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# Program Specifications
# (Postgraduate Degree)

| | |
|---|---|
| **Program Name:** Master of Engineering in Cyber Security | |
| **Qualification Level :** 7th Level – Master Degree | |
| **Department:** Computer Engineering | |
| **College:** Computer Engineering and Sciences | |
| **Institution:** Prince Sattam Bin Abdulaziz University | |

# Content

# A. Program Identification and General Information

**1. Program Main Location:**

Prince Sattam Bin Abdulaziz University (Main Campus in Alkharj)

**2. Branches Offering the Program:**

No Branches

**3. Reasons for Establishing the Program:**

(Economic, social, cultural, and technological reasons, and national needs and development, etc.)

The program is urgently required to satisfy the following national needs:

1. Enhancing the Kingdom's national security related to cybersecurity through the use of technologies and through skilled specialists in the field.
2. Transferring the concept of cybersecurity technology to students and researchers as well as transferring it to the community.
3. There is an urgent need for highly trained experts to enable them to carry out the mission of ensuring the safety and security of information in the various institutions of the Kingdom, whether governmental or private.
4. There is an urgent need to educate community members about the importance of security and how to secure data, information and devices.

**4. System of Study**

☐ Coursework & Thesis  ☒ Coursework & Project

**5. Mode of Study**

☒ On Campus  ☐ Distance Education  ☐ Others

**6. Educational and Research Partnerships**( if any)

- Partnership Arrangement: NA
- Type of Partnership: NA
- Duration of Partnership: NA

**7. Total Credit Hours for Completing the Program: ( 42 )**

**8. Professional Occupations/Jobs:**

Security Analyst

Security Architect

Security Engineer

Security Consultant

Cryptanalyst

Security Administrator

Cryptographer

Security Software Developer

**9. Major Tracks/Pathways** (if any)**: NA**

| Major Track/Pathway | Credit Hours (For each track) | Professional Occupations/Jobs (For each track) |
|---|---|---|
| NA | | |
| | | |
| | | |
| | | |

**10. Intermediate Exit Points/Awarded Degree** (if any)**:** NO Exit Points

| Intermediate Exit Points/Awarded Degree | Credit Hours |
|---|---|
| NA | |
| | |
| | |

## B. Mission, Goals, and Learning Outcomes

**1. Program Mission:**

To provide a suitable environment for producing highly qualified Cybersecurity engineers, capable of solving security issues and assuming leadership to make significant contribution in knowledge society.

**2. Program Goals:**

*PG1: Provide graduates with an in-depth specialization knowledge in cybersecurity, selected from areas such as hardware security, network security and systems security.*

*PG2: Enhance the ability of graduates to succeed in dealing with the latest developments in the field, formulate solutions to address attacks, and plan for a secure world through cyber security.*

*PG3: Provide graduates with the necessary skills in Cybersecurity to contribute to enhancing the national security of the Kingdom of Saudi Arabia associated with cybersecurity through the adaptation of developed technologies.*

*PG4: Qualify graduates to pursue more postgraduate studies and scientific research in the field of cybersecurity.*

**3. Relationship between Program Mission and Goals and the Mission and Goals of the Institution/College.**

*<u>College Mission:</u> Providing distinguished education and preparing competing graduates according to international standards through distinguished academic programs, solid scientific research, effective community partnerships and optimal utilization of human and technical resources.*

*<u>College Goals:</u>*
*CG1: Developing distinguished programs for teaching and learning*
*CG2: Providing an academic environment to attract distinguished human resources*
*CG3: Enhancing students' abilities and developing their skills*
*CG4: Enhancing applications of quality and academic accreditation*
*CG5: Developing programs for applied scientific research*
*CG6: Building local and international strategic partnerships*
*CG7: Development of the self-financial resources of the college*
*CG8: Creation of distinct postgraduate programs with the Kingdom's Vision 2030*

*The following subsections breakdown missions of the College (CCES) and the Program (MSCE). Then map the breakdown elements of missions with each other to ensure their consistency.*

*<u>C.1 Breakdown of Missions</u>*

*<u>C.1.1 College Mission (CM) Elements:</u>*
*CM1. Providing distinguished education and preparing competing graduates.*
*CM2. Encouraging solid scientific research.*
*CM3. Building effective community partnerships.*

