implemented at SQU is oriented towards the students' workload. The experts consider that the estimated workload is realistic and well-founded, so that the study programme can be completed in the standard period of study.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-assessment report
- Student handbook on „Undergraduate Academic Regulations“
- Module handbook
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The representatives of the rector's office introduce the experts to the campus-wide project of active learning. They highlight that active learning is now implemented in almost all courses in the bachelor program *Statistics*. Recently, the lecturers contain a higher number of group work, assignments and projects. Moreover, students receive reading materials in advance, which will be discussed in class (“flipped classroom”). The program coordinators emphasize that they consider the most suitable teaching methods for ensure that students reach the learning outcomes of the module. In this regard, they consider the students' feedback at the end of the class essential to improve the teaching and learning methods of their courses. The teaching staff confirms that they integrate active learning and group work in their courses. To observe the teaching in the classroom, the experts request slides

used during teaching. The experts acknowledge the teaching materials of single classes of the courses “Introduction to statistics”, “Introduction to probability” and “Design and Analysis of Experiments.” The experts approve the slides but add that the slides could be more interactive. They mention that slides could contain useful links for data or code, which studies could use for their self-studies and individual training.

In addition, the teaching staff explains to the experts that each class contains theoretical lectures and tutorials. Both are considered as contact hours according to their classification. During tutorials, students work in groups to solve assignments or exercises. The experts approve the teaching staff’s statement and emphasize that group work strongly benefits the students’ team working and communication skills. Therefore, they encourage the instructors to continue to implement soft skills in their teaching, including group work, critical-thinking as well as presentation skills.

The experts confirm that a variety of teaching methods are integrated to promote the achieving of the learning outcomes in the bachelor program *Statistics*. They support SQU’s initiative to introduce active learning or student-centered learning in all modules to promote the students’ learning process. The experts note that the module handbook clearly states the applied teaching methods for each module. They conclude that the study program contains an adequate balance of contact hours and self-study time. The experts form the opinion that the teaching methods are regularly reviewed with regard to new developments and updates in the content of the study program. The experts continue to emphasize that the lectures should contain more group work and real-world case studies as practical examples.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 1:

The experts acknowledge that the Department of Statistics fully agrees to add some new courses such as machine learning and artificial intelligence to the curriculum. This will be discussed in the next Curriculum Committee meeting.

The experts confirm that there is an Advisory Board with external stakeholders at the Department of Statistics, which will meet for the first time September 2024.

The experts appreciate that their suggestion of offering a summer internship programme will be discussed with the Advisory Board. In similar way, the improvement of students’ soft skills will be discussed during by the Department Board and will then be forwarded to the College Board for approval.

The experts consider criterion 1 to be mostly fulfilled.

2. Exams: System, Concept and Organization

Criterion 2 Exams: System, Concept and Organization
--

Evidence:

- Self-assessment report
- Module handbook
- Student handbook on „Undergraduate Academic Regulations“
- Guidelines for final year projects in Statistics
- Examples of final year projects presented during the on-site visit
- Examples of exams presented during the on-site visit
- Discussions during the audit

Preliminary assessment and analysis of the experts:

The experts observe that the assessment criteria are described in detail in the module handbook as well as in the student handbook on “Undergraduate Academic Regulations.” Based on this documentation, the experts learn that there are typically mid-term and final examinations, while continuous assessment takes place with quizzes, assignments and mini-projects.

The program coordinators add that the criteria listed in the module handbook are enforced. In the rare case that lecturers want to change, e.g. the number of quizzes per semester, they need to seek approval from all students in class first. In the opinion of the experts, there is a high number of assessments during the semester. The program coordinators acknowledge the number but state that they consider the total workload of the students in their preparations and selection of deadlines and examination dates. They distribute the assessments, such as quizzes and assignments, during the semester and make sure that students have sufficient time to prepare. Therefore, they assume that students prepare for their assessments according to their own needs. Inside SQU, the regulation the final exams received between 40–50% weight of the final grade. The final decision is up to the lecturer of the course themselves. The students confirm to the experts that there is a high number of assessments throughout the year. The estimate that on average, there are four quizzes and two exams during one semester in each course. In some courses, the instructors have started to reduce the number of quizzes and added mini-projects. The teaching staff specify that most courses have mid-terms, mini-quizzes (two to three) and mini-projects. The teaching staff describes that quizzes contain a mix of multiple-choice questions and written questions. A mini-project is commonly a one-week assignment, which can be done individ-

usually or as a group. The instructors assure that they schedule the assessments evenly distributed during the semester, whereas the mid-term and final exams are coordinated by the department. Mid-term exams commonly account for 20 to 25% of the final grade; final exams range between 40 to 60%. Quizzes usually account for 15% of the final grade. The teaching staff confirms to the experts that all courses include group work and mini-projects. Within these mini-projects, the students work on real-world data. Furthermore, the teaching staff highlights that students receive the slides they prepare for the classes in order to learn for the exams. The experts agree with the students and alumni that the number of exams is quite high and that a higher diversity of assessment methods would benefit all types of students. They also favor the idea of adding more projects and assignments instead of quizzes and increasing the number of presentations and oral exams.

The experts continue to discuss the final year project with the program coordinators. They confirm that the final project spans across two semesters, where students receive two credits in the seventh semester and four credits in the eighth semester. One lecturer supervises the final project during both semesters. The examination of the final project takes place at the end of the second semester in form of a final oral presentation. In the bachelor program *Statistics*, it is possible for two students to work on one project following a clear outline that of each student's tasks and requirements. The program coordinators state that students mainly work on external data, which they can also specially request for their analysis (e.g. data from hospitals, NSCI or ministries). In these cases, an additional external advisor is possible, but the responsible supervisor is always a member of the department. The presented regulation clearly states that the final project requires the students to apply critical analysis skills, their ability to use the library for referencing and use of statistical software packages for data management and analysis. Moreover, a clear structure is presented for the first and second semester of the final year project.

The students and alumni confirm that once they are eligible to start with their final thesis, they receive an email. In their opinion, they felt well prepared for working on the final project. This also includes scientific writing. Moreover, lectures integrated mini-projects in their lectures, which guided them towards their final project.

The experts received the regulations for the final year project and they can acknowledge that the final year project is divided in two modules in the seventh and eighth semester; however, the expert suggest to include these regulations also as one module in the module handbook. In this way, the students can receive a complete set regarding their compulsory modules.

The experts summarize that SQU as defined assessment methods for each module, which allow to evaluate to which degree the learning objects have been achieved. The experts

confirm that individual assessment methods are selected for each module depending on the content. Students are entitled to receive feedback on their performance to support them in their learning process. The experts further state that students receive information on the applied assessment methods and criteria at the beginning of each lecture and in the module handbook. The experts highlight that the student handbook on “Undergraduate Academic Regulations” defines regulation for grade appeal, re-sits and cases of illness. The experts form the opinion that SQU considers the students’ workload during the semester and distributes the number of exams to ensure an adequate workload as well as sufficient time for preparation. Nevertheless, the experts recommend to reduce the number of assessment during the semester. They especially emphasize that projects or oral exams could potentially replace written exams (e.g. mid-term). The experts further approve that SQU applies moderation of examinations and continues to review whether the exams can adequately determine the achievement of the learning objectives and whether the requirements are appropriate to the level.

The experts further see evidence that each student has to work on a final project, which demonstrates that the student is able to work independently on a task at the equivalent to a bachelor level on EQF level 6.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 2:

The experts appreciate that their suggestions with respect to the high number of exams and the unification of the two final year courses will be discussed in the next Department Board meeting.

The experts consider criterion 2 to be mostly fulfilled.

3. Resources

Criterion 3.1 Staff and Staff Development
--

Evidence:

- Self-assessment report
- Webpage SQU <https://www.squ.edu.om/>
- Webpage COS <https://www.squ.edu.om/science/>
- Webpage BSc Statistics <https://www.squ.edu.om/science/Departments/Statistics/BSc-in-Statistics>
- Staff handbook
- Discussion during the audit

Preliminary assessment and analysis of the experts:

According to the presented data, the Department of Statistics has eleven academic staff members (status fall 2023). The faculty employs three women and eight men for teaching.

Recruitment of new lecturers at SQU considers the nationality of the candidate and their qualifications. Omani candidates receive priority, especially since the department does currently not have any Omani male academic staff members. As a second criterion, they consider only the qualifications in teaching and research. The Appointment Committee of the Department of Statistics usually oversees the entire process.

The program coordinators explain to the experts that each member of the academic staff has to teach, conduct research and engage in community service. In addition, they need to perform administrative tasks, provide assistance and advice to students, and work in several department-internal committees. They confirm that the individual teaching load can be reduced but requires approval from COS. In general, reduced teaching load is achieved by acquiring larger grants (e.g. “his majesty grants”), which provides enough financial support to hire students and assistants, who are qualified to teach.

The teaching staff describes to the experts that each lecturer is eligible to receive funding for one international conference per year. Additional activities need to be covered by personal grants or funding from consultancy. Each lecturer confirms that they attend at least one conference per year. Additional travel activities require personal research grants, which can be acquired internally at SQU or externally. They add that sabbatical leaves to stay outside SQU are offered once a lecturer has stayed at SQU for more than six years. For a sabbatical, lecturers can stay between one and two years outside their institutions but

has to result in international publications. During this time, their teaching load will be divided to the other lecturers or covered by part-timers, which are employed only for short contracts. In addition, a paid leave can be offered on request for up to one semester. The teaching staff mentions that two are currently outside SQU at universities in Sri Lanka and Jordan.

The teaching staff mentions that they aim to work on high-class international publications. However, due to their high workload in teaching and administration, they often are left with little time to perform research and write publications. The lecturers have already addressed the lack of staff with the COS, but currently it could not be solved yet. This represents also a problem for their individual promotion, which is linked to research publications. Nevertheless, they aim to find one day per week to work on their research projects. The experts acknowledge these problems and want to highlight this issue to the university management. In addition, they continue to suggest increasing the cooperation between different departments in research and teaching. This should also result in joint conferences at SQU. Based on the comments of the industry representatives, the experts further recommend to increase the collaboration with the private and governmental sectors. Since statistics has various applications, the experts consider that many would be interested to develop joint research projects, which would benefit both parties.

The program coordinators and the teaching staff draw the experts' attention to their high administrative work load. Since they are a small department, each faculty member is part of at least three committees, which takes a high amount of their time. In addition, there are bureaucracy on the level of the college and university, where they are also represented. The experts can relate to this problem. They understand that they are limited with a staff of eleven people, who manage three study programs supporting all students, and engage in a high administrative load. The experts form the opinion that more support from the college and the university is needed to support the Department of Statistics in their workload. They suggest that SQU reviews the workload of the entire department and develop a strategy to ensure that the quality of teaching and research is not endangered by the high amount of administrative and bureaucratic tasks and committees.

The teaching staff further describes to the experts that guest lecturers require approval from SQU. The industry representatives remark that they are not involved in teaching; however, they participate in various events on campus to promote their companies with students to make them aware of the job market in Oman. This includes presentations of their products (in data science) as well as training e.g. creating surveys and analyzing its data. However, they mention to the experts that this training is mainly of master and doctoral students, not for bachelor students of Statistics. The experts support the invitation of guest lecturers to the Department of Statistics, either to conduct regular teaching or summer

schools. This would allow introducing modern topics to the staff and students. However, the experts point out those guest lecturers alone cannot reduce the workload of the staff.

The experts further raise the topic of staff development with the teaching staff. The teaching staff describes that SQU provides training in pedagogy within its Center for Teaching and Excellent Learning. Several members present in the discussion round confirm that they took part in various development programs on active learning and assessment techniques. Further technical offers are workshops on high-performance computing and webinars by (international) experts. Nevertheless, the experts consider that SQU should encourage the staff to attend professional development programs, including teaching skills. This could contain courses on pedagogy (including slide preparation) or oral and written communication.

The experts conclude that the composition, professional orientation and qualification of the teaching staff are suitable for successfully delivering the study program. In addition, the research and development of the teaching staff contributes to the desired level of education. The experts continue to highlight a detailed review of the total workload of the teaching staff to ensure that sufficient human resources are available to ensure the high quality of the study program, including administrative and technical staff. Although the experts observe opportunities for further development of the teaching staff's professional and didactic skills, they suggest a stronger encouragement for the attendance of the courses. The experts summarize that regular reviews whether the subject-specific and didactic qualifications of the lecturers contribute adequately to the delivery of the study program.

Criterion 3.2 Funds and equipment

Evidence:

- Self-assessment report
- Visitation of the campus facilities during the audit
- Discussion during the audit

Preliminary assessment and analysis of the experts:

SQU describes in their self-assessment report that as a state university, they receive their main funds from the state of Oman. The funds are officially transferred to the COS, which oversees the maintenance of the facilities. The funding is divided into several schemes of expanses.

To support the bachelor program *Statistics*, SQU provides two computer laboratories for teaching managed by COS. The experts visit the laboratories during the on-site visit and note that the provided computers are already more than seven years old. The program coordinators admit they are aware of the situation. During the last year, SQU has provided them with new funding to update their equipment; therefore, they have already ordered new computer for both laboratories. Unfortunately, these have not arrived yet in Oman.

The program coordinators confirm to the experts that students can log in with their student account, which gives them access to their personal working space, where they can store data. They add that the computer laboratories are available for students outside the teaching schedule. The experts continue on the available software at SQU. The students confirm that they learn how to use MATLAB, SPSS, R as well as Python. SQU supports the students with licenses if necessary. The alumni add that several governmental agencies and ministries require their staff to perform analysis with excel using various plug-ins. They state that this is currently not included in the study program but it might be a suitable addition to the established software in statistics. Nevertheless, the experts notice that students lack competences in the currently often used coding language Python. The experts learn that students only receive training during the pre-major courses and receive no further training during the course of statistics. The experts highlight that the study programs should be aware of the modern developments in software in their area, especially on the job market. They acknowledge that students have the opportunity to continue to use Python instead of other software, such as R. Nevertheless, the experts emphasize on the strong application of Python, especially using big data. The teaching staff states that they are aware of new developments regarding software, especially in the field of programming. Therefore, a newly hired staff member is also an expert on the programming language Julia. The industry representatives add that they mainly use their own software as well as Microsoft Excel and SAS. However, they mention that the students received sufficient training inside their company. The experts continue to emphasize the importance of programming and software for everyone in the field of statistics; therefore, students should be able to use the mostly used up-to-date software to support them for their professional career.

The experts learn that each student has access to textbooks for each course. Students and alumni confirm that these textbooks are provided by the university and are available in sufficient quantity in their library. In addition, they receive a copy of the slides from the lecturers. They add that digital books are not available for the lectures. The experts note that this poses a challenge for developing fields such as machine learning or artificial intelligence. The experts support that the study program needs to be aware of the ongoing changes in these fields and recommend offering (addition) digital reading materials, which are updated on a regular basis. In addition, they mention the main library as a source of

literature. This also includes an electronic library, where they can search for research articles with their student ID.

Overall, the students and alumni are satisfied with the equipment and facilities in the bachelor program *Statistics*.

In summary, the experts consider that the financial resources and the available equipment of the bachelor program *Statistics* is adequate. SQU provides oversight and reliable funding to support the sufficient infrastructure in terms of both quantity and quality. Nevertheless, the experts state the importance of updating the computer facilities at SQU/COS considering new developments in technology. A focus should be placed on new software/programming languages and programming packages (e.g. for Python where how to use the latest programming packages should be used). Changes should be quickly implemented in the study program to closely follow the demand on the job market. Likewise, the experts recommend considering offering digital media, especially regarding software, which allows regular updates of the implemented learning materials.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 3:

The experts thank SQU for explaining that there are currently eleven academic staff members (three women, eight men) at the Department of Statistics. This low number and leads to a high teaching load and leaves little room for conducting research activities, which is also a problem with respect to promotions. The experts emphasise that this issue needs to be addressed.

As SQU point out in its statement, there is the Center for Excellence in Teaching and Learning (CETL) which offers courses for improving teachers' didactic and teaching skills. The experts think that it would be useful to encourage all academic staff members to attend these courses.

The experts consider criterion 3 to be mostly fulfilled.

4. Transparency and Documentation

Criterion 4.1 Module Descriptions

Evidence:

- Self-assessment report
- Webpage BSc Statistics <https://www.squ.edu.om/science/Departments/Statistics/BSc-in-Statistics>
- Module handbook

Preliminary assessment and analysis of the experts:

SQU submits their module handbook during the accreditation process, which combines the module descriptions available on the webpage of the study program. The module handbook gives all necessary information about teaching methods, intended learning outcomes, content, admission and examination requirements, forms of assessment, details explaining how the final mark is calculated, and biographical references. The experts remark that the module handbook is not complete; it does not include the necessary information about the awarded credit hours and ECTS points and misses the module descriptions for the final project. For this reason, the experts expect SQU to update the module handbook of the bachelor program *Statistics* and include all required information.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-assessment report
- Example of a Diploma Certificate
- Example of a Transcript of Records

Preliminary assessment and analysis of the experts:

The experts confirm that the students of the study program *Statistics* are awarded a Diploma and Transcript of Records after graduation. The Transcript of Records lists all the courses that the graduate has completed, the achieved grades, and cumulative GPA. However, the Transcript of Records should also list the awarded ECTS credits points for each course according the conversion presented by SQU during this review. Both documents are issues in English.

The experts add that no Diploma Supplement was handed in during the review. The Diploma Supplement should contain additional information about the study programme following the European template.

The experts conclude that SQU issue a Diploma certificate as well as a Transcript of Records. However, the experts emphasize that a new Transcript of Records as well as Diploma Supplement are necessary for the review.

Criterion 4.3 Relevant Rules

Evidence:

- Self-assessment report
- Webpage SQU <https://www.squ.edu.om/>
- Webpage COS <https://www.squ.edu.om/science/>
- Student handbook on “Undergraduate Academic Regulations”
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The experts confirm that SQU has presented documents, which present the rights and duties of both the university and the students, which are clearly defined and binding. Admission regulations and regulations for transfer students are clearly presented on the university webpage. Yet, the experts note that the webpage of the university, the college and the study program could contain more useful information for external parties. The representatives of the webpage admit that the webpage needs improvements; however, the study plan, course outlines and admission criteria are transparently presented online. They add that suggestions from the experts are welcome to continue to improve the virtual presentation of SQU and its study programs.

Upon the question of the expert panel, they confirm that all documents are available in English and Arabic for all students. Nevertheless, they miss easy access on the webpage for essential documents such as the student handbook on “Undergraduate Academic Regulations” or the guidelines for the final project in *Statistics*. Further available documents could include useful forms and additional guidelines.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 4:

The experts thank SQU for submitting a sample Diploma Supplement and guidelines (module descriptions) for Final Year Project I + II (Bachelor's Thesis) together with their statement. The provided sample Diploma Supplement is aligned with the European template.

The experts consider criterion 4 to be mostly fulfilled.

5. Quality management: quality assessment and development

Criterion 5 Quality management: quality assessment and development

Evidence:

- Self-assessment report
- Webpage SQU <https://www.squ.edu.om/>
- Results course and teaching survey (appendix 9)
- Results survey “Students’ perception of the Statistics major” (appendix E-9)
- Results of employer satisfaction survey (appendix 30)
- Discussion during the audit

Preliminary assessment and analysis of the experts:

SQU describes in its self-assessment report that quality assurance includes various levels and tools. On college level, the quality assurance processes are coordinated by the Quality Assurance and Academic Accreditation Unit with the goal of enhancing the academic performance. These processes aim for continuous improvement of the study programs through monitoring, assessing, and analyzing the teaching and learning methods. In addition, internal evaluation of the quality of the study program *Statistics* are conducted. At program level, these are managed by the Statistics Curriculum Committee, which is responsible for all aspects of curriculum development and improvement. SQU presents evidences that students and other stakeholders such as employers are involved in this process. As states in the self-assessment report, the Committee collects data on the study program on the following issues

- “Whether the intended learning outcomes required to obtain the degree have been achieved
- The academic feasibility of the degree programme
- Student mobility (abroad, where applicable)
- How the qualifications profile is accepted on the labour market
- The effect of measures in use to avoid unequal treatment at the higher education institution (if any)”

Moreover, SQU invites external quality assurance provided by accreditation agencies. In addition, the Advisory Boards on department and college level provide suggestions for further development regarding the needs and demand of the labor market.

The experts discuss the quality management system at SQU with the program coordinators and the students. The program coordinators explain that the quality management at the level of the study program is divided into several committees, such as the exam committee and the teaching committee. If the department makes changes in courses or plans to establish new courses, it needs to seek approval from the quality assurance unit at the college level and university level. This sequence of approval can take very long in some cases. In turn, the quality assurance at university level can also ask for feedback on their proposal to all other responsible units. They are currently working on a review of their textbooks, which was a proposal by the university unit on quality assurance. Once they receive the feedback, the issue will be discussed in the university council to make the final decision.

The experts refer to appendix E-9 “Students’ perception of the Statistics major”, which gives interesting insights. The program coordinators mention that this survey was conducted at the end of the last academic year. It was a questionnaire where students of all levels could freely complain about their experience in the study program. Of the 71 students, 25 have sent their responses. The results of this questionnaire were discussed in the board meeting of the Department of Statistics. They admit that they detected problems related to the teaching methods. This had motivated them to change to active learning in their courses. They plan to conduct another survey at the end of the current academic year and expect an improved outcome.

The program coordinators confirm that SQU collect information from its alumni. However, they admit that SQU often has problems to track alumni. In addition, the program coordinators often have problems to receive information from the university management. Although they can request data, this process often takes a long time. They support that SQU should work on an open data initiative, which would facilitate the availability of data. The experts share this opinion for easy access of the most important facts and data regarding one study program, including availability for external partners in the frame of transparency.

Moreover, the experts request more information on the staff-student liaison committee. According to the program coordinators, this committee is established to connect the teaching staff with the students directly to share their problems and concerns. They describe that students choose their representatives in this committee themselves. Students’ representatives are announced allowing students to approach them with their issues. Each semester, the staff-student liaison committee holds at least one meeting; however, complaints are also discussed outside the meeting. The program coordinators emphasize that

they aim for a close connection to their students. Therefore, they have established to share coffee breaks, which also gives the students room to raise their issues and concerns.

The students and alumni confirm that they take part in course evaluations at end of each semester. They consider them as effective as they do notice how the conditions improved after raising complains. The alumni confirm that they were further invited to surveys after graduation. However, they admit that their fellow students often considered the course evaluation as non-effective and thus were not motivated to participate. They explain to the experts that the students have never received a feedback on the results of the surveys they participated. However, they have previously experienced that they can directly address their advisors and the program coordinators when issues arise. This includes problems with poor-performing lecturers. The experts appreciate the good relationship between instructors and students. Nevertheless, they consider it essential to inform students on the results and actions of each survey they participate. This could include by providing the information digitally or in person. The experts are certain, that students will be motivated to participate in surveys when they are informed on the direct actions are taken based on their complaints.

In conclusion, the experts confirm that SQU has established an effective quality management, which includes all stakeholders. The experts see evidence that the results of these processes are incorporated into the continuous development of the program. The experts note that these processes and responsibilities are defined and distributed among various units and committees.

Final assessment of the experts after the comment of the Higher Education Institution regarding criterion 5:

SQU does not comment on this criterion in its statement.

The experts consider criterion 5 to be mostly fulfilled.

D Additional Documents

The experts kindly request the additional documents:

- Diploma Supplement
- Module description for the 2 modules STAT5501 and STAT5502

E Comment of the Higher Education Institution (12.08.2024)

SQU provides a detailed statement as well as the following additional documents:

- Sample Diploma Supplement
- Guidelines (Module Descriptions) for Final Year Project I + II (Bachelor's Thesis)
- College of Science Report for Students on Academic Probation

The following quotes the comment of SQU:

Criterion 1.1

“(a) Earlier, the Department of Statistics has developed new courses that are currently being offered, including; Introduction to Bayesian statistics, Simulation and modelling, Advance programming with R, Introduction to Statistical learning and Data mining Techniques which is already mentioned in the ASIIN report.. The department fully agree to add some new courses such as machine learning and artificial intelligence in our undergraduate study program so that these courses may benefit our students in their future jobs. This addition of new courses will be discussed in the next curriculum committee meeting. We are continuing to add more courses, some with ongoing consultations with the department of computer science.

(b) The department has already initiated the proposal related to Memorandum of Understanding with Concordia University, Montreal, Canada. Once the proposal is finalized it will benefit both the students and faculty to pursue their academics and research.

(c) The Advisory Board, for the Department of Statistics, which consists of members from academia, government organization and industries, is already approved. The members comes up with vast experience in their field, which will help the department, and its students in establishing a strong collaboration between academia, government and private sector. The first advisory board meeting is scheduled in September 2024, where this matter will be discussed in detail.

(d) The three departments have a common historical background having been one department when the university commenced. Students these departments offer many courses in common to bolster their different professional paths. At the undergraduate level, courses, including, Introduction to Statistics and Introduction to Probability are considered requirements in the BSc Mathematics and BSc Computer Science programs. It should be noted that

students majoring in Computer Science and Mathematics usually take Statistics as a Minor specialization with 18 credits Statistics courses. Similarly, students majoring in Statistics take either Computer Science or Mathematics as their Minor specialization. As noted in the BSc Statistics study program, courses such as; Introduction to Computer Science (Python) course and Introduction to Objected Oriented or Data visualization with Python are requirement in the BSc Statistics degree plan, in addition to five mathematics courses including Linear Algebra and Discrete Mathematics. We are in the process of designing some new courses, which will benefit the students from all the three departments as per the market demand.”

Criterion 1.3

“(a) As desired, enclosed herewith this report the complete information about the number of students and their percentage who are on probation.

(b) The suggestion related to establishing of data platform within SQU, which will be highly beneficial for the students in storing their data and program codes for the future use in their research and projects. A request regarding establishing a data platform will be made to SQU administration.

(c) Data science is playing a pivotal role in the today’s world, the suggestions related to introduction of courses related to machine learning and data science in collaboration with computer science and mathematics department is highly welcomed. This will train our students to pursue the career in data science. The matter will be proposed in the department curriculum committee meeting and will be implemented accordingly.

(d) In the forthcoming meeting with the Advisory Board, the suggestion related to initiating of summer training internship/ projects for the graduate students will be discussed and help will be sought from the advisory board members in accepting our undergraduate students as summer intern in their organizations so that the students may get maximum experience and develop their skills.

There is a credit internship course (IDAAD) in which students compete for placements. The university is trying continuously to increase the placement positions offered by the industry. Other summer training (non-credit) opportunities are made available every summer through the Assistant's Dean Office, which is continuously try to increase the number of such placements.

The request will also be made to the university authorities to initiate internship program (IDAAD), which students can take within their study program and does not prolong their studies.

(e) The matter related to the development of soft skills for the students within their study program will be discussed in the department board meeting and will be sent to college board for approval. Various Independent learning strategies are currently implemented (e.g. mini projects and FYP) to develop students soft skills and collaboration with the Excellence in Teaching Center is ongoing.

(f) Currently, student mobility to provide more opportunities and exposure for students is limited to individual staff research collaboration grant availability. Memorandum of Understanding with other universities as mentioned before will encourage international student mobility with other departments of statistics. Further, the students will be informed about the international student mobility during their department orientation program so that they will be more aware about this program and will participate actively.

(g) Our BSc Statistics degree plan is periodically reviewed every five years, and the last review was done in the year 2020. Currently, students study statistical programming languages such as R and Python in their introductory courses where R is integrated in the introduction to statistics course and Python in introduction to computer Science. Students also practice computational statistics in almost all statistics courses. More computing-based courses are expected to be designed when reviewing the study degree plan for the period 2025-2029.”

Criterion 1.4

“(a) Intake of international students

As per the observation related to the intake of international students in the bachelor program in Statistics. (Admission to SQU is centralized), however SQU is currently finalizing a proposal to internationalize the entire university and would reserve 10% of the student’s capacity for international students, who would be accepted on tuition fee basis.”

Criterion 1.5

“(a) Module handbook information related to credit point

One credit point is equivalent to 1-hour lecture or two hours of Lab or two hours of tutorial and is equivalent to 2 European Credit Transfer System (ECTS), (for the definitions of credits see academic regulations handbook section C-2, page 28).”

Criterion 1.6

“(a) Interactive Teaching Methods

The Department promotes the notion of active learning, and many courses have embraced the teaching and learning approach that promotes student interaction. Further, statistics courses such as introduction to statistics, statistical computing, Advance programming with R and Simulation & modelling, have some lectures notes written using R markdown, where data, code and output are shared with students via the Moodle learning platform. Also, interactive tutorials using R Markdown have been developed for the university elective course to ease teaching R. More efforts will be taken to fully implement interactive teaching methods. Soft skills method in the teaching will also be promoted, as well.

This suggestion related to adding of useful links for data or program codes in their teaching slides will be forwarded to every faculty members in the department.”

Criterion 2

“(a) To accommodate interactive teaching methods, some courses have introduced a course project, especially in the higher-level courses. However, the matter related to reducing the high number of assessments per course during the semester will be discussed in the department board meeting in the month of September 2024, once the university re-opens after the summer vacation. Also, regarding the suggestion related to the change in regulation of the final year project by merging the two modules as one module in the module handbook will be discussed in the department board meeting and necessary suggestions will be implemented.”

Criterion 3.1

“(a) The Department of Statistics currently has a strength of eleven academic staff members out of which there are three women faculty and eight men faculty. Due to high involvement in teaching and administrative activities, the faculty members are left with little time to perform research and publish manuscript articles in high-class core field international journals. This gives problem in their individual promotions too.

As per the experts suggestions, more support should be provided from the college and university administration to the Department of Statistics in this matter and a proper review of the workload is needed to ensure that quality of teaching and research should not suffer due to high amount of administrative and bureaucratic tasks and committees assigned to the department faculty members.

This suggestion will be forwarded to the SQU authorities for consideration, especially given the fact that it is relatively a new department, which deserves more support.

The other suggestion of the experts related to encouraging the staff to attend professional development programs which include teaching skills will be discussed in the forthcoming department board meeting and the suggestions will be forwarded to the concerned authorities. However, it is worth noting that SQU has a mandated Center for Excellence in Teaching and Learning (CETL).”

Criterion 3.2

“(a) As per the expert suggestions, the department will encourage the students to brush up their skills on up-to-date software’s and programming packages like Python, Julia which will help the students to excel in the job market specially while working with big data.

(b) As per the expert’s suggestion, the department will provide the students with additional updated digital materials on regular basis.

(c) As per the expert’s suggestion, the department will encourage students to access the available electronic libraries.”

Criterion 4.1

“(a) Update of module handbook of the bachelor program in Statistics.

As per the expert’s suggestions related to incomplete handbook with missing of necessary information about the awarded credit hours and ECTS points as well as regarding the missing of module descriptions for the final year project.

The Academic & Register’s office provides detailed online and printed handbook about all the undergraduate academic regulations alongside with online services. However, this matter will be discussed further by the department’s curriculum committee meeting, and any the missing information pointed by the experts will be added in the module handbook for the bachelor program in Statistics.”

Criterion 4.1

“(a) Diploma Supplement and Transcript Record.

The expert concern related to listing of the awarded ECTS credit points for each course in the Transcript of Records will be discussed in the forthcoming department curriculum committee meeting and will be further forwarded to the SQU authorities for updating it.

Diploma Supplement is attached herewith the report.”

Criterion 5

No comment

“Conclusion: In this response report, we have endeavored to address the pending requirements of ASIIN as per the experts’ observations outlined in their onsite visit report for seeking the accreditation of our BSc (Statistics) program. We look forward to your further decision on the extension of the accreditation.”

F Summary: Expert recommendations (22.08.2024)

Taking into account the additional information and the comments given by SQU, the experts summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation
Ba Statistics	With requirements for one year	30.09.2031

Requirements

- A 1. (ASIIN 4.1) Submit a module handbook, which contains module descriptions for all modules of the study programme (including those provided by the Department of Mathematics).
- A 2. (ASIIN 5) Ensure that students are informed about the results and actions taken based on the satisfaction questionnaires.

Recommendations

- E 1. (ASIIN 1.1) It is recommended to increase the collaboration between different departments and colleges at SQU as well as with partners from the private sector and public institutions.
- E 2. (ASIIN 1.3) It is recommended to implement new software and new programming packages into the study programs in accordance with new developments.
- E 3. (ASIIN 1.3) It is recommended to include the fundamentals in machine learning, artificial intelligence, and data mining in the compulsory curriculum.
- E 4. (ASIIN 1.3) It is recommended to sufficiently introduce students to probability models and fundamental knowledge on statistical error control.
- E 5. (ASIIN 1.3) It is recommended to improve content of lectures on (statistical) error control.
- E 6. (ASIIN 1.3) It is recommended to allow students to take part in credited internships without prolonging their study duration.

- E 7. (ASIIN 1.3) It is recommended to foster students' soft skills in the classroom, especially in communication (oral and written), leadership and critical thinking.
- E 8. (ASIIN 1.6) It is recommended to continue to implement student-centered approaches, including group work and case studies. Further, it is recommended to have smart classrooms and promote active learning in addition to updating the laboratories, computers as well as the software and related tools. This should also strengthen the students' practical skills.
- E 9. (ASIIN 2) It is recommended to review the high number of assessments and provide a higher variety of assessment forms.
- E 10. (ASIIN 3.1) It is recommended to review the total workload (teaching, research, supervision, administration, committee work, etc.) of the staff of the Department of Statistics to ensure sufficient human resources are available.
- E 11. (ASIIN 3.1) It is recommended to increase the number of guest lectures at the Department of Statistics.
- E 12. (ASIIN 3.1) It is recommended to encourage the staff to take part in professional development programs, including programs on pedagogy and personal development.
- E 13. (ASIIN 3.2) It is recommended to increase the number of digital books and learning materials to facilitate regular updates.
- E 14. (ASIIN 4.2) It is recommended to include information on the awarded ECTS points in the Transcript of Records.

G Comment of the Technical Committee 12 - Mathematics (09.09.2024)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee confirms that there is a particular need for improvement in the areas of module descriptions and feedback on teaching evaluations. The TC briefly discusses the procedure and overall agrees with the proposed requirements and recommendations.

The Technical Committee 12 – Mathematics recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation
Ba Statistics	With requirements for one year	30.09.2031

H Decision of the Accreditation Commission (24.09.2024)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The Accreditation Commission discusses the procedure, especially about the need to conduct an internship. In general, the AC agrees that conducting an internship is useful. However issuing a recommendation to this effect is not supported, because it would mean to cancel other modules. Additionally, conducting internships are not common practice in Oman. The other proposed changes are accepted.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN Seal	Maximum duration of accreditation
Ba Statistics	With requirements for one year	30.09.2031

Requirements

- A 1. (ASIIN 4.1) Submit a module handbook, which contains module descriptions for all modules of the study programme (including those provided by the Department of Mathematics).
- A 2. (ASIIN 5) Ensure that students are informed about the results and actions taken based on the satisfaction questionnaires.

Recommendations

- E 1. (ASIIN 1.1) It is recommended to increase the collaboration between different departments and colleges at SQU as well as with partners from the private sector and public institutions.
- E 2. (ASIIN 1.3) It is recommended to implement new software and new programming packages into the study programs in accordance with new developments.
- E 3. (ASIIN 1.3) It is recommended to include the fundamentals in machine learning, artificial intelligence, and data mining in the compulsory curriculum.
- E 4. (ASIIN 1.3) It is recommended to sufficiently introduce students to probability models and fundamental knowledge on statistical error control.

- E 5. (ASIIN 1.3) It is recommended to improve content of lectures on (statistical) error control.
- E 6. (ASIIN 1.3) It is recommended to foster students' soft skills in the classroom, especially in communication (oral and written), leadership and critical thinking.
- E 7. (ASIIN 1.6) It is recommended to continue to implement student-centered approaches, including group work and case studies. Further, it is recommended to have smart classrooms and promote active learning in addition to updating the laboratories, computers as well as the software and related tools. This should also strengthen the students' practical skills.
- E 8. (ASIIN 2) It is recommended to review the high number of assessments and provide a higher variety of assessment forms.
- E 9. (ASIIN 3.1) It is recommended to review the total workload (teaching, research, supervision, administration, committee work, etc.) of the staff of the Department of Statistics to ensure sufficient human resources are available.
- E 10. (ASIIN 3.1) It is recommended to increase the number of guest lectures at the Department of Statistics.
- E 11. (ASIIN 3.1) It is recommended to encourage the staff to take part in professional development programs, including programs on pedagogy and personal development.
- E 12. (ASIIN 3.2) It is recommended to increase the number of digital books and learning materials to facilitate regular updates.
- E 13. (ASIIN 4.2) It is recommended to include information on the awarded ECTS points in the Transcript of Records.

Appendix: Programme Learning Outcomes and Curricula

According to self-assessment report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Statistics:

BSc Statistics Program Objectives

- To provide graduates with a coherent knowledge of Statistics, both in breadth and depth, on the principles and practice of the subjects;
- To produce graduates who can apply their mathematical knowledge effectively in interdisciplinary areas;
- To produce graduates with good communication skills;
- To produce graduates who are able to apply their acquired knowledge and skills in Statistics to solving real life problems;
- To produce graduates prepared for life-long learning and subsequent graduate studies;
- To produce graduates who can think analytically and critically.

BSc Statistics Program Outcomes

Upon successful completion of the program, graduates are expected to have achieved the following Program Outcomes.

1. The ability to apply the knowledge and skills acquired in mathematics and statistics in solving real life problems.
2. The ability to identify, formulate and solve mathematical and/or statistical problems.
3. The ability to communicate effectively with a range of different audiences.
4. The ability to collect, organize, analyze and interpret data in statistical settings.
5. The ability to write reports clearly and legibly and systematically.
6. The ability to function effectively as a team player to accomplish a common goal.
7. The recognition of the need for self-improvement, and to seek more knowledge and skills in mathematics and/or statistics.
8. The ability to reach out and cope with complexities of interdisciplinary applications.

9. An understanding of professional responsibilities.
10. The ability to think analytically and critically, and to engage in innovative applications of mathematics and statistics in diverse areas.

The following **curriculum** is presented:

**Department of Statistics Degree Plan for
Cohort 2021-2025**

Categories	CR
University Requirements (UR)	6
University Electives (UE)	6
College Requirement (CR)	3
College Electives (CE)	16
Departmental Requirements (DR)	17
Departmental Electives (DE)	6
Major Requirements (AR)	42
Major Electives (AE)	26
TOTAL	122

Semester 1 Fall	Course Code	Course Title	Cr .	Pre-Requisite/Co-Requisite*	Cat.
	ARAB1060 or	Arabic Arabic for Non-Arabic Speakers	2 3		UR
	SOCY1005 or	State and People or Omani Contemporary Society (for Non-Omanis)	2		UR
	LANC2058	Communication in Science	3	FPEL0560 or FPEL0600 or FPEL0601 or FPEL0602 or FPEL0603 or FPEL0604	CR
	MATH2107	Calculus 1	4	FPEL0560 or FPEL0600 or FPEL0601 or FPEL0602 or FPEL0603 or FPEL0604 and (FPMT0105 or FPMT0108 or FPMT0109)	DR
	STAT2101	Introduction to Statistics	4	FPEL0560 or FPEL0600 or FPEL0601 or FPEL0602 or FPEL0603 or FPEL0604 and (FPMT0105 or FPMT0108 or FPMT0109)	AR
	Total			15	

0 Appendix: Programme Learning Outcomes and Curricula

Semester 2 Spring	HIST1010 or ISLAM1010	Oman & Islamic Civilization or Islamic Culture	2		UR
	COMP2101	Introduction to Computer Science	4	FPEL0560 or FPEL0600 or FPEL0601 or FPEL0602 or FPEL0603 or FPEL0604 and (FPCS0101 or FPCS0102)	CE
	MATH2109	Calculus II for Science and Engineering	3	MATH2107	DR
	MATH2348	Foundations of Mathematics	4	MATH2107	DR
	STAT2102	Introduction to Probability	3	STAT2101/ (MATH2108 OR MATH2109)*	AR
Total			16		

Semester 3 Fall	Course Code	Course Title	Cr.	Pre-Requisite/Co-Requisite*	Cat.
	MATH2201	Linear Algebra with Applications	3	LANC2058	DR
	STAT3335	Introduction to Sampling	3	STAT2102 and LANC2058	AR
	STAT3239	Statistical Inference I	3	STAT2102	AR
		College Elective	4		CE
		University Elective	2		UE
	Total			15	

Semester 4 Spring	MATH3111	Calculus III	3	(MATH2108 OR MATH2109) & LANC2058	DR
		University Electives			UE
	STAT3339	Statistical Inference II	3	STAT3239	AR
	STAT3336	Computational Techniques in Statistics	3	STAT3239, COMP2101 & LANC2058	AR
		Major Elective	3		AE
Total			16		

Semester 5 Fall	STAT4432	Regression Analysis	3	(MATH2202 OR MATH2201) , STAT3339	AR
	STAT4434	Non-Parametric Statistics	3	STAT3339, (MATH2108 OR MATH2109)	AR
		Departmental Elective	3		DE
		Major Elective	3		AE
		Major Elective	3		AE
Total			15		

0 Appendix: Programme Learning Outcomes and Curricula

Semester 6 Spring	STAT4436	Survey Methodology	3	STAT3335	AR
	STAT4433	Design and Analysis of Experiments	3	STAT3339	AR
		Major Elective	3		AE
		Major Elective	3		AE
		University Electives (2)	4		UE
Total			16		

Semester 7 Fall	STAT5521	Categorical Data Analysis	3	STAT3336, STAT3339	AR
	STAT5537	Multivariate Techniques	3	STAT4433, (MATH2201 OR MATH2202), (MATH3111 OR MATH3110)	AR
	STAT5539	Data Analysis	3	STAT3336, STAT 4432, STAT4433, STAT 4434/STAT5521*	AR
		Departmental Elective	3		DE
		Major Elective	3		AE
Total			15		

	Course Code	Course Title	Cr.	Pre-Requisite/Co-	Cat.
Semester 8 Spring	STAT5536	Time Series Analysis	3	STAT 4432	AR
	STAT5599	Project in Statistics	3	STAT5539	AR
		Major Elective	3		AE
		Major Elective	3		AE
		Major Elective	3		AE
Total			15		