ACQUIN
Akkreditierungs-, Certifizierungs- und Qualitätssicherungs-Institut

Accreditation Report

Accreditation of

German University of Cairo

"Information Engineering and Technology" (B.Sc./M.Sc.),
"Media Engineering and Technology" (B.Sc./M.Sc.)

I. Procedure

Previous accreditation: September 28th, 2011

Date of Contract: December 20th, 2017

Receipt of self-evaluation report: April 1st, 2017

Date of the on-site visit: April 22nd-23rd, 2018

Standing Expert Committee: "Information Technology" and "Engineering"

Attendance by the ACQUIN Office: Clemens Bockmann

Accreditation: September 25th, 2018

Members of the Peer Group:

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The Evaluation report of the peer group is based on the self-evaluation report of the GUC and extensive discussions with the President, the head of the study programme, staff representatives (lectures), students. **Evaluation Criteria** have been the "Rules for the Accreditation of Study Programmes and for System Accreditation" in the actual official version of February 20th, 2013.

Date of Publication: October 30th, 2018

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II. Introduction

1. Short Profile of the Higher Education Institution (HEI)

The German University in Cairo (GUC) is an independent, non-profit oriented Egyptian private institution, managed by a consortium of Germans and Egyptians with the vision of building a leading centre of excellence in teaching and research that will effectively contribute to the general welfare nationally and internationally and endeavour the scientific, technical, economic and cultural cooperation between Egypt and Germany.

GUC was founded in 2002 in cooperation with the State Universities of Ulm and Stuttgart, under the patronage of the Egyptian Ministry of Higher Education, the Ministry of Science, Research and Arts, State of Baden- Württemberg, Germany, and supported by the German Academic Exchange Service (DAAD), the German Embassy in Cairo, the Arab/German Chamber of Industry and Commerce (AHK), the Federal Ministry of Education and Research, Germany, The State University of Tübingen and The State University of Mannheim. GUC opened its gates to students in October 2003.

The GUC is with roughly 12,500 students (summer 2017) a significant educational institution now and is ranked according to the results of national examinations for university ranking among the best universities in Egypt. GUC attracts students mostly from Egypt, but other Arabian and African countries as well. Due to its reputation, GUC is able to select its students from the top 5% of each school year's graduates – one out of ten applicants is admitted to study at GUC.

GUC offers 31 undergraduate and 40 postgraduate study programmes including PhD-programmes in seven faculties: the Faculty of Pharmacy and Biotechnology, the Faculty of Engineering and Materials Science, the Faculty of Information Engineering and Technology, the Faculty of Management Technology, the Faculty of Media Engineering and Technology, the Faculty of Postgraduate Studies and Scientific Research, and the Faculty of Applied Sciences and Arts. The teaching language at GUC is English; while German is taught in addition to allow the exchange of GUC students with German universities and to facilitate their training in German companies. For the future the establishment of a Faculty of Basic Sciences and of a Faculty of Human Sciences and Languages is planned.

GUC is located on 577,000 m² in New Cairo City, an eastern suburb of Egypt's capital. The Campus includes a 70,400 m^2 sports area, 77,500 m^2 industrial park and a newly erected solar park. GUC has established a German campus in Berlin in 2013 to give students a better chance for a semester abroad in Germany and to attract more short term visiting scholars from Germany.

2. Short programmes of the programme

The international bachelor programme IET (BIET) offered by the FIET consists of eight semesters (240 ECTS-points). Graduates choose one of three majors: Communications, Electronics, and Networks. On average 130 students start every fall semester. The BIET is open to students with highest school degrees that have an interest in Information Technology and pass the English and reasoning tests on application.

The international master programme IET (MIET) offered by the FIET consists of three semester (90 ECTS-points). Admission to the master programmes MIET is only open to GUC Bachelor graduates who achieve a minimum of "C" overall grade and who are highly interested and strongly committed towards post-graduate studies and research. The final selection of the students will be based on the GPA ranking and on availability of M.Sc. topics.

The international bachelor programme MET (BMET) offered by the FMET consists of eight semesters (240 ECTS-points). Graduates choose one of two majors: computer science and engineering (CSEN) or digital media engineering and technology (DMET). Students start in the fall semester. The numbers of students are rising since several years, peaking fall 2016/17 with 300 students. The BMET is open to students with highest school degrees that have an interest in Media Engineering Technology and pass the English and reasoning tests on application.

The international master programme MET (MMET) offered by the FMET consists of three semester (90 ECTS-points). Admission to the master programmes MMET is only open to GUC Bachelor graduates who achieve a minimum of "C" overall grade and who are highly interested and strongly committed towards post-graduate studies and research. The final selection of the students will be based on the GPA ranking and on availability of M.Sc. topics.

According to the law in Egypt demanding at least ten semesters as requirement for the Egyptian Bachelor in Engineering, a student can obtain the Egyptian Bachelor following another year of his/her study after an international bachelor programme. This year is considered to be the first year (two semesters) in the study programme towards obtaining the International Master degree which can be obtained after three semester. Therefore, the whole study time of both the international bachelor and international master programme comprises eleven semester (cf. III.0).

3. Recommendation of the previous accreditation

- Research should be encouraged and supported, so that it can influence the study programmes to a greater extent. The environment to foster research should be created.
- The teaching assistants should be employed following the German model of "Wissenschaftlichen Mitarbeiter", which means a teaching load of 5 hours per week and sufficient time for research, in particular for the Ph.D. program. The university leaders have signalized their

support for this idea already. This development is considered to be essential for a positive research environment at the GUC.

- Modules:
  - In the module descriptions, the learning outcomes should still be described in a better way. Also the frequency of the module offers should be described in the module descriptions.
  - Only whole-number ECTS-points should be used.
  - The workload of the language course HUMA 102 Academic English should be evaluated and the workload of this module should be, if necessary, adjusted.
- The time of attendance in the lectures should be reduced to provide the students with more time for independent studies.
- The workload in the study programs should distributed more equally over the semesters. Currently, the second year contains a total of 34.5 +32.5 = 67 ECTS credit points, which is well above the level of 60.
- The students should have the possibility to select from the catalogue of electives also modules in the area of the humanities/economics.
- According to the workload not only for the students but also for the teaching staff the teachers should have more flexibility in the number and form of exams they offer within the modules.
- The procedure for the correction/adaption of the curricula at the level of the faculties and the cooperation between faculty and central management (who is responsible for what and when) should be clearly described.
- Students should get a feedback about evaluation results.
- In particular, the following subjects should be covered by the curriculum of the different study programs (as electives):
  - IET NETW: Security and upper-layer communications (Web engineering, content-delivery networking)
  - MET DMET: Technology of games and security
  - MET CSEN: Technology of games and security, with slightly different focus
  - All programs: energy-aware communications and computing

III. Evaluation

0. Special Situation concerning Egyptian Bachelor vs. International Bachelor

The specific situation in Egypt has to be taken into account if one wants to assess the study programmes. The situation arises from the fact that GUC is a German university offering study programmes in Egypt and thus has to adhere to Egyptian legislation as well as to objectives of Egyptian engineering students. On the other side GUC is interested to offer international recognized bachelor and master degrees in line with German regulations.

According to the law in Egypt demanding at least ten semesters (300 ECTS-points) as requirement for the Egyptian bachelor of science in an engineering topic, equivalent to a bachelor *and* master study programme in Germany. To satisfy both the Egyptian and the German regulation, GUC offers bachelor programmes in engineering of eight semesters (240 ECTS-points) that consists of seven semester study time and an internship/practical time and bachelor thesis in the eighth semester. After this semester, students have finished the international bachelor and are handed out the diploma supplement that documented this achievement. It has to be noted that this diploma supplement is *not* a certificate representing a B.Sc. graduation certificate according to the Egyptian graduation system, as one year is missing.

To obtain the Egyptian bachelor of science in engineering, the students continue their study time by starting the master programme of three semesters (90 ECTS-points). After two semesters, or one year, resp., the students have accomplished the necessary amount of study time for the Egyptian bachelor of science in engineering and are presented with the Egyptian bachelor degree. Since the international master programme can be studied in three semesters as compared to the usual four-semester Egyptian master of science programmes in engineering, it has the advantage to end with the international master of science degree in engineering after another semester or the eleventh semester in total. This last semester is reserved for the master thesis. Studying the master of science in engineering programmes to the end is primarily of interest to scientifically oriented students willing to do a subsequent PhD degree, especially for those who want to go abroad. But as students obtain an international master degree after 330 ECTS-points compared to students of an Egyptian master degree after 420 ECTS-points, more and more students continue the international master programme to the end.

1. Targets of the University and Faculty

1.1. Objectives of the HEI

The vision and mission statement along with philosophy and values are published on the internet and give a clear picture of GUC's grand strategy. GUC's vision is: "Building a leading centre of excellence in teaching and research that will effectively contribute to the general welfare nationally and internationally and endeavour the scientific, technical, economic and cultural cooperation between Egypt and Germany." This vision is coherent to the mission statement, which serves as guideline for the conduct of affairs:

- Achieve excellence in teaching and research.
- Offer non-traditional study programmes in science and technology that are built on modern curricula in collaboration with the German State Universities and other international institutions.
- Produce the most comprehensively prepared, multidisciplinary and innovative graduates being able to interact effectively with the challenges and competitions created by global economy and being competent to play leading roles in their areas of specialisations.
- Attract students of high potentialities.
- Provide the chance for students from neighbouring countries to pursue their studies and obtain their academic degrees at international standards.
- Award annual scholarships for distinguished students, thus promoting talent and excellence among students.
- Create an excellent and self-contained intellectual atmosphere of work and study for both staff and students.
- Develop scientific, cultural and business links with the national and international institutions in Egypt, Germany and other countries.
- Apply state-of-the-art information technology in teaching and research.
- Open new channels for Egyptian-German cooperation in higher education and in basic and industrial research.
- Provide continuous training and professional services to the public, thus helping individuals to acquire up-to-date knowledge and experience.
- Commit itself to the training and development of academic and non-academic staff as key resources to the success of GUC.

Derived from these mission statement, GUC has set several goals to accomplish:

- To provide high quality education that meets the needs of our students and their employers in Egypt and the region and internationally.
- To develop and enhance the international scope and reputation of GUC as a nationally and internationally recognised leader in selected academic programs as well as in scientific research and creative activities.
- To recruit highly qualified and academically prepared students.
- To attract, develop, and retain excellent faculty and staff.
- To ensure that students receive high quality academic and student support services appropriate to their needs, interests and goals
- To enhance the university and community through partnership with public, private, and non-profit sector organisation (local & international) knowledge transfer, and cultural resources.
- To maintain an overall sound financial position.
- To maintain quality of physical plant and ensure the efficient and appropriate utilisation of GUC instructional and laboratory facilities as well as faculty and staff offices and workshops.
- To ensure that students, faculty, and staff have access to the latest, state-of-the-art IT applications in teaching, learning, and research.
- To develop, maintain and continue to improve library facilities in order to enhance the quality of teaching, learning, and research through providing students, faculty, and staff with access to the up-to-date books, references, research materials, periodicals and journals.
- To develop and implement communication and promotional plan consistent with the University strategic plan.

The first decade of GUC has seen a rapid expansion both in study programmes as well as in student numbers. By now, GUC has entered a consolidation phase. Although there will be an expansion into the field of Humanities and a constant rise of student numbers up to 25,000 in the long run, the focus for the next decades is set on PhD-programmes and expansion of the research capacities. Although less than 1% of all Egyptian studying at GUC, the university's output of scientific papers is more than 8% of the research papers published in Egypt. GUC aims at more papers published in peer-reviewed international journals. The peer group welcomes such efforts.

1.2. Strategy of the faculties

1.2.1 Strategy of the Faculty of Information Engineering and Technology

The mission of the faculty of Information Engineering and Technology (FIET) is to:

- Provide world class standards of electrical engineering education with emphasis on information technology.
- Inspire its students to become high caliber engineers with high desire for learning and commitment to innovative research.
- Contribute to GUC evolution as a comprehensive research institution of higher education.
- Play a fundamental role in preparing students for their future lives as engaged and responsible citizens.
- Promote industrial cooperation and to provide the industry with innovative solution for their problems.

The vision of the FIET is to be recognized in the future as a leading centre of excellence in internationally credited scholarly and innovative research, dedication to teaching and proactive involvement in national and global societies.

1.2.2 Strategy of the Faculty of Media Engineering and Technology

The mission of the faculty of Media Engineering and Technology (FMET) is to:

- Produce graduates that can pursue top international leadership positions.
- Provide graduates with strong foundations in basic sciences, computer sciences and engineering, and digital media engineering, so that they are able to creatively apply their understanding to the real-world problems they will face in whatever career path they choose.
- Tackle challenging and fundamental real-world problems with the potential of long-term social benefit.
- Promote the GUC as a leading research institute through collaboration with national and international academic and industry partners.

The FMET is committed to scholarly research in the different fields of computer science and digital media engineering. The Faculty accomplishes its research mission by:

- Supporting innovative research and creativity with the best facilities and funding for these activities;
- Inspiring students to engage in scholarly activities that spark their passion, inside and outside the classroom
- Participating in world class conferences and publishing in internationally credited periodicals;
- Acquiring research grants from internationally recognized funding agencies.

2. Targets and Concept of the Study Programmes "Information Engineering and Technology" (B.Sc./M.Sc.)

2.1. Targets of the Study Programmes

Another specific aspect is due to the denomination of the programmes. Indeed, the label 'Information Engineering and Technology' is not really in line with the study contents of the programmes. However, the Egyptian supreme council supervising the designation of Egyptian engineering programmes as a central authority does not permit to name the programmes according to their contents. Instead, in the year 2000, the names of the study programmes have been chosen and defined by a presidential degree so that they cannot be changed, no matter what their contents are.

2.1.1 Short summary of the Study Programme

The BIET programmes' target is to educate communication engineers being responsible for designing, developing, testing as well supervising the production of telecommunication systems, radar and navigation systems and wireless communication networks. These engineers are to be involved in designing new products, writing requirements for their performance, as well as developing maintenance schedules and charts. Testing equipment and machinery, solving operation problems, estimating time and cost of electrical and electronic products are also considered parts of potential graduates' activities.

With respect to the contents, the MIET programme deepens the knowledge of students in advanced telecommunications systems, signal processing, advanced electronics, and computer networking. Even if the graduates do *not* continue their studies in the framework of a PhD programme, they will have the technical skills for an employment in industry dealing with communications, networking and electronics. The MIET programme is presently only open to graduates of the GUC, which emphasizes the specific role it has in the spectrum of M.Sc. engineering programmes in Egypt. Therefore, the arrangement of the BIET and MIET programmes are a problem de jure, but de facto cannot be changed, be it with or without an accreditation according to the Bologna rules.

With regard to contents, the programmes focus on certain parts of electrical engineering as well as information engineering, namely communications, electronics and computer networks. Differently from usual electrical engineering B.Sc. and M.Sc. university curricula, though, electrical power engineering, metrology and electrical networks are *not* part of the IET programmes. A prerequisite for students to be accepted in the programmes is a sufficient English language proficiency, which is checked prior to registration (cf. Sect. 2.2). The level of most courses and classes is sufficient to educate students both for practical activities as engineers in industry and companies

as well as for a scientific career with a subsequent PhD project upon finalization of the M.Sc. programme. Therefore, the qualification targets are in line with those of German university B.Sc. and M.Sc. engineering programmes.

A minor difference as compared to other German degrees, which is worth mentioning, though, is that all graduates are granted an *engineering* degree, while graduates with a focus on computer networks could also be considered to be rather *computer science* graduates than engineering graduates.

2.1.2 Competences to be achieved

The professional competences to be achieved are not termed this way, but are rather considered 'professional and practical skills'. The latter are listed in the module handbooks together with corresponding course aims and learning outcomes. Summarizing these skills in the general descriptions of the programmes, it can be concluded that the professional competences correspond to the classical ones of engineers working in communications, electronics and computer networks. These competences comprise research and development, consulting, operation and maintenance, technical and eco-technical designs, management tasks, tendering etc.

The methodical competences comprise independent literature research, presentations, deductive and inductive reasoning, formulations and solutions of optimization problems, ability to work in interdisciplinary fields related to engineering etc.

Generic competences include primarily language skills in German and English, the ability to work in international and intercultural contexts, to adapt to specific environments and working conditions and to act by critical thinking. Concerning the nexus to the German education system, there are four compulsory German language modules in the undergraduate level, which are foreseen to reach a German language level B2. This can be considered a good basis to continue towards the level C1, which is required to continue studies in a German programme at a university in Germany.

2.1.3 Personal Development and Capability for Civic Engagement

There are no explicit measures foreseen exclusively to develop personal skills and the capability for civic engagement. The only module targeting *parts* of these skills is 'Critical Thinking and Scientific Methodology' (HUMA 202) taught by the English Centre in the IET undergraduate programme. Furthermore, many modules encourage leadership skills as well as efficient team building.

2.1.4 Employability

In general, communication engineering graduates can find employment in all fields where signal processing, signal estimation and detection is relevant, primarily in research and development departments of small and medium enterprises as well as globally operating companies. Foremost,

this concerns communication, control and metrology industry, e. g. in the automotive industry with global positioning systems, in designing, developing, testing as well supervising the production of telecommunication systems, radar and navigation systems and wireless communication networks as well as systems requiring high-precision measurement facilities. In addition, biomedical engineering and data science systems are on the rise to host these graduates. In view of the complexity of modern systems in all aforementioned areas, the companies to employ the graduates are operating in most cases globally so that the employability, in general, has to be assessed on a global scale. An example is the current development of the new 5G mobile communication standard and its roll-out to be expected soon. Clearly, job opportunities for graduates on the Egyptian labor market depend on national economy figures and political developments, which are not under the control of GUC.

Similar to communications, electronics engineering graduates are required in different fields of industry, research and commerce including consumer electronics, circuit design, microelectronics and power electronics. Electronics graduates work in development and research, design, testing and verification of electronic circuits, or in automation engineering areas. Computer network engineers are responsible for building, maintaining and administering computer networks for troubleshooting hardware and software, providing software support and performing system design and analysis. Other increasingly demanded job titles with similar responsibilities include mobile communication network administration, security engineering and network architecture engineering.

An important option for IET graduates is the possibility to continue their professional career in Germany or, in general, outside Egypt. Currently, there is a demand for qualified engineers in communications, electronics and computer networks in German industry as well as in research, primarily in academia and Fraunhofer Society research organizations, where M.Sc. graduates can do their PhD to qualify for the German degree 'Doktor-Ingenieur'.

2.2. Admission criteria & demand of the programme

As an Egyptian private university, GUC complies with the admission regulations from the Supreme Council for Egyptian Universities and Private Universities Council (PUC) of the Ministry of Higher Education. The PUC sets the general rules that regulate the admission to private universities including the minimum requirements for acceptance at private universities. These rules include the minimum high school scores to be obtained by the applicants, the qualifying subjects required by each secondary school certificate for each study group, the documentations needed for registration etc. The GUC admits undergraduate students once a year, namely in the winter semester. Based on availability of places, a second admission may be allowed for the spring semester. Applicants must apply for admission before the declared deadline, which can be obtained from the

university admission office. Each applicant must complete all required documentation upon applying for admission. The GUC cannot guarantee admission of a student with incomplete documentation. The Egyptian Ministry of Education mandates that all students admitted to a university must have completed a minimum of eleven years of education for foreign certificates such as the International General Certificate of Secondary Education (IGCSE), the American Diploma etc. Applicants must submit a proof of their eleven years of primary and secondary education.

Furthermore, each applicant must pass the following tests:

- GUC reasoning test: This test lasts for 50 minutes and includes questions that are classified into categories according to their types, namely verbal comprehension and relationships, induction, facts and results, deduction and discovery.
- GUC computerized English language test: This test lasts for 45 minutes and is made up of three sections, namely language use, reading comprehension and listening comprehension. It aims at finding out whether a student can study without difficulty in lectures and in reading textbooks and lecture notes at an English-speaking university.

Passing the GUC admission tests is a prerequisite for admission. The students being admitted at GUC are those who pass both the reasoning and English admission tests as well as meet the university academic requirements including having the qualified subjects and obtaining at least five percent higher than the minimum score set by the PUC for the chosen study group. More specific descriptions for applicants of the BIET and MIET programmes can be found on the GUC web site.

It would be suitable for the development of the study programme BIET to monitor the programme specific drop-out-rate of students and the number or students switching the subject and the major/minor within the GUC, respectively.

2.3. Concept

The structure of the programmes resembles the standard structure of corresponding consecutive bachelor and master engineering programmes according to the Bologna process. With respect to the contents, the MIET programme builds upon the competences and knowledge achieved in the BIET programme. The specific conditions described in Sect. III.0, however, require to ‘adapt’ this usual standard structure to the Egyptian requirements defined by the Supreme Council.

The contents of the programmes fully cover the required topics being necessary to enable graduates to achieve the competences described in Sect. III.2.1.2. In particular, the programmes have a sound basis in mathematics and the topics of the three study foci communications, electronics and networks. The major “Networks” of the study programme IET should be changed to “Computer Networks”. Furthermore, the acquisition of language and soft skills is being ensured in the course of the programmes, where specific emphasis is on German language proficiency and critical

thinking, where the latter is part of about 20 modules in the undergraduate and graduate level modules.

The programmes are appropriate with respect to the contents of the individual modules. However, while the graduates are overall well-educated and should be able to work in both industry and academia, the number of scientific publications at the IET department muss increase in the near future to evidence an appropriate 'scientific embedding' of bachelor and master thesis projects.

2.4. ECTS & modularization

Overall, the changes in the offered modules being described in the document on curricula changes are important and address certain claims of the previous accreditation recommendations. In this context, it is worthwhile mentioning that GUC aims at improving the modules in different respects like e.g. workload equalization, deletion of courses not being chosen by students and addition of courses for giving students insight into recent topics in all three study foci communications, electronics and computer networks.

The modules are reasonably balanced concerning the workload and documented in the module handbooks. According to the Bologna standards, though, the so-called 'professional and practical skills' should be termed 'competencies' instead. Concerning the number of ECTS per module, it there are a total of five modules in the BIET programme that contain only two ECTS-points and several more of three or four ECTS-points. But the former are modules training soft skills abilities, while the latter include the language courses. After all, there are regularly six modules in each semester leading to six module examination.

Furthermore, the type and scope of exams are not described uniformly within the module handbooks. In the latter, the exams are described in a somewhat hidden way in form of so-called 'Student Assessment Methods' with corresponding weights. It should be clearly indicated what type of exam is being conducted (written, oral, presentation, homework etc.) and the time it takes for doing the corresponding exams.

3. Targets and Concept of the Study Programmes "Media Engineering and Technology" (B.Sc./M.Sc.)

3.1. Targets of the Study Programmes

3.1.1 Short summary of the Study Programme

The objective of the bachelor programme BMET is to enable graduates to take over leading positions in a wide area of future oriented media industries. The bachelor programme has the objective to provide programme graduates with:

- Solid practical and theoretical knowledge in the field of either "computer science and engineering" or "digital media engineering and technology" that will qualify them for a wide range of successful career paths in the industry or in public institutions.
- Excellent opportunities to pursue their postgraduate studies and research at the GUC, in Germany or Europe.
- Skills, both technical and personal, that will allow them to communicate successfully in a multicultural and rapidly changing professional environment.

In addition the master programme MMET has the objectives of

- Deepening the fundamental scientific and engineering principles that the students acquired in the fields of Computer Science and Engineering and Digital Media Engineering and Technology.
- Deepening the scientific research capabilities of the students through analysing and solving research problems.
- Building and refining personal skills in critical thinking, problem analysis and problem solving.
- Being able to work in teams and communicate effectively, both verbally and in writing, in a multi-cultural environment to achieve objectives.
- Being able to pursue further studies, i.e., PhD, nationally and internationally.

The students are educated in an interdisciplinary way such that after basic studies including fundamentals in mathematics and science they choose one of two possible specializations, i.e., Computer Science and Engineering (CSEN) or Digital Media Engineering and Technology (DMET). The first specialization, CSEN, comprises an informatics-centred direction. Graduates of CSEN are expected to be proficient in state-of-the-art computer engineering techniques and the design, as well as, analysis of computer systems. The study programme MET with specialization CSEN is

comparable to computer science programmes in Germany, however, with less emphasis on theoretical computer science.

Students choosing the second specialization DMET are taught to have command in digital technologies for audio-visual content production and delivery. The DMET graduates are expected to possess skills in understanding advanced media hardware and software systems. The study programme BMET with specialization DMET is not fully comparable to Media informatics in Germany. It comprises, however, a mixture of courses found in Media informatics in Germany in addition to fundamental engineering and science courses, as well as, courses from traditional electrical engineering and Technical Informatics syllabi in Germany. Nevertheless, the current majors CSEN and EDPT in the study programme BMET should be substituted with three majors "Computer Sciences", "Computer Engineering", "Media Engineering" to give a better differentiation of the content taught. The content and scope of "Media Engineering" should be re-evaluated in due time.

In the master programmes MMET the two specializations are continued as "Computer Science and Engineering" and "Digital Engineering and Technology". Here, emphasis is placed on professional development. The Master programme has the clear goal to enable students to pursue their PhD either at GUC or abroad.

3.1.2 Competences to be achieved

The graduates of the MMET study programme with both specializations CSEN and DMET – as most of the BMET students continue their studies up to the tenth semester for the Egyptian bachelor degree – are expected to achieve the following competences:

- Demonstrate proficiency in logic and mathematics, including calculus and discrete mathematics;
- Demonstrate proficiency in software design and development, algorithms, operating systems, programming languages, theory of computation, and computer architecture and successfully apply these principles and practices to a variety of problems;
- Work with other students on multi-disciplinary teams;
- Demonstrate the ability to communicate effectively;
- Demonstrate knowledge of basic science and laboratory procedures;
- Realize the need to continuously refine their computing knowledge and skills and learn to use new tools and processes;
- Be employed upon graduation in positions that utilize their computing education or enter graduate programs in computing to further refine their skills.

3.1.3 Personal Development and Capability for Civic Engagement

The students receive strong support to conduct many activities covering a broad and diverse spectrum. The students' active working groups provide a strong path towards personal development and civic engagement. The student activities do not only contribute towards professional working groups such as the IEEE but also towards leadership development efforts and organizations working for sustainable development in education, employment creation and health care. In addition the students attend courses that require them to demonstrate critical thinking which helps them to take over responsibility in the society after graduation.

3.1.4 Employability

The students are taught to be able to target different areas of employment such as academia, research, industry, government, private and business organizations. The graduates of the MET programme are expected to possess the capabilities to target technical positions in the media oriented industrial sectors. The focus of the syllabi for the specializations CSEN and DMET enables the students to target areas such as artificial intelligence, computer networks and media engineering.

3.1.5 Conclusion

The defined objectives of the study programmes BMET and MMET are clearly formulated. The objectives are credible and match with the sought qualifications. The students acquire fundamental knowledge, as well as, specialized further treatment of either Computer Science and Engineering or Digital Engineering and Technology allowing them to demonstrate proficiency in a broad spectrum of corresponding problem spaces. The students' personal development in a professional direction, as well as, the development in their capability for civic engagement is strongly supported. The students are engaged to critically examine the taught knowledge.

The programmes show effectiveness in reaching the envisioned objectives as the graduates of the MMET study program, which is currently renowned in Egypt, are employed by distinguished firms such as IBM, Oracle, Vodafone, EMC and Orange. The study programmes further showed success in motivating 25 graduates who are currently employed as teaching assistants to pursue their PhD.

3.2. Admission criteria & demand of the programme

Students admitted to the BMET study program come from different high school backgrounds. The high school diploma degrees accepted at the GUC include the German Abitur, the American Diploma, IGCSE and GCSE and the Egyptian high school diploma. The GUC admission process not only concentrates on the high school diploma scores but also includes GUC's own tests covering reasoning and English language. Top students receive scholarships that are divided in categories

depending on their ranking in their module class. It is worth noting that students receiving scholarships come from different parts of the country.

The GUC enrolled 2,331 students in 2016/17 out of nearly 20,000 applicants. The enrolled students have high average scores of at least 5% higher than the minimum score set by the Council of Private Universities of the Ministry of Higher Education for the chosen study group. Around 293 students joined the BMET programme in the academic year 2015/16. This shows the high demand for the GUC and especially for the BMET programme. Considered over the years 2009 until 2015 this demand for the MET programmes has been growing with an exception due to an external change in the Egyptian high school system.

The dropout rates are very low due to the method of calculation. Only students leaving GUC are calculated as dropouts. It would be suitable for the development of the study programme BMET to monitor the programme specific drop-out-rate of students and the number or students switching the subject and the major/minor within the GUC, respectively.

3.3. Concept

3.3.1 Bachelor programme

The BMET is structured into eight semesters. The first two semesters constitute a basic introduction into engineering with focus on mathematics, physics, chemistry, computer science and programming, engineering drawing, and scientific methodology. Two German language courses supplement the programme. There is a focus on exercises (18 out of 30 semester hours per week (SWH)) in these two semesters and a slight work overload (34 out of 60 ECTS-points) in the second semesters. Structure and topics are appropriate as such, however, a course on chemistry appears be out of scope of MET and the workload could be more balanced between the two semesters. The third and fourth semester comprise mathematics, physics, electric circuits, digital logic, signals and systems theory, computer programming, including soft skill courses. Topics in these two semesters are reasonable, while workload is above 70 SWH equivalent to 65 ECTS-points and comparatively high to European standards. Fifth, sixth and seventh semester specialize in two different directions, CSEN and DMET, with focus on either computer science engineering technology or digital media technology. This is a sensible subdivision as it well reflects the two major departments involved in the study programme; however, more choices by offering selective electives could strengthen the programme. In the fifth and sixth semester the overlap between the specializations is apparent. The number of SWH dedicated to lab courses is four out of 30, which is somewhat small by still sufficient.

In the eighth semester the students have to complete an internship of three months and a Bachelor thesis of three months both comprising 15 ECTS points. The internship can be split into parts of at least four weeks duration for each part. The internship aims at developing subject-related

knowledge and experience. The students get assistance in finding internship positions by the GUC, for example, through a well-organized annual Internship & Employment Fair on GUC Campus. The GUC also provides the students with the opportunity to train in a GUC on-campus industrial park which was built in a strategic alliance with leading German multinational firms.

The bachelor thesis has the aim of showing that the students have knowledge of the most recent developments in their working field and that they are able to use their knowledge and insights to address convolved problems. Here, the students also show their ability to work independently.

The structure of the programme shows a balance containing basic courses in engineering and natural sciences, fundamental computing and electrical engineering courses and labs as well as soft skill and language courses. Paper writing courses help spark the students' research interest. The specialization into CSEN and DMET start with a split in either "Theory of computation" and "Computer graphics". Main specialization courses are taken in the 6th and 7th semester.

3.3.2 Master programme

The master programme MMET is structured into three semesters. The goal is to possess knowledge in fields of CSEN or DMET and to deepen the students' scientific research capabilities. The students should be able to pursue graduate studies in different fields of computer science and digital media engineering after graduation. The concept of the master programme aims at making the students able to demonstrate knowledge and understanding, intellectual and professional skills as well as general and transferrable skills.

In the first two semester the MMET has courses on computer vision and soft skills (seminar and project management) as common modules, otherwise is separates into the two study directions CSEN and DMET already set in the bachelor programme. Each study direction offers tow meaningful compulsory courses and, contrary to the BMET, 10 ECTS-points elective courses in each of the two semesters nine and ten. The eleventh semester dedicates to the master thesis of six months' work or 30 ECTS-points, respectively. In their thesis students demonstrate that they have knowledge of the most recent developments in their area of research and that they are able to address theoretical and practical problems in that field.

3.3.3 Conclusion

The concepts of the BMET and MMET study programmes are well-balanced. They have the potential to give the students adequate skills (professionally, intellectually and beyond) for their future career. The specializations are strong on the practical work and could be stronger on the theoretical sides of both computer science and media engineering. The programme includes key practical labs preparing students for industry and business. Overall, structure as well as compulsory courses selected are reasonable for a programme in media engineering and technology. The de-

fined curriculum can well achieve the defined objectives of the BMET and MMET study programme. The curriculum shows a mixture of cutting-edge and classical topics. The peers suggest utilizing the established process for adapting the curriculum to include more up-to-date subjects such as Blockchain based systems and Hardware-accelerated networks. The curriculum of the BMET may also introduce a seminar in the bachelor thesis phase to prepare the students for the writing of the thesis.

A description for each module supplements the programmes' structure, containing learning outcomes, topics taught, methodology, student assessment methods, and references. This "handbook of modules" is up-to-date in terms of organization and content. For students it might be helpful to add a structured list for electives, grouping them into basic and advanced courses including recommended combinations. Some module descriptions are missing information such as HUMA 414 that misses ECTS-points and workload information and CSEN 905 which misses workload information. The seminar in both CSEN and DMET specializations is missing a description.

With respect to research-oriented teaching, it might be an option to include research seminars and flipped classroom teaching in the future to strengthen students' capabilities of self-guided learning. The continuous feedback of the students through the Students' Curriculum Committee helps to improve the programmes.

3.4. ECTS & modularization

The modularization of the program is valid and ordered in a logical way. It adequately meets the objectives of the concept described above. The modules collectively contribute to the study program in a coherent manner. The sequence of the modules, and especially the load, has been improved greatly. Professional and general skills are well reflected in the program.

The workload of the students is adequate with the exception of the second year which has overall 65 ECTS-points. This seems to be quite high and should be reduced to provide the students with more time for self-regulated studying. The workload per semester varies between 34 and 26 CPs during the eight semesters of the BMET. Therefore, in the study programme BMET the workload should be balanced evenly over the course of the semesters. The workload in one year should comprises 60 ECTS-points. The curriculum should not contain uneven ECTS-points. The workload of the modules of the German centre HUMA 411-413, which are compulsory modules, surpasses the designated overall nine ECTS-points.

According to the discussions with the teaching staff and the students, the workload and modules contents were further developed and adapted based on students' feedback which is very important to react to the student needs.

4. Implementation

4.1. Resources

4.1.1 Personal resources

The academic staff at GUC in general consists of German academics with degrees from public German universities or other countries as well as Egyptian academics with a comparable high qualification. A German Committee performs selection of academic staff after a careful pre-screening and interview process. The committee consist of the German deans as well as academic staff from the Universities of Ulm, Stuttgart, and other German cooperating universities. Successful applicants for GUC are expected to perform teaching as well as advanced study and research in their particular field of competence, which shall be aligned with the department research plans. Professors are required to have a PhD degree, teaching assistants need a Master's or Bachelor's degree. All academic staff shall have teaching experience, a record of quality publications, a significant track record in research, as well as working experience matching the position.

Upon hiring, full time as well as part time contracts are offered, where full time is limited to three years. As the three year validity depends on performance evaluation after each year, quality of the academic personal is monitored and can be kept on an expected level. A possible threat comes from the three year limitation of the contract, as this could possibly endanger continuity of academic programmes.

The teaching load of professors is eight hours per week, associate professors and lectures have to teach twelve hours per week while teaching assistants need to give between eight and 24 hours per week depending on their contract. In case of full professors, these are reasonable numbers ensuring high quality teaching output and leave space for research in a way as practiced throughout many European universities. For associate professors and lectures, the workload should be appropriate to ensure teaching quality but may be too high if additional research output on an internationally comparable level is expected.

With respect to academic staff development, GUC has recognized the need to make training an integral part of its commitment and offers the possibility to take periodical training and development programs with focus on teaching for its academic staff. While this is positively recognized, precise options or programmes are not addressed. With respect to academic staff development in the area of research, GUC offers its academic staff the possibility to attend conferences. While this is very positive, more GUC activities to foster research capabilities among its academic staff could be envisaged such as research starting grants or teaching duty reductions for collaborative research programs. GUC should aim at strengthening its academic profile to attract academic personal for research and teaching, to avoid brain drain of young scientists, and to establish an own research profile.

To ensure high quality teaching and research, GUC continuously monitors and evaluates its academic staff using performance criteria such as number of students, funded research from industry, participation in committees, student feedback, and awards. These criteria are in line with those used in monitoring systems at other universities worldwide and may be concretized by adding performance expectations for each criterion.

With respect to calculation of academic staff required to fulfil all program duties, GUC uses a plausible demand calculation based on the total number of teaching modules and given weekly hours per semester. Academic teaching staff distribution among faculties is presumably done based on this calculation, but the exact way remains vague and could be described in more detail. The self-report is unclear in what is meant by "The research and university activities increase as the teaching load decreases."

GUC very positively also recognizes the need for non-academic staff as a valuable resource to its success. It offers non-academic staff training as well as development. In terms of qualification required for the non-academic staff, their assignment to professors and teaching units, as well as human resources development for non-academic staff within GUC, the was little concrete information. It appears that this is dealt with in a centralized manor at general university administration level.

4.1.2 Infrastructural Resources

Infrastructural resources and facilities seem to be sufficiently well established and equipped according to worldwide university standards. GUC library has textbooks, periodicals, encyclopaedias, and access to online databases. As the library is a member of the South-West Library Association in the German state of Baden-Württemberg and other associations, literature that is locally not available could easily be borrowed. All standard library services such as circulation, reference services, and online database research using OPAC are offered by GUC. Computing facilities are established as a central IT service with state-of-the-art infrastructure. There is a wireless and wired network access for all students as well as academic staff, access points are widely spread in computer labs as well as public university places such as cafeteria and other sports and cultural facilities. All lecture halls and classrooms are equipped with network and internet access.

New students as well as academic staff are introduced to the university internet services in regular seminars offered by the GUC IT centre in order to become familiar with computing facilities, services, and policies. User access to student network and IT services is controlled by username and password, all students are provided by GUC with access to internet and e-mail. Standard software packages for text processing, database programming, spreadsheets, graphics and statistics are available through the student network. As such, students' access to internet services and software packages is on par with other universities worldwide.

GUC also comprises a dedicate English language department offering courses in academic English, text reading, scientific methodology, communication and presentation skills, as well as research paper writing. A German language department provides German language courses and shall offer motivated students with the necessary language skills needed to study at a German university. The concept of having language departments integrated into GUC indeed fosters student exchange with foreign universities, as interviews during the on-site visit in Cairo revealed that around 2/3 of the Bachelor students in Media Engineering and Technology actually complete their Bachelor's thesis at a German university.

4.2. Organization, counselling and co-operation

All reviewed study programmes are under the supervision of either the FIET or the FMET. The faculties are organized in the following way: The Faculty Council comprises the dean, the vice dean for academic affairs, who supervises the study programme directors, and the vice dean for student affairs. The academic coordinators for each study programme are responsible to the dean and the respective study programme directors. Several faculty committees support the Faculty Council to perform its obligations. All tasks responsibilities have been cleary defined for the peer group.

The GUC maintains strong co-operations with German universities and Egyptian companies, respectively. As the study programmes were originally developed in Germany by the founding/ partner universities, there are strong ties between the professors on an institutional level as well as personally. Co-operation agreements between these universities and the GUC were presented to the peer group. In addition, via the Berlin campus, academic ties to Germany were strenghten over the last couple of years. Despite having strong roots to the mother universities of Stuttgart and Ulm, GUC could expand its network of partners internationally to look beyond its ties to HEI in Baden-Württemberg.

Academic co-operations to other countries, especially in the Middle East, could not be explored to that extand given the difficult political circumstances in the Levant.

4.3. Teaching Methods

The teaching methods comprise the usual ones including lecturing in classes, doing practical work in labs, attending tutorials, giving presentations in the framework of seminars, working independently in final bachelor and master thesis projects and alike. Methods of teaching include lectures, tutorials, labs, internship and projects. The students are taught the fundamentals in lectures with an average size of about 200 students before deepening the knowledge in labs/tutorials with groups of around 30 students. Blended-Learning aspects include research oriented teaching with the help of scientific papers that are provided in some courses. Soft skills are strengthened in exchange trips to the GUC Berlin Campus as well as language trips. Research oriented teaching

helps the students to prepare for a research oriented bachelor or master thesis. This is done using a research paper writing course in the bachelor programmes and a seminar in the master programmes.

The used methods of teaching are well balanced and particularly appropriate for the education of engineering students. Students acquire theoretical skills as well as practical skills and soft skills, such as, problem solving skills and team working skills. Nevertheless, the didactical concept can be characterized as a classical textbook-based approach, while e-learning or blended learning schemes are dominant in the curriculum. This, however, does not seem to be a problem for the students who are present and in close contact with lecturers and professors. Overall, the different teaching methods are sufficient to make the students achieve the targeted competences. We would like to encourage the inclusion of more active methods of teaching such as reversed classrooms.

4.4. Examination system

The examination system consists of course work (including assignments, seminars, projects and presentations), Quizzes and midterm and final term exams. Various methods of examination, including oral, written and practical are used. Also those methods are module-related as well as knowledge and competence oriented. Although there is one final exam for each module, the final grade also includes other works which are not graded (mid-terms, assignments, etc.). The assessments of the total grades are clearly stated in the respective course syllabi. Examination dates and results can be accessed by the students through the GUC's self-developed administration system.

As for the final exams, GUC is making major efforts to ensure equal treatment of all students. In compliance with Egyptian law, the university uses a system of anonymized examination materials. Examiners do not have access to the examinee's names or IDs before having entered the exam results. Examinees are granted the right to review the graded exams by asking for a re-evaluation of exams. There are special regulations for handicapped students. The latter may be granted more time for answering exam questions and/or receive additional support depending on their specific impairment.

Considering the midterm exams and other quizzes during the semester in addition to the final exam the students have a high workload. However, students agree that it is doable and indeed, feasible. The workload for all programs is within the recommended range. The exam schedule is posted ahead of time. Students find enough resources throughout the campus. A large amount of students is graduating within the recommended study period. Overall, the peer group is satisfied with the organisation, the variety and the amount of examinations to monitor the students' success in enhancing their competences.

4.5. Documentation and Transparency

The peer group had access to all documents concerning the bachelor and master programmes such as diploma supplementae, study and examination rules, module descriptions and course plans. The peer group states that the documentary aspects are fulfilled sufficiently. The information and counselling services of the GUC are very good. The GUC has a dedicated office called Students Career and Alumni Development Office (SCAD) that does offer individual guidance for the students in all important aspects of their studies such as external/international internships, studies abroad etc. Furthermore, the SCAD office implemented an elaborated online system which offers a multitude of information to the students, such as tracking examination performance, selected courses, timetables and many other services. There are 28 student clubs and organisations listed that enhance the academic and competitive activities of the students as well as social live at the GUC. Therefore, the students could collect information of their study programmes from a broad range of different sources as well as from multiple counselling services and advisory bodies.

4.6. Gender justice and compensation opportunities for disabled people

Students with special needs are provided with additional service and facilities. The GUC campus is barrier-free and special examination arrangements are made in individual cases. A disadvantage compensation is not fixed yet in the examination regulations, but in case of illness/special needs individual solutions are found. No discrimination of a sex was detected at the GUC. The gender ratio in the study programmes is indeed not balanced, but far from controversial. In accordance to social responsibility, GUC provides stipends for a majority of its students and others as well, e.g. there is a Syrian refugee scholarship programme providing study capacities for ten students.

4.7. Conclusion

Both faculties have sufficient to excellent staff conditions to provide the students with ample opportunities to achieve the goals of all four study programmes. The ratio of academic staff vs. students is very good compared to German universities and far out of reach for regular Egyptian universities. The organisation of the faculty and its departments including research groups clarifies the tasks and responsibilities of each faculty member. Cooperation with German universities and Egyptian companies have enhanced GUCs level of excellence over the last decade and given multiple opportunities to the students to improve their intercultural competences and professional qualifications. A comprehensibly and feasible examination process monitors the students' enhancement in an appropriate way. Documentation and transparency is achieved by a good information and counselling system. GUC follow an equal rights policy towards women and handicapped people. Overall the implementation of the reviewed study programmes has been successful achieved and the means available for the timespan of the accreditation are sufficient.

5. Quality Management

The Quality Management System at German University in Cairo (GUC) consists of monitoring, review and evaluation of all study programs. Defined standards should ensure teaching and learning aspects at GUC. There are two centers (ECTS Coordination Center, Quality Assurance and Accreditation Center), which have the task to support the continuous improvement of quality aspects. "QMAC Board Level Committee" supervises both center. A new center is created additionally with the name "Six Sigma Center". There are different quality assurance units inside the faculties, which monitor the quality status. The Quality Management and Accreditation Committee (QMAC) define and update the Total Quality Management (TQM) concept. Its responsibilities are the developing of the internal quality assurance system, the interaction, coordination and cooperation between the responsible academic and nonacademic staff for implementing self-study programs and assuring a sustainable performance enhancement of quality levels. The ECTS Coordination Center is responsible to deal with the academic and administrative aspects of ECTS, to enhance and facilitate the implementation of ECTS, ensure the commitment of the institution to ECTS principles and mechanism, to promote ECTS within the institution and outside and to ensure the appropriate estimation of workload. The Quality Assurance and Accreditation Center is responsible to apply and enhance the processes of developing, implementing, ongoing monitoring, documenting and continuous improvement of programs and to evaluate programs to detect their strength and weaknesses. Additionally a student's curriculum committee was established to open a communication channel between faculty and university, enhance the educational process or show the point of innovation and differentiation in the curricula. There are several possibilities for students to participate in the Quality Management System at the German University in Cairo. The advising system, the review committee and the mentoring system are also important to enhance the Quality Management System.

The Quality Management is done according to "Plan – Do – Check – Act" cycle as a continuous improvement. That includes the planning of program objectives, program outcomes, curricula and student workload. After implementing the plan, there are different types of surveys to check the implementation of the plan. That can be for instance a graduate survey, an alumni survey, employer survey, and external evaluator agency, benchmarks with other universities or the employability rate. After the analysis, an action plan is proposed for further improvement and implementation. The courses are evaluated every semester. Therefore, at the end of the course an evaluation is performed by a questionnaire. This questionnaire includes different types of questions including the question regarding the workload of the students. After this evaluation, the course reports are reviewed and updated. A feedback to students regarding the evaluation results is not possible, because the evaluation is done at the end of the semester. According to the feedback of the students, they could give some examples that courses were modified in a positive way after the feedback of the students.

One of the parameter for the evaluation is the dropout rate of the students. Only an overall dropout rate is measured until now. This should be done also for both study courses in the future to get a better overview of the specific dropout rate. In addition, the middle duration time for students should be measured in the future to get a better overview also on a statistic level. The already measured workload of the course can be a good indicator to have the same workload for all semesters in the study courses.

The German University in Cairo has a defined structure to fulfil Quality Management aspects. The responsibilities are clear and defined. The quality for the two study courses is measured constantly and is further improved. Different kind of surveys and other instruments are suitable to validate the goals, concept and implementation of the study courses of the GUC correctly. At the last accreditation was mentioned, that the students should get a feedback about evaluation results. This is still not possible, because the evaluation is done very late at the end of the semester. After the feedback from the students, this is no further point for this accreditation. No other points from the last accreditation were found regarding the Quality Management System. The biggest changes were done with the implementation of "Six Sigma" at a new centre at the German University in Cairo for a further development of the Quality Management System. These measures are also suitable to improve the Quality Management.

6. Evaluation according to the "Rules for the Accreditation of Study Programmes and for System Accreditation" in the actual official version of February 20th, 2013.

All criteria are fulfilled.

7. Accreditation recommendation of the peer group

The peer group advise the accreditation with **recommendations**:

1. GUC should aim at strengthening its academic profile
   - 1.1 to attract academic personal for research and teaching,
   - 1.2 to avoid brain drain of young scientists, and
   - 1.3 to establish an own research profile.
2. The major "Networks" of the study programme BIET should be changed to "Computer Networks".
3. In the study programme BMET the current majors CSEN and EDPT should be substituted with the three majors "Computer Sciences", "Computer Engineering", "Media Engineering". The content and scope of the latter should be re-evaluated in due time.
4. In the study programme BMET the workload should be balanced evenly over the course of the semesters. The workload in one year should comprises 60 ECTS-points.

IV. Decisions of to the accreditation commission of ACQUIN

Based on the report of the peer group and the statement of the standing expert committee the accreditation commission took in its session on September 25th, 2018 the following decisions:

Information Engineering & Technology (B.Sc.)

The bachelor programme "Information Engineering & Technology" (B.Sc.) is accredited without conditions. The accreditation is valid until September 30th, 2024.

To enhance the study programme the accreditation commission advises the following recommendation:

- The major "Networks" should be changed to "Computer Networks".

Information Engineering & Technology (M.Sc.)

The master programme "Information Engineering & Technology" (M.Sc.) is accredited without conditions. The accreditation is valid until September 30th, 2024.

Media Engineering & Technology (B.Sc.)

The bachelor programme "Media Engineering & Technology" (B.Sc.) is accredited without conditions. The accreditation is valid until September 30th, 2024.

To enhance the study programme the accreditation commission advises the following recommendations:

- In the study programme MET the current majors CSEN and EDPT should be substituted with the three majors "Computer Sciences", "Computer Engineering", "Media Engineering". The content and scope of the latter should soon be re-evaluated.
- In the study programme BMET the workload should be balanced evenly over the course of the semesters. The workload in one year should comprises 60 ECTS-points.

Media Engineering & Technology (M.Sc.)

The master programme "Media Engineering & Technology" (M.Sc.) is accredited without conditions and recommendations. The accreditation is valid until September 30th, 2024.