*<u>C.1.2 Program Mission (PM) Elements:</u>*
*PM1. Providing a suitable environment for graduating highly qualified Cybersecurity engineers.*
*PM2. Cybersecurity engineers who are capable of solving problems via scientific research.*
*PM3. Cybersecurity engineers who are capable of assuming leadership to make significant contribution in knowledge society.*

### C.2 Mapping of Missions

Here we map the program mission to the college mission, the college mission to the university mission, and the program mission to the university mission, as presented in Table 2.1, 2.2 and 2.3, respectively.

### C.2.1 Program (MSCE) to College (CCES) Mission Mapping

Table 1: Mapping of PM to CM

| PM Elements | CM Elements | | |
|---|---|---|---|
| | CM1 | CM2 | CM3 |
| PM1 | ✓ | | |
| PM2 | | ✓ | |
| PM3 | | | ✓ |

The above tables illustrate that the missions of the program and college are consistent. In addition, the mission of the Master of Science in Cybersecurity Engineering Program (MSCE) helps in achieving the missions of the College (CCES) which achieves mission of the University (PSAU).

**_Mapping the program goals to the college goals:_**

Table 1: Mapping of PG to CG

| PG Elements | GM Elements | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CG1 | CG2 | CG3 | CG4 | CG5 | CG6 | CG7 | CG8 |
| PG1 | ✓ | ✓ | ✓ | | | | | ✓ |
| PG2 | | | | ✓ | ✓ | | ✓ | |
| PG3 | | | ✓ | ✓ | ✓ | ✓ | | |
| PG4 | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ |

The above table illustrate that the goals of the program and college are consistent. In addition, the goals of the Master of Science in Cybersecurity Engineering Program (MSCE) helps in achieving the goals of the College (CCES) which achieves goals of the University (PSAU).

## 4. Graduate Attributes:

Graduates who successfully completed the program are expected to have the following attributes:

CSE1- Have in-depth knowledge, understanding and skills associated with Cybersecurity.

CSE2- Have the ability for lifelong personal development and learning to be successful in society.

CSE3- Have the ability to evaluate and draw conclusions from information, to find sustainable solutions to complex security problems and make decisions.

CSE4- Have the ability to lead and support others by inspiring them with a clear vision and motivating them to achieve security goals.

CSE5- Have the ability to work under pressure, where the organization's security can be at

*stake if they do not work carefully and thoroughly.*

*These attributes were derived from the program`s mission as well as PSAU graduate attributes.*

*Prince Sattam bin Abdulaziz University graduate attributes:*

PSAU1.    *Breadth of knowledge*

PSAU2.    *Depth of knowledge*

PSAU3.    *Critical and creative thinking*

PSAU4.    *Research skills*

PSAU5.    *Technical skills*

PSAU6.    *Communication skills*

PSAU7.    *Self-directed lifelong learning*

PSAU8.    *Career skills*

PSAU9.    *Ethical responsibility*

PSAU10.   *Social responsibility*

PSAU11.   *Confidence and adaptability*

*Table 3.1: Mapping PSAU Graduate attributes to CSE program Graduate Attributes.*

| PSAU Prog. | CSE1 | CSE2 | CSE3 | CSE4 | CSE5 |
|---|---|---|---|---|---|
| PSAU1 | ✓ | | | | |
| PSAU2 | ✓ | | | | |
| PSAU3 | | | ✓ | ✓ | |
| PSAU4 | | | ✓ | | |
| PSAU5 | | | ✓ | | |
| PSAU6 | | | | ✓ | |
| PSAU7 | | ✓ | | | |
| PSAU8 | | | | | ✓ |
| PSAU9 | | | | | ✓ |
| PSAU10 | | ✓ | | | |
| PSAU11 | | | ✓ | ✓ | |

1- *It is clear from the above table that program's graduate attributes are consistent with PSAU graduate attributes.*

| **5. Program Learning Outcomes*** | |
|---|---|
| **Knowledge and Understanding** | |
| K1 | Describe complex computing problems related to cybersecurity. |
| K2 | Recognize the principles of computing applications and optimum security solