



**ASIIN Seal & Euro-Inf®**

## **Accreditation Report**

**Bachelor's Degree Programmes**

***Computer Science***

***Computer Engineering***

Provided by

**University of Hail (female campus)**

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## A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for <sup>1</sup>	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC) <sup>2</sup>
بكالوريوس فى علوم الحاسب	Bachelor of Science in Computer Science	ASIIN	International Accreditation from ASIC (Valid till 2022) QMS accreditation (Valid till 2023)	04
بكالوريوس فى هندسة الحاسب	Bachelor of Science in Computer Engineering	ASIIN	International Accreditation from ASIC (Valid till 2022) QMS accreditation (Valid till 2023)	04
<b>Date of the contract:</b> 13.02.2018 <b>Submission of the final version of the self-assessment report:</b> 28.03.2018 <b>Date of the onsite visit:</b> 06.-08.11.2018 <b>at:</b> Hail, Saudi Arabia				
<b>Peer panel:</b> Prof. Dr. Bettina Harriehausen-Mühlbauer, University of Applied Sciences Darmstadt Prof. Dr. Helena Szczerbicka-Lipinska, Leibniz University of Hannover				
<b>Representative of the ASIIN headquarter:</b> Raphaela Forst				
<b>Responsible decision-making committee:</b> Accreditation Commission for Degree Programmes				
<b>Criteria used:</b> European Standards and Guidelines as of 15.05.2015				

<sup>1</sup> ASIIN Seal for degree programmes; Euro-Inf®: Label European Label for Informatics

<sup>2</sup> TC: Technical Committee for the following subject areas: TC 04 – Informatics/Computer Science

ASIIN General Criteria, as of 10.03.2015  Subject-Specific Criteria of Technical Committee 04 – Informatics/Computer Science as of 29.03.2018	
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## B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF <sup>3</sup>	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Computer Science	B.Sc.		6	Full time	-	8 Semester	220 ECTS/ 132 CH. (KSA)	September, 2005
Computer Engineering	B.Sc.		6	Full time	-	8 Semester	220 ECTS/ 132 CH. (KSA)	September, 2005

For the Bachelor's degree programme Computer Science the University of Hail (UOH) has presented the following profile in the Self-Assessment Report:

„Objectives and Learning Outcomes of Computer Science Program

The educational objectives of the degree program in Computer Science are consistent with the university and College mission. University of Hail vision is to achieve the leadership and excellence in education, research studies, and community service in order to build the society and the knowledge-based economy.

The University of Hail mission is consolidating standard education and research that aims to develop and provide better service to the community. These services will be in an effective teaching and learning environment, build a distinguish partnership with community and make optimal utilization of available resources, using the sophisticated technology and strategy to achieve these goals.

The College of Computer Science and Engineering strives for excellence in education and learning fields, scientific research, and social services in Computer Science, Software Engineering, and Computer Engineering regionally and nationally.

The College of Computer Science and Engineering is committed to graduate distinguished students to fulfill labor market needs and local community through providing educational

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<sup>3</sup> EQF = The European Qualifications Framework for lifelong learning

environment attracting qualified personnel and utilizing the best technology aligned with Saudi society values.

### **Computer Science Program Vision**

An excellent academic performance in the domain of Computer Science area at both local and regional level.

### **Computer Science Program Mission**

Preparing highly qualified Computer Science professionals competent to stability both the local and regional competition through a commitment to maintaining the standard of quality and excellence in education, scientific research, and community services.”

For the Bachelor's degree programme Computer Engineering the institution has presented the following profile in the Self-Assessment Report:

### „Objectives and Learning Outcomes of Computer Engineering Program

The educational objectives of the degree program in Computer Engineering are consistent with the university and college mission. University of Hail vision is to achieve the leadership and excellence in education, research studies, and community service, in order to build the society and the knowledge-based economy.

The University of Hail mission is consolidating standard education and research that aims to develop and provide better service to the community. These services will be in an effective teaching and learning environment, build a distinguish partnership with community and make optimal utilization of available resources, using the sophisticated technology and strategy to achieve these goals.

The faculty of Computer Science and Engineering strives for excellence in education and learning fields, scientific research, and social services in Computer Science, Software Engineering, and Computer Engineering regionally and nationally.

The faculty of Computer Science and Engineering is committed to graduate distinguished students to fulfill labor market needs and local community through providing educational environment attracting qualified personnel and utilizing the best technology aligned with Saudi society values.

### Computer Engineering Program Vision

To excel in teaching, learning, scientific research, and community services in the field of computer engineering, regionally.

### Computer Engineering Program Mission

The Computer Engineering program transforms the next generation of engineers for future challenges, conducts research, and disseminates knowledge through different platforms for the benefits of the society.“

## C Peer Report for the ASIIN Seal<sup>4</sup>

### 1. The Degree Programme: Concept, content & implementation

<b>Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)</b>
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- Self-Assessment Report
- Objective-Module Matrices
- Module descriptions
- Discussions during the audit

#### **Preliminary assessment and analysis of the peers:**

For both study programmes, the University of Hail (UOH) presents a detailed description of general learning outcomes in the Self-Assessment Report (SAR). UOH explains that the learning outcomes are based on international standards for subject-specific content and on national standards only for the Islamic and Arabic components. The peers approve that for each programme a detailed presentation of learning outcomes is given in the SAR in combination with objective-module-matrices matching the described learning outcomes with the respective modules of the programmes.

In the Computer Science programme, it is envisaged that graduates should be able to design, develop, document, and test software using current techniques as well as be able to understand the fundamentals of computer architecture and computing theory. Students will, among other aspects, gain knowledge of the fundamental hardware components and their functionality and learn programming languages, software systems and their objectives. They should have the competence to design systems by applying efficient methodologies, analyse problems and find solutions using different tools and measurements and be able to apply the concepts of science and mathematics in problem-solving.

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<sup>4</sup> This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.



All students should be capable to solve problems individually and to present their research results in oral as well as written form. They should be able to work in teams, cooperate with partners from different professional backgrounds and develop leadership skills in computer projects. Furthermore, it is emphasized that the students should be made aware of the importance of social and ethical issues related to the profession. Once the degree programme is completed, graduates will be enabled to continue their studies and develop their research skills in the form of a Master's programme or to work in the broad professional field of computer science.

In the Computer Engineering programme, it is targeted that students gain the basic knowledge as well as the skills of the major fundamentals of hardware and software components appropriate for Computer Engineering systems. Graduates should possess solid background in mathematics, algorithms, and hands-on networking systems and be able to identify, formulate, and analyse complex Computer Engineering problems to reach substantiated conclusions along with recommendations using principles of mathematics, natural science, and engineering science. The students will gain the competence to recognize the features and differences between main computer architecture families, to apply different techniques to understand and use software components and programming structures and to design large-scale digital systems with different options and alternatives.

In addition, all graduates should be capable to work effectively in teams, communicate their research results in oral and written form as well as possess an awareness of the social and ethical implications of their actions. After successfully concluding their studies, graduates will be able to continue their education in a Master's programme or to work professionally in the field of Computer Engineering.

The programme coordinators explain that for both study programmes, ethical implications are taught within the modules even if this is not stated in the module descriptions. Embedded in the islam classes, students learn about ethics in quran, then later ethics in general. Staff members explain that during teaching they steer away from the destructive side of programming and raise awareness of responsibility as a software programmer. The university offers workshops on cybersecurity, which are often open to any students and habitants of Hail. In March 2019, an international conference about Cybersecurity will take place, and a new course on "technology ethics or computer ethics" is in the process of being approved.

In conclusion, the peers agree that both programmes adequately reflect the ASIIN Subject-Specific Criteria as well as the EQF-level 6 for Bachelor's programmes.

<b>Criterion 1.2 Name of the degree programme</b>
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**Evidence:**

- Self-Assessment Report

**Preliminary assessment and analysis of the peers:**

The panel consider the names of the study programmes to be adequately reflecting the respective aims, learning outcomes and curricula.

<b>Criterion 1.3 Curriculum</b>
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**Evidence:**

- Self-Assessment Report
- Study plans
- Module descriptions
- On-Site discussions

**Preliminary assessment and analysis of the peers:**

The curricula of all study programmes under consideration are reviewed by the panel in order to identify whether the described learning objectives can be achieved by the available modules. Course descriptions as well as matrices matching the general learning objectives and the module contents are presented for a detailed analysis. Furthermore, the discussions during the on-site visit reveal that the current curricula are in a constant revision process and that several modifications have already been applied for with the HEI management, as will be outlined in more detail below. While assessing the current status of the programmes, the peers also take notice of the planned developments and consider them a great improvement in the direction which they themselves indicate in their recommendations. However, as the curricula development process is still ongoing, the programmes will be described as they were at the moment of the on-site visit.

In both programmes, students have to take a preparatory year before the beginning of the freshman year of their Bachelor's programme. In these two semesters, students are generally prepared for academic life and learn the basics of mathematics and English. Only afterwards do the real academic programmes start.

In the Computer Science programme, the first study year (freshman year) is reserved for general introductions and basic knowledge in the natural sciences with courses in chemistry, physics and computer programming but also several English courses, religious education and sports. The second year (sophomore) offers almost exclusively core Computer Sci-

ence and math courses such as “data structure”, “discrete structures” and several mathematical courses. This structure is basically kept up in the third (junior) year with modules on computer architecture, programming, computer networking systems, etc. in the last semester of their junior year and more so in the senior year students are offered a choice of electives. They also are required to take a course in academic writing in order to improve the scientific writing skills. The seventh semester is reserved for the “COOP Education”, an internship where students are being prepared for later professional options before they return in the final semester to conclude the programme with several electives and a senior project.

The senior project consists of a practical lab and a thesis in English, and offers an introduction into academic work. It generally is completed as a group work with a mix of good and weak students, though sometimes students are allowed to do it on their own if they are considered good enough. Students need to submit a project proposal and there is a continuous evaluation of the work on the project. The teacher/advisors ensure that the students distribute the tasks fairly by assigning weekly tasks to each student. Students are marked according to their attendance, team work, contribution to the project and whether they completed the tasks on time. The teacher uses a separate evaluation form per student. At the end, each student presents her individual contribution to the project in front of the teacher and two additional examiners. The student is judged based on her presentation skills, her answers to relevant questions about her work and about the whole project, as well as her individual work on the project. The peers understand that though the senior project is often a group work, the contribution of each student is clear and students are marked individually based on their specific contribution. However, the current senior project is very small with a size of about 5 ECTS credits. The programme coordinators agree with the peers’ assessment that the extension of such a module is necessary and explain that in the development of the programmes this would be the next step envisaged. In the next curricula already in the approval process, final projects are going to be compulsory and the project will be extended to two semesters. This way, more credits can be assigned to it and the scientific level shall be improved. The peers approve of these measures and agree that with the implementation of these reforms the demand for a capstone project could be met. They expect that in the course of the procedure further documents verifying the implementation of a compulsory final project will be submitted.

During the audit, the peers have a chance to look at completed theses. They notice that the references are too general, citing e.g. the website instead of the specific site where the information can be found. The peers suggest requesting more specific references and the use of current research/standard books in the senior project. They also recommend teaching students how to use the library for academic research or offering a compulsory class on

how to use search engines and start academic search to prepare the students to work scientifically.

In Computer Engineering, students similarly start the degree programme in the Freshman year with introductory courses on Chemistry, Physics, Computer Programming but also English, Religion and sports. In their Sophomore year, fundamental skills in the discipline are being conveyed (Fundamentals of Computer Engineering, Electric Circuits, Electronics, etc.). In the third year, a further specialization is carried out with two elective courses and modules on Microcomputer System Design, Data & Computer Communication or Principles of VLSI Design. Additionally, students have to take courses on Religion but also scientific research (Technical Report Writing and a seminar). As in the Computer Science programme, the seventh semester is reserved for the COOP Education before students take the final semester with two more electives, a System Design Lab and a module on Operating Systems. The peers note the lack of lacking of a final or capstone project equivalent to a Bachelor thesis. According to the ASIIN criteria and the opinion of the peers, each student should document her ability to work independently for some time on a research project, analyse scientific literature and present the results of this work in written form. The programme coordinators agree with the peers' assessment that the creation of such a module is necessary and explain that in the development of the programmes this would be the next step envisaged. As Bachelor's theses and scientific research do not have a long tradition in Saudi Arabian education, it was considered necessary to introduce it step by step. In the next curricula already in the approval process, final projects are going to be compulsory in this study programme. The peers approve of these measures and agree that with the implementation of these reforms the demand for a capstone project could be met. They expect that in the course of the procedure further documents verifying the implementation of a compulsory final project will be submitted.

While the peers agree that the curricula as described above are generally compliant with international standards, they wonder whether it would be preferable to strengthen some aspects such as IT Security or Theoretical Computer Science. The peers understand that plans for curriculum change in that regard are already being discussed. Following the wishes of the programme coordinator of Computer Science, a compulsory module in IT security and computer theory will be introduced soon. The auditors additionally suggest implementing a module about ethical matters and social responsibility in IT.

The College is also working on introducing several Master's programmes among them a Master in IT Security, which sounds very promising. The peers consider these plans to be exactly what they were expecting and express their support for the coordinators in pursuing them. During the discussion, the peers and staff members discuss if more programming languages should be introduced as compulsory. Currently, the curriculum focusses on Java

as the predominant programming language to fulfil job market requirements but alternatives are also touched upon in certain elective courses or the senior projects. The peers are very impressed by the fact that students themselves offer additional voluntary courses for example on Python in their free time, which further broadens the students' opportunities. While such offers are very helpful, the programme coordinators might think about the full implementation of at least a second programming language in the future development of the curricula.

In conclusion, the peers agree that the curricula are up to date and adequate in order to reach the described learning outcomes of the programmes. Once the described curricular modifications will be implemented, the programmes will also comply in all aspects with the ASIIN criteria.

<b>Criterion 1.4 Admission requirements</b>
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**Evidence:**

- Self-Assessment Report
- On-Site discussions

**Preliminary assessment and analysis of the peers:**

Admission regulations are based on national legislation as well as university rules. For admission to the University of Hail, applicants need to have a high school certificate and pass the respective entrance exams. Accepted students have to pass the preparatory year with a special focus on English, Mathematics, Computer Skills and non-technical subjects. After successfully completing the preparatory year, the students will be accepted in the Computer Science program if their GPA is better than 1.75 out of 4 and in the Computer Engineering programme if their GPA is better than 2 out of 4. The peers agree that the admission policy is generally transparent and acceptable.

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

The University of Hail does not comment on the report. For this reason, the peers confirm their initial assessment and consider his criteria to be partly fulfilled.

## **2. The degree programme: structures, methods and implementation**

<b>Criterion 2.1 Structure and modules</b>
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**Evidence:**

- Self-Assessment Report
- Module Descriptions
- Study Plans for all degree programmes
- Regulations and Procedures of Higher Education Council
- Webpage University of Hail: <http://www.uoh.edu.sa/en/Pages/default.aspx>
- On-Site discussions

**Preliminary assessment and analysis of the peers:**

All study programmes under review are divided into modules, which comprise a sum of teaching and learning. In general, the panel found the structure of the modules to be adequate and manageable. The modules are split into four different categories (compulsory college and university requirements, compulsory general, free electives and general electives). All modules are divided into lecture and lab units as well as time for self-study and exam preparation. In most modules, practical work is included while the students gain additional professional practice during the compulsory COOP Education in the seventh semester. The peers consider it laudable that so much professional training is included in order to give the students the best opportunities for establishing contact with possible employers already during the final stage of their studies. The discussion with industry representatives reveal that many companies receive COOP students on a regular basis and that a growing number of companies is settling down in the Hail area. This is especially important for the female students, as they are limited to Hail area due to family/parental wishes. Students and staff alike stress, however, that opportunities for women are growing due to societal changes. There are branches for banks, companies etc. with only female staff, and the University of Hail continues to increase their staff. Graduates in the field of IT also have the opportunity to work as freelancers, which is especially interesting to female graduates as they are able to work without moving away. As UOH understands itself as a higher education institution for the region and most students are coming from the local area. In order to provide them with job opportunities at home, the peers emphasize that cooperating with companies in the province has to be maintained on the high level already achieved.

In each programme, the students can choose between different electives during the course of their studies. This allows for a certain specialization and will be of growing importance once the respective Master's programmes will be introduced. The selection of electives and the composition of the individual study plans in general is done individually by the students

in cooperation with their personal supervisor every semester. The peers are pleased to learn that each of the listed electives will indeed be offered once every year.

Concerning the aspect of internationalization, the peers notice that this is still an aspect under development. However, they understand that international mobility on Bachelor level is not the highest priority of the university at this stage but to take roots in the region and to provide education and jobs for the local population. Nevertheless, the programme coordinators envisage international partnerships and the international staff provides a number of possible contacts throughout the world. From the discussion with the students, the peers also learn that students would like to spend some time abroad, for example during their COOP Education. Apparently, this is theoretically possible and the peers thought this to be a good idea as many of the companies in Saudi Arabia are acting on an international level. Maybe it would be possible to award international internships to outstanding students as long as international mobility to other universities is still difficult. The students explain that it is possible to spend a semester abroad as a visiting student or during the COOP. For them, parental permission is an additional hurdle. Established international partnerships with both universities and companies abroad as well as clear information and procedures could help alleviate the parental concerns and enable students to spend time abroad. The international staff could also function as a role model for international academic exchange. Their ties to their alma maters could be used to establish new and strengthen existing partnerships.

In any case, the peers clearly saw that mobility is of importance when it comes to the Master level. As there are no Master programmes for many subjects but the university requires a growing number of skilled staff, scholarships are awarded to Bachelor graduates whose GPA exceeds a certain limit, to join Master programmes at other universities within or outside Saudi Arabia. Once they have completed their degrees, they are required to return and teach at the University of Hail for a given period of time. The peers saw this practice in a very positive light as it allows for (international) mobility and at the same time assures the continuous backflow of innovation and talent.

<b>Criterion 2.2 Work load and credits</b>
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**Evidence:**

- Self-Assessment Report
- Module descriptions
- On-Site discussions

### **Preliminary assessment and analysis of the peers:**

As outlined above, all modules are assigned with credit hours between 1 and 4 amounting to 15 to 19 credit hours each semester. Consequently, the credits are more or less equally distributed over eight semesters with the exception of the seventh semester with the COOP Education. This semester is valued at only 9 credits. In General, Saudi Arabian credit hours do not take the actual workload of the students into account but only consider the time spent in classes and in laboratories. However, the module descriptions presented to the peers clearly indicate for each course the expected workload in time hours for every week including the time spent on self-study and preparing for classes. Thus, a transfer of the workload into the ECT System is easily possible and reveals that the workload is evenly distributed and usually meets the reality. The students confirm that the calculation of the workload was transparent to them and that the time indicated in the module descriptions was sufficient. Additionally, in consultation with their advisor and depending on their GPA, each student can choose their own workload between the minimum and maximum workload prescribed for the study programme. Hence, there has not yet been any reason to complain about the amount of workload.

The only problem outlined by the peers referred to the COOP Education. Currently, the students have to spend at least four months in internships handing in written reports every month documenting their work and progress. Although, according to the new development plan, the COOP Education will be reduced to three months in order to create more space for the final project, the peers outline that nine credits in this case do not reflect the real student workload nor the expectancy of time invested. In this case, not even the module descriptions offers more information about the actual workload. This is generally understandable, because the Saudi credit system only refers to contact hours and during an internship the number of class hours is limited. Consequently, the peers think it important to outline in the description how much time each student has to spend with one company and how many hours of working are reflected in the number of 9 contact hours in this particular case. This is crucial as the practical experience is of major importance for future employers and therefore, graduates from the University of Hail will be able to document clearly how much time they already spent in industry when applying for jobs. During the discussions, students indicate that they would be interested in doing their COOP abroad. A clear description of the expected working hours as well as the expectations towards the supervisor in the company would help facilitate the application process and would assist in finding an internship abroad.



### Criterion 2.3 Teaching methodology

**Evidence:**

- Self-Assessment Report
- Facilities and Equipment at site
- On-site-discussions

**Preliminary assessment and analysis of the peers:**

It has already been outlined that teaching in both programmes includes theoretical foundations as well as practical work, which is welcomed by the peers. In general, teaching includes lectures, classroom exercises, tutorials, group exercises, laboratory work, as well as group work and individual projects. As mentioned before, the peers are also very impressed by the active participation of outstanding students as tutors and voluntary teachers. Thus, the teaching methodology does not only include a top-down approach from professor to student but also student for student teaching in subjects that are not offered in the curriculum as well as supplementary courses in difficult matters where students would require additional support. Research projects by the staff are included in the lectures. In some classes, students prepare research papers or reports for research, which then sometimes are published. In conclusion, the peers clearly saw that the teaching methods applied in the degree programmes are diverse, up-to-date and oriented towards the best learning approach of the students.

### Criterion 2.4 Support and assistance

**Evidence:**

- Self-Assessment Report
- Overview of academic advising at College of Science
- Audit discussions

**Preliminary assessment and analysis of the peers:**

The peers are impressed by the offers related to support and assistance for the students at the College. The staff members explain that they are available during official office hours (5h per weeks), but that they also have an open door policy and can be contacted via the Whatsapp groups. The students confirm that the teaching staff is always available to any questions and supports the students in every possible way. Both teaching staff and students stress that it is “like family”. The contact between the female students and the male teaching staff that offer classes via video conference differs from that. Here, the contact and academic advising mainly takes place via microphone during the call and via mail, blog,

or telephone during the office hours. While the peers recognize that communication between students and staff currently works very well, they suggest implementing an electronic professional platform specifically dedicated to the communication with students and the management of the teaching/learning process. This could facilitate the communication process especially if student numbers continue to rise. Furthermore, it could assist in the electronic administration of students and their performance. This platform could be a way to share lecture slides and homework assignments, or enable discussions online.

A second positive aspect in terms of support and assistance is participation in the quality management system. Student representatives participate in the quality assurance committees and consequently feel well taken care of. A special support to students is given through the intense, individual tutoring of each student. At the beginning of each semester student and tutor meet to agree on the study plan and discuss specializations and electives as well as bad GPA performance or other challenges. The study plans have to be signed officially by the tutor in order to ensure that each student is on track. The additional support from student tutors that offer support lectures in difficult subjects or voluntary courses has already been outlined as outstanding.

The students furthermore commend the bus service offered by the university to transport students.

Concerning international mobility in the COOP Education, the students also confirm that there is a central support unit where they can get information and help. Consequently, the students are content with the only small restriction that there is little opportunity for international mobility. According to the students' impression, it would be generally possible to spend the COOP Education at a company abroad but none had ever done so due to the complicated organization. The peers gather that this aspect ought to be addressed in the future. Nevertheless, they have no doubt that currently the students receive all possible support to complete their studies successfully in due time.

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

The University of Hail does not comment on the report. For this reason, the peers confirm their initial assessment and consider his criteria to be partly fulfilled.

### **3. Exams: System, concept and organisation**

<b>Criterion 3 Exams: System, concept and organisation</b>
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**Evidence:**

- Self-Assessment Report
- Undergraduate study and examination regulation and the University of Hail rules for their implementation
- Module Descriptions
- Audit discussions

**Preliminary assessment and analysis of the peers:**

Each course-content in the reviewed study programmes is reflected in exams, which are distributed in three examination periods/types during the semester: each course has a mid-term exam and a final examination while students have to pass a number of smaller tests or quizzes during the semester. The consequently high amount of exams during one semester was not considered problematic but helpful by the students since it allows for a continuous evaluation of each student's individual achievement. The students considered the information about examinations in the courses to be excellent; all information required was given in advance in the module descriptions or online and all course requirements including deadline or exam dates are conveyed at the beginning of the course. If there are any conflicts of dates during the examination period, an individual solution is always found. Apart from the mid-term and final examination, many courses include small projects or practical work that the students have to prepare during a certain period and afterwards present orally to the class. While the projects themselves are usually not part of the final grade, the oral presentation is so in several cases. Consequently, the peers are convinced that apart from written exams the students are being adequately trained in oral presentation skills as well. Each course entails a timeline that indicates the deadline until when students can withdraw from the course without consequences. Afterwards, if the student fails, she has to re-take the whole course rather than just repeat the exam. The university allows four additional semesters to finish all classes, though students explain that the staff members and the personal coordinator are in contact with the student to offer support. A dialogue is sought to help students graduate.

After checking a selection of provided exams, the peers agree that these generally represented an adequate level of knowledge as required by the EQF-Level 6. However, as has been outlined already, the programmes still lack a final project of a size and academic depth equivalent to a Bachelor thesis or comparable capstone project. Such projects are being introduced gradually with the developing curricula and the peers support the coordinators and teacher in this process in order to close this final gap to international examination standards.

In conclusion, the peers agree that all relevant examination regulations are in place and are being well communicated in a transparent way. The forms of exams are oriented toward the envisaged learning outcomes of the respective courses and the workload is distributed in an acceptable way.

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

The University of Hail does not comment on the report. For this reason, the peers confirm their initial assessment and consider his criteria to be completely fulfilled.

## 4. Resources

<b>Criterion 4.1 Staff</b>
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**Evidence:**

- Self-Assessment Report
- Audit discussions
- Staff Handbook
- Instructor Course Assessment Report
- Regulations for Saudi and Non-Saudi Staff

**Preliminary assessment and analysis of the peers:**

During the discussions on site, the peers participate in an active exchange with a variety of staff members from both programmes and gain the impression that the quality of this very international staff was absolutely adequate for the management of the programmes under review. Nevertheless, a complete staff handbook with short CVs and publication lists of all staff members should be made available to the peers. It has been agreed that this material should be provided in the aftermath of the visit. In any case, the peers are convinced that the number of staff assigned to the programmes was sufficient to sustain them properly. As outlined before, the peers are impressed by the international staff and their great dedication as well as their academic qualification. The number of the staff is regulated by the government and thus ensures an adequate provision. If the number of students increases, the number of teaching staff will be equally increased in order to guarantee a good student-teacher-ratio.

For the female campus, the Vice Dean reports that the college is currently recruiting and hiring new staff. In the meantime a few courses are taught in the form of a video conference by male staff from the male campus, which illustrates the close cooperation and problem-solving attitude of staff members from both campuses. Advertisements and job announcements are placed locally and internationally, as the college also wants to attract foreign teachers.

At the University of Hail, the staff members have different academic positions. There are professors, associate professors, assistant professors, lecturers and demonstrators. The academic position of each staff member is based on research activities, publications, academic education, supervision of students, and other supporting activities. For example, a full professor needs to hold a PhD degree and has to have at least three years of experience in the field. Moreover, the responsibilities and tasks of a staff member with respect to teaching load, research, and supervision depend on the academic position. Often times, teaching assistants are themselves previous students of UOH.

The programme coordinators explain that the standard working hours are from 8 am – 2 pm with labs/lectures sometimes from 1 – 4 pm. With a maximum of 16 hours teaching work load and maximum three courses per semester, the teaching staff agrees that the teaching load is suitable and that the workload is adequately distributed amongst teaching load, research time and administrative tasks.

In summary, the auditors confirm that the composition, scientific orientation and qualification of the teaching staff are suitable for successfully implementing and sustaining the degree programmes.

<b>Criterion 4.2 Staff development</b>
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**Evidence:**

- Self-Assessment Report
- Audit discussions with the teaching staff

**Preliminary assessment and analysis of the peers:**

The University of Hail claims to set a special focus on professional development through the Skills Development Deanship on University level. This unit organizes workshops and seminars, which aim at sustaining different didactical, communication and professional skills, raising awareness of self-development and using new teaching methods.

An even more important aspect of professional development at this young university is the improvement of research activities. The staff members and programme coordinators agree

that in this regard there is still much room for improvement. However, substantial university and governmental support progressively enhances the research opportunities of staff members. Schedules for professors are usually designed in a way to ensure that they have sufficient spare time for research and if staff members apply for a promotion, 60% of the required points are research-based. In addition, staff members outline that they expect the introduction of Master programmes for the respective areas to be very helpful. Only then will they have students at hand who can be integrated as an active part into the research projects of the professors. The peers agree with this opinion and express their support for the introduction of the Master programmes as outlined during the discussions.

The staff members and programme coordinators also praise the scholarships provided by the university for lecturers and teaching assistants to go abroad for a Phd or a Master's programme. For five and three years respectively, scholarship holders can pursue their degree on half the salary and with no teaching obligation. After graduation, they return to the University of Hail to teach. The peers agree that this enhances the knowledge and experience of the staff and allows for an improvement of the research activities and integration into international research in their respective fields.

During the discussions, the staff members explain that sabbaticals are generally possible. Though they would like to take this opportunity if offered, the staff members feel that taking a sabbatical is not needed as there is sufficient time allocated to research (at least three hours a week) and staff members can take a six-week break from teaching to focus on their research.

Additionally, the University maintains affiliations with international companies that provide training to teachers who will then teach the students, e.g. in the field of cloud computing.

The peers find that there are sufficient offers and support mechanisms available for teaching staff who wish to further develop their professional and teaching skills.

<b>Criterion 4.3 Funds and equipment</b>
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**Evidence:**

- Self-Assessment Report
- Self-Assessment Report
- On-site visit of the laboratories, lecture rooms, and the library

During the on-site visit, the peers inspect the research and teaching facilities of the programmes and consider the available equipment to be of highest standards. The premises are spacious and offer many opportunities for the professional and individual development

of students and teachers. The students confirm that they are also provided with free computer software and have easy access to all necessary rooms and equipment including any software needed. The labs are open from 8am-4pm, lab assistances offer help and assistance.

The recently built Fab-Lab, a research centre open to all students, stakeholders and interested public in general, was especially impressing. Here, students can follow their own projects using the most modern equipment. Several outstanding project results and ongoing development presented to the peers underline that the students actively use the Fab-Lab and thus that the facilities leave great space for their personal creative development.

The university offers personal Windows laptop computers for all members of staff, nearly all desks are supplied with desktop computers connected to internet and printers, and WLAN services are offered for both staff and students to access their teaching and learning modules and to view their academic registrations or credit points achieved. A specialized portal website for course information, learning materials, assignments, and electronic exams is accessible through the blackboard system of the University.

The auditors are impressed by the modern central library that offers direct access to international literature, scientific journals, and publications. The students also express their satisfaction with the library and the available literature. From their point of view, there is sufficient access to current international literature and databases and a remote access is possible.

In summary, the auditors consider the available funds, technical equipment, and infrastructure (laboratories, library, seminar rooms etc.) adequate for implementing the degree programmes.

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

The University of Hail provides the requested staff handbook in the aftermath of the on-site-visit. Consequently, the peers consider this criterion to be completely fulfilled.

## 5. Transparency and documentation

<b>Criterion 5.1 Module descriptions</b>
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**Evidence:**

- Module descriptions Bachelor Computer Science

- Module descriptions Bachelor Computer Engineering

**Preliminary assessment and analysis of the peers:**

The peers appreciate the module descriptions presented beforehand with the Self-Assessment Report. For most subject-specific courses, descriptions are available to the peers. They give full information about the courses, examinations, contents, learning outcomes and recommended literature. The module descriptions are also available to the students via the University's intranet. The peers realize that descriptions for non-CS-modules are missing and they ask the staff to provide the additional descriptions, in particular for the Math courses, the subject-specific electives and the modules on Islamic religion. These should be provided in the aftermath of the visit.

<b>Criterion 5.2 Diploma and Diploma Supplement</b>
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**Evidence:**

- Self-Assessment Report

**Preliminary assessment and analysis of the peers:**

Along with the graduation certificate, all students receive a Diploma Supplement including information about the college, courses included into the degree, as well as the grades of the courses and the structure of the degree. However, the peers ask to see exemplary Diploma Supplements for both courses that shall be provided in the aftermath of the on-site-visit.

<b>Criterion 5.3 Relevant rules</b>
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**Evidence:**

- Self-Assessment Report
- Audit discussions
- Regulations and Procedures of Higher Education Council
- Webpage University of Hail: <http://www.uoh.edu.sa/en/Pages/default.aspx>

**Preliminary assessment and analysis of the peers:**

The peers realize that regulations for every important aspect of student life and the respective degree programmes have been issued by the HEI and are accessible to the students through the University website. During the discussion with the students, it became clear that all participants knew perfectly well where to find any regulations or whom to contact if any additional information was required.



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

The University of Hail provides the requested module descriptions and exemplary versions of the diploma documents in the aftermath of the on-site-visit. The peers notice that the diploma supplements feature a cross-reference to the university homepage for the access requirements and the programme requirements. As the website may change over the years, this information might change as well. The programme details are not mentioned at all. The peers are of the opinion that the diploma supplement has to clearly state the access requirements, the programme requirements and the programme details.

The peers furthermore notice that the Diploma Supplement does not include a statistical distribution of final grades. As such, a comparison of a student's final grade with her peers' grades is not possible. The peers consider it necessary that the Diploma Supplement also provides statistical data on the distribution of grades.

Consequently, the peers consider this criterion to be partly fulfilled.

## **6. Quality management: quality assessment and development**

<b>Criterion 6 Quality management: quality assessment and development</b>
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**Evidence:**

- Self-Assessment Report
- Audit discussions
- Sample Surveys
- Procedural guidelines for quality practices
- Programme development forms for both degree programmes
- Terms for quality and academic accreditation of University Hail

**Preliminary assessment and analysis of the peers:**

The auditors discuss the quality management system at UOH with the programme coordinators and the students. They learn that the measures to secure and improve the quality of both degree programmes are conducted through the following ways: First, Key Performance Indicators (KPI) are established to measure annually whether the overall performance of the programmes is consistent with national benchmarks. Second, the Deanship

of Quality and Development (DQD) facilitates, oversees and controls a concise quality management system that detects and adapts the strengths and weaknesses of each programme. Finally, a variety of other quality measures are in place, such as an internal audition committee, evaluations, or feedback from the University's stakeholders that in sum aid in improving the quality of the study programmes. The stakeholders, i.e. students, teachers, industry partners and especially programme coordinators are heavily involved in the programme development process and several mechanisms are in place to ensure that the programme contents are constantly up to date.

In regular intervals throughout the academic year, the Deanship of Quality and Development and its units in the respective departments carry out activities with the students, such as general meetings or quality day activities, to demonstrate the importance of quality management and its impact on the students' performance and achievement. During such activities, students fill out several evaluations concerning their opinion on study materials, learning capabilities or academic support and advising, which is then evaluated on a higher level. The results of the surveys are channelled back to the teacher who then reflects on the course and the survey results in a report as well as an action plan for the following semester. These reports are sent to Deanship of Quality Development who analyses them on a central level by the. At the beginning of the following semester, each teacher discusses the improvement plan with the new students and outlines what has been criticized by the previous students and what measures she wants to adopt in order to improve the situation. Therefore, the peers generally consider the feedback loops to be closed although it would be desirable to give a personal feedback not only to the students of the next semester but to those that actually participated in the survey. This might help to encourage their participation and signal to them that their remarks are not lost on the way.

During the on-site visit, the auditors learn that the quality management of the two degree programmes is undertaken jointly by both the male and the female branches. The programme coordinators and the staff responsible for the quality management state that everything related to the quality management, such as curricula and templates, is discussed in unison first and implemented afterwards separately in both campuses. All the while, there continues to exist close communication between both campuses to ensure that the programmes remain equal with regard to their content and their implementation.

While this is the official and institutionalized way for feedback, the peers also gain a very good impression of the informal feedback mechanisms that are in place in the programmes under review. Both students and teachers confirm that there is a close relationship between them and that the students can always contact the teachers if something needs to be addressed, improved or criticized. If any problems occurred, an easy solution favourable to everybody could usually be found. In addition, students have their personal supervisor

whom they can contact for assistance and there are students representatives in the most important quality assurance bodies. In conclusion, the peers thought the quality management system at the University of Hail to be exemplary in the Kingdom of Saudi Arabia.

**Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:**

The University of Hail does not comment on the report. For this reason, the peers confirm their initial assessment and consider his criteria to be completely fulfilled.

## D Additional Documents

Before preparing their final assessment, the panel asks that the following missing or unclear information be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

- D 1. Exemplary Diploma Supplements for both programmes
- D 2. Module descriptions for the non-CS-modules, in particular for the Math courses, the subject-specific electives and the modules on Islamic religion
- D 3. Staff Handbook

## **E Comment of the Higher Education Institution (08.02.2019)**

University of Hail does not comment on the report, but submits the following additional documents:

- Exemplary Diploma Supplements for both programmes
- Module Descriptions for the non-CS-modules
- Staff Handbook

## F Summary: Peer recommendations (19.02.2019)

Taking into account the additional information, the peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Computer Science	With requirements for one year	Euro-Inf	30.09.2024
Computer Engineering	With requirements for one year	Euro-Inf	30.09.2024

### Requirements

#### For all degree programmes

- A 1. (ASIIN 1.3) Provide statistical data according to the ECTS-Users' guide in addition to the final grade.

#### For the Bachelor's degree programme Computer Science

- A 2. (ASIIN 1.3) Ensure that the compulsory final project is of adequate academic level comparable to EQF level 6.

#### For the Bachelor's degree programme Computer Engineering

- A 3. (ASIIN 1.3) Introduce a compulsory final project of adequate academic level comparable to EQF level 6.

### Recommendations

#### For all degree programmes

- E 1. (ASIIN 1.3) It is recommended to further strengthen aspects of IT Security, Theoretical Computer Science and Programming languages apart from Java in the curricula.
- E 2. (ASIIN 1.3) It is recommended to train students in conducting research and scientific writing.
- E 3. (ASIIN 1.3) It is recommended to implement a course on professional ethics and ethical responsibility, especially regarding systems design, verification and validation of

(developed) systems. If ethical issues are addressed in other modules, it is recommended to include this in the relevant module descriptions.

- E 4. (ASIIN 2.2) It is recommended to indicate the workload of the COOP Education in expected working hours comparable to the ECT System.

## **G Comment of the Technical Committee 04 – Informatics (19.03.2019)**

*Assessment and analysis for the award of the ASIIN seal:*

The Technical Committee discusses the procedures of the male and female Cluster. They largely agree with the assessment of the peers. Concerning the female Cluster they propose to combine the two requirements 2 and 3 into one as with the male Cluster. Further, they recommend to delete the recommendation 3 since the conveyance of ethical aspects in the programme cannot be doubted. To specify what kind of ethical elements should be taught appears in the eyes of the committee members to be over-specific.

*The Technical Committee 04 – Informatics/Computer Science recommends the award of the seals as follows:*

The Technical committee agrees that the learning outcomes aimed for do comply with the Subject-Specific Criteria of the Technical Committee.

The Technical Committee 04 – Informatics/Computer Science recommends the award of the seals as follows:

<b>Degree Programme</b>	<b>ASIIN-seal</b>	<b>Subject-specific label</b>	<b>Maximum duration of accreditation</b>
Computer Science	With requirements for one year	Euro-Inf	30.09.2024
Computer Engineering	With requirements for one year	Euro-Inf	30.09.2024

### **Requirements**

#### **For both programmes**

- A 1. (ASIIN 1.3) Both programmes need to have a capstone project of adequate academic level comparable to EQF level 6.
- A 2. (ASIIN 5.3) Ensure that the Diploma Supplement contains detailed information about the educational objectives and intended learning outcomes of the degree programme and including statistical data according to the ECTS-Users' guide in addition to the final grade.



**For the Bachelor programme Computer Science**

~~A 3. (ASIIN 1.3) Ensure that the compulsory final project is of adequate academic level comparable to EQF level 6.~~

**For the Bachelor programme Computer Engineering**

~~A 4. (ASIIN 1.3) Introduce a compulsory final project of adequate academic level comparable to EQF level 6.~~

**Recommendations**

**For both degree programmes**

- E 1. (ASIIN 1.3) It is recommended to further strengthen aspects of IT Security, Theoretical Computer Science and Programming languages apart from Java in the curricula.
- E 2. (ASIIN 1.3) It is recommended to train students in conducting research and scientific writing.
- ~~E 3. (ASIIN 1.3) It is recommended to implement a course on professional ethics and ethical responsibility, especially regarding systems design, verification and validation of (developed) systems. If ethical issues are addressed in other modules, it is recommended to include this in the relevant module descriptions.~~
- E 4. (ASIIN 2.2) It is recommended to indicate the workload of the COOP Education in expected working hours comparable to the ECT System.

## H Decision of the Accreditation Commission (29.03.2019)

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

The Committee discusses the procedure and agrees with the assessment of the peers and proposed synchronization between male and female campus made by the Technical Committee.

*Assessment and analysis for the award of the Euro-Inf® Label:*

The Accreditation Commission deems that the intended learning outcomes of the degree programmes do comply with the Subject-Specific Criteria of the Technical Committee 04 - Informatics.

The Accreditation Commission for Degree Programmes decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Computer Science	With requirements for one year	Euro-Inf	30.09.2024
Computer Engineering	With requirements for one year	Euro-Inf	30.09.2024

### Requirement

- A 1. (ASIIN 1.3) Both programmes need to have a capstone project of adequate academic level comparable to EQF level 6.
- A 2. (ASIIN 5.3) Ensure that the Diploma Supplement contains detailed information about the educational objectives and intended learning outcomes of the degree programme and including statistical data according to the ECTS-Users' guide in addition to the final grade.

### Recommendations

- E 1. (ASIIN 1.3) It is recommended to further strengthen aspects of IT Security, Theoretical Computer Science and Programming languages apart from Java in the curricula.

- E 2. (ASIIN 1.3) It is recommended to train students in conducting research and scientific writing.
- E 3. (ASIIN 2.2) It is recommended to indicate the workload of the COOP Education in expected working hours comparable to the ECT System.

# I Fulfilment of Requirements (20.03.2020)

## Analysis of the peers and the Technical Committee (09.03.2020)

### Requirements

#### For all degree programmes

- A 1. (ASIIN 1.3) Both programmes need to have a capstone project of adequate academic level comparable to EQF level 6.

Initial Treatment	
Peers	not fulfilled Justification: It is not clear from the submitted module descriptions whether there is a capstone project in each of the programmes nor whether it is of an adequate academic level comparable to EQF level 6. The modules for which the HEI submitted module descriptions do not fulfil the expectations for an adequate capstone project. A new study plan shows that both study programmes now contain the modules “graduation project I and II”. However, the HEI does not submit any module descriptions for these new modules.
TC 04	not fulfilled Vote: unanimous Justification: The Technical Committee follows the decision of the peers.

- A 2. (ASIIN 5.3) Ensure that the Diploma Supplement contains detailed information about the educational objectives and intended learning outcomes of the degree programme and including statistical data according to the ECTS-Users’ guide in addition to the final grade.

Initial Treatment	
Peers	Fulfilled

	Justification: The HEI submits amended Diploma Supplements which now contain detailed information about the educational objectives and intended learning outcomes of each degree programme, as well as statistical data according to the ECTS-Users' guide.
TC 04	fulfilled Vote: unanimous Justification: The Technical Committee follows the decision of the peers.

## Decision of the Accreditation Commission (20.03.2020)

The Accreditation Commission discusses the fulfilment of the requirements and agrees with the peers' and the Technical Committee's opinion. It regards requirement 1 as not yet fulfilled and requirement 2 as fulfilled.

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Computer Science	Requirement 1 not fulfilled	Euro-Inf	6 months prolongation
Computer Engineering	Requirement 1 not fulfilled	Euro-Inf	6 months prolongation

## Analysis of the peers and the Technical Committee (09.09.2020)

### Requirements

#### For all degree programmes

- A 1. (ASIIN 1.3) Both programmes need to have a capstone project of adequate academic level comparable to EQF level 6.

Initial Treatment	
Peers	not fulfilled

	Justification: It is not clear from the submitted module descriptions whether there is a capstone project in each of the programmes nor whether it is of an adequate academic level comparable to EQF level 6. The modules for which the HEI submitted module descriptions do not fulfil the expectations for an adequate capstone project. A new study plan shows that both study programmes now contain the modules “graduation project I and II”. However, the HEI does not submit any module descriptions for these new modules.
TC 04	not fulfilled Vote: unanimous Justification: The Technical Committee follows the decision of the peers.
AC	not fulfilled Vote: unanimous Justification: The Accreditation Commission agrees with the peers’ and the Technical Committee’s opinion. It regards requirement 1 as not yet fulfilled.
<b>Secondary Treatment</b>	
Peers	not fulfilled <u>Justification:</u> The university provides updated module descriptions. Both study programmes now include a capstone project where students have to work independently on a research problem and the module descriptions detail the necessary work: self-study, scientific report and oral presentation. However, it remains unclear to the peers how basic knowledge of scientific work is taught, practiced and checked. As the peers are unable to judge the quality of the final project and the preparation for it from a distance, they regard the requirement as not fulfilled.
TC 04	fulfilled <u>Justification:</u> Since the evidence provided was the same for male and female campus, the technical committee takes the same decision as for the male campus.

## Decision of the Accreditation Commission (17.09.2020)

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Computer Science	Requirement 1 fulfilled	Euro-Inf	30.09.2024

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Computer Engineering	Requirement 1 fulfilled	Euro-Inf	30.09.2024

## Appendix: Programme Learning Outcomes and Curricula

According to the Self-Assessment Report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Computer Science:

### “1 Knowledge

- 1.1 Define the fundamentals of hardware components and their functionality.
- 1.2 Recall the components of programming languages, software systems, and their objectives.
- 1.3 Memorize the knowledge of science and technologies appropriate to the discipline.
- 1.4 Memorize the concept of mathematics to the Computer Science applications.
- 1.5 Recall the ethical issues and Islamic culture.
- 1.6 Describe and practice Arabic and English Languages.
- 1.7 Practice of physical body exercise and activities.
- 1.8 Differentiate between distinct measurements, techniques and models used to solve computer problems.
- 1.9 List the computing requirements and processes relevant to Computer Science problems.
- 1.10 Select appropriate strategies to obtain optimal solution for computer applications.

### 2 Cognitive Skills

- 2.1 Discuss the aspects and differences between main computer architecture families.
- 2.2 Apply different techniques to understand and use software components and programming structures.
- 2.3 Design systems by applying efficient methodologies.
- 2.4 Analyze the problems and their solution using different tools and measurements.
- 2.5 Design solutions to the problems using varied techniques and models.
- 2.6 Apply the concepts of science and mathematics in problem-solving.
- 2.7 Evaluate different computer systems.
- 2.8 Formulate correct expressions using Arabic and English languages.
- 2.9 Justify the solutions of the problems using suitable methods.
- 2.10 Integrate knowledge and technology from several disciplines related to Computer Science to obtain high-quality applications.
- 2.11 Show critical awareness of current problems and/or new insights in their chosen specialist area

### **3 Interpersonal Skills & Responsibility**

- 3.1 Apply the ethical standards and legal rules related to computer and information technology.
- 3.2 Show responsibility and accountability for continued personal and professional learning.
- 3.3 Develop working skills in terms of independence and leadership in computer projects.
- 3.4 Demonstrate effective cooperation during teamwork.
- 3.5 Demonstrate adequate skills of reasoning in solving computing problems.

### **4 Communication, Information Technology, Numerical**

- 4.1 Assess the effectiveness of different methods in hardware techniques and technologies
- 4.2 Demonstrate an appropriate level of numerical skills related to computing.



4.3 Demonstrate presentation, reports and documentation skills.

4.4 Interact effectively using different communication skills to present high quality of computer applications.

4.5 Utilize information technology tools to collect, analyze and interpret topics related to Computer Science.

4.6 Illustrate the usage of new trends in programming languages and system software.

## 5 Psychomotor

5.1 Experiment with modern design tools professional and safe manner.

5.2 Develop optimal solutions for a range of problems using programming languages.”

The following **curriculum** is presented:

## Computer Science Plan

First Year (Preparatory)							
Course	Title	Lec	Lab	CRD	Prerequisite	Course	Title
MATH001	Preparatory Math I	3	1	4		MATH001	Preparatory Math II
ENGL 001	Preparatory English I	15	5	8		ENGL 001	Prep. English II
PREP 001	Univ. Study Skills	2	0	2		PREP 004	Introduction to Eng.
PREP 002	Prep. Natural Science	0	2	1		PREP 002	Prep. Shop II
PE 001	Prep. Physical Educ. I	0	2	1		PE 001	Prep. Physical Educ. II
		20	10	16			

Total credit hours required in Preparatory Program: 31

Second Year (Freshman)							
Course	Title	Lec	Lab	CRD	Prerequisite	Course	Title
CHEM 101	General Chemistry I	3	4	4		ENGL 102	English Compos. II
ENGL 101	English Compos. I	3	0	3		IAS 111	Belief & its Conseq.
MATH 101	Calculus I	4	0	4		ICS 102	Computer Program.
PE 101	Physical Education I	0	2	1		MATH 102	Calculus II
PHYS 101	General Physics I	3	3	4		PE 102	Physical Education II
IAS 101	Practical Grammar	2	0	2		PHYS 102	General Physics II
		15	9	18			

Third Year (Sophomore)							
Course	Title	Lec	Lab	CRD	Prerequisite	Course	Title
COE 200	Fund. of Computer Eng.	3	3	4	PHYS 101	ICS 202	Data Structure
ENGL 214	Technical Report Writing	3	0	3	ENG 102	ICS 232	Computer Org & Assembly Program.
ICS 251	Foundation of Computer Science	3	0	3	MATH 101	ICS 252	Discrete Structures
ICS 201	Introduction to Computer Science	3	3	4	ICS 102	XE xxx	General Elective I
MATH 201	Calculus III	3	0	3	MATH 102	MATH 260	Intro. to Diff. Eq& Lin. Algebra
		15	6	17			

Fourth Year (Junior)							
Course	Title	Lec	Lab	CRD	Prerequisite	Course	Title
COE 308	Computer Architecture	3	0	3	ICS 202	IAS 311	Islamic Shariah
ICS 313	Fund. of Program. Language	3	0	3	ICS 202	ICS 432	Computer Networking Systems
ICS 334	Database Systems	3	3	4	ICS 202	ICS 413	Software Engineering
ICS 353	Des. & Analysis of Algorithms	3	0	3	ICS 202	ICS XXX	ICS Elective I
IAS 211	Ethics in Islam	2	0	2	IAS 111	XE xxx	General Elective II
STAT 319	Prob. & Stat	2	3	3	MATH 201	IAS 201	Objective Writing
		16	6	18			

Summer Session

ICS 350	Summer COOP	0	0	0		ENGL 214& ICS334& ICS313	
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Fifth Year (Senior)							
Course	Title	Lec	Lab	CRD	Prerequisite	Course	Title
ICS 351	COOP Education	--	--	9	ENGL 214& ICS334& ICS313	ICS 411	Senior Project I
						ICS 431	Operating Systems
						IAS 301	Literary Styles
						ICS XXX	ICS Elective II
						ICS XXX	ICS Elective III
						XE xxx	General Elective III
				9			

Total Requirements (132 credit hours)

**1. Elective Courses (9 - Credit Hours).**

Course Number	Course Name	Credit			Prerequisite
ICS 381	Intro to Artificial Intelligence	3	0	3	ICS 202
ICS 434	Advanced Database Systems	3	0	3	ICS 334
ICS 435	Computer Graphics	3	0	3	ICS 202
ICS 481	Neural Networks	3	0	3	ICS 381
SWE 344	Internet Protocols & C/S Prog	2	3	3	ICS 202
SWE 423	Multimedia Systems	3	0	3	ICS 202
SWE 444	Internet & Web App Development	3	0	3	ICS 334

**1. Free Elective Courses (9 - Credit Hours).**

Course Number	Course Name	Credit			Prerequisite
ECON 101	Principles of Economics 1	3	0	3	--
ECON 202	Principles of Economics 2	3	0	3	ECON 101
ECON 403	Engineering Economics	3	0	3	--
MGT 301	Principles of Management	3	0	3	--
MGT 311	Legal Environment	3	0	3	--
MGT 401	Human Resources Management	3	0	3	MGT 301
MGT 410	Organization Behaviour & Design	3	0	3	MGT 301
MKT 301	Principles of Marketing	3	0	3	ECON 202

According to the Self-Assessment Report the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Bachelor degree programme Computer Engineering:

**“1. Knowledge**

- 1.1 Define the fundamentals of hardware components.
- 1.2 Define the fundamental components of software systems and programming languages and their objectives.
- 1.3 Memorize the knowledge of science and technologies appropriate to the discipline.
- 1.4 Recall the mathematical knowledge appropriate to the COE and related sciences
- 1.5 Recall the ethical issues and Islamic culture
- 1.6 Describe and practice Arabic and English Languages
- 1.7 Practice of physical body exercise and activities

1.8 Recognize the different representations and techniques used by different applications to solve a computer problem.

1.9 Describe the basic principles of circuit design.

1.10 Define the structures of networking systems and their objectives.

## **2. Cognitive Skills**

2.1 Recognize the features and differences between main computer architecture families.

2.2 Apply different techniques to understand, and use software components and programming structures.

2.3 Design digital systems with large-scale with different options and alternatives.

2.4 Analyze the problems and their solution using different tools.

2.5 Design solutions for the computing problems using different representations, tools, techniques, and models.

2.6 Apply the concepts of science and mathematics in problem solving.

2.7 Evaluate different computer systems.

2.8 Formulate correct expressions using Arabic and English languages.

2.9 Differentiate between various communication and networking models.

2.10 Analyze different electronic circuits with semiconductor devices.

## **3. Interpersonal Skills & Responsibility**

3.1 Apply ethical and high moral standards in both private and public environments.

3.2 Demonstrate accountability for continued personal and professional learning and development

3.3 Acquire the skills of working independently and as in groups including leadership responsibilities.

3.4 Demonstrate necessary skills of communication and teamwork.

3.5 Demonstrate adequate skills of negotiation and effective discussions.

## **4. Communication, Information Technology, Numerical**

- 4.1 Assess the effectiveness of different methods in circuit simplification and computer architectures
- 4.2 Demonstrate an appropriate level of numerical skills related to computing.
- 4.3 Demonstrate presentation, reports, and documentations skills.
- 4.4 Use different communication skills to present high quality of Computer Engineering fields.
- 4.5 Use several tools of information technology to gather, analyze, and interpret topics related to computer engineering.
- 4.6 Illustrate the usage of new trends in programming languages and system engineering.

## 5. Psychomotor

- 5.1 Experiment with modern design tools in professional and safe manner.
- 5.2 Develop optimal solutions for a range of problems using programming languages.
- 5.3 Assemble electric and electronic components to construct complex circuits
- 5.4 Handle different types of equipment to develop different systems.”

The following **curriculum** is presented:

## Computer Engineering Plan

First Year (Freshman)											
Course	Title	Lec	Lab	CRD	Prerequisite	Course	Title	Lec	Lab	CRD	Prerequisite
CHEM101	General Chemistry I	3	4	4		ENGL102	English Composition II	3	0	3	ENGL110
ENGL110	English Composition I	3	0	3		IC101	Intro. To Islamic Culture	2	0	2	
MATH101	Calculus I	4	0	4		ICS102	Computer Programming	2	3	3	MATH101
PE101	Physical Education I	0	2	1		MATH102	Calculus II	4	0	4	MATH101
PHYS101	General Physics I	3	3	4		PE102	Physical Education II	0	2	1	PE101
ARAB101	Arabic Language Skill	2	0	2		PHYS102	General Physics II	3	3	4	PHYS101
		13	9	18				14	8	17	
Second Year (Sophomore)											
Course	Title	Lec	Lab	CRD	Prerequisite	Course	Title	Lec	Lab	CRD	Prerequisite
COE200	Fund. of Computer Eng.	3	3	4	PHYS102	ICS202	Data Structures	3	3	4	ICS201
EE201	Electric Circuits I	3	3	4	PHYS101&MATH102	ICS232	Computer Org & Assembly Program.	3	3	4	ICS201&COE200
IC102	Islamic & Society Building	2	0	2		ICS252	Discrete Structures	3	0	3	MATH101&ICS102
ICS201	Introduction to Computer Science	3	3	4	ICS102	EE-203	Electronics I	3	3	4	EE201
MATH201	Calculus III	3	0	3	MATH102	MATH260	Intro. to Diff Eq & Lin. Algebra	3	0	3	MATH201
		14	9	17				16	9	18	
Third Year (Junior)											
Course	Title	Lec	Lab	CRD	Prerequisite	Course	Title	Lec	Lab	CRD	Prerequisite
STAT319	Prob. & Stat	2	3	3	MATH201	COE308	Computer Architecture	3	0	3	COE305
COE305	Microcomp. Syst. Design	3	3	4	ICS232	COE344	Computer Networks	3	3	4	COE341
ICS334	Data base Systems	3	3	4	ICS202	COE390	Seminar	1	0	1	
ENGL214	Technical Report Writing				ENG102	COE360	Princi. of VLSI Desg.	3	0	3	EE203
COE341	Data & Computer Comm.	3	0	3	COE200	COE4xx	COE Elective	3	0	3	
IC103	Economic System in Islam	2	0	2		XE xxx	General Elective I	3	0	3	
		16	9	19		ARAB102	Arabic Composition	2	0	2	
								18	6	19	
								Summer Session			
						COE350	Summer COOP	0	0	0	ENGL214&ICS334&COE344
Fourth Year (Senior)											
Course	Title	Lec	Lab	CRD	Prerequisite	Course	Title	Lec	Lab	CRD	Prerequisite
COE351	COOP Education	--	--	9	ENGL214&ICS334&COE344	COE400	System Design Lab	1	6	3	COE305
						COE4xx	COE Elective	3	0	3	
						ICS431	Operating Systems	3	3	4	ICS232
						XE xxx	General Elective II	3	0	3	
						IC104	The Political System in I.	2	0	2	
						COE xxx	COE Elective	3	0	3	
								15	9	18	

**1. Elective Courses (9 - Credit Hours).**

Course Number	Course Name	Credit			Prerequisite
COE 405	HDL Modeling of Digital Systems	3	0	3	COE 308 OR CI (Consent of Instructor)
COE 410	Design of Sequential Systems	3	0	3	COE 308
COE 420	Parallel Computing	3	0	3	COE 308
COE 446	Mobile Computing	3	0	3	COE 344 OR CI
COE 462	Design Automation of VLSI Circuits	3	0	3	COE 360 OR CI
COE 488	Data Acquisition Interfacing	3	0	3	COE 305
ICS 353	Design and Analysis of Algorithms	3	0	3	ICS 202 & ICS 252
ICS 490	Special Topics 1	3	0	3	
ICS 491	Special Topics 2	3	0	3	

**2. General Elective Courses (6 - Credit Hours).**

Course Number	Course Name	Credit			Prerequisite
ECON 101	Principles of Economics 1	3	0	3	--
ECON 202	Principles of Economics 2	3	0	3	ECON 101
ECON 403	Engineering Economics	3	0	3	--
MGT 301	Principles of Management	3	0	3	--
MGT 311	Legal Environment	3	0	3	--
MGT 401	Human Resources Management	3	0	3	MGT 301
MGT 410	Organization Behavior & Design	3	0	3	MGT 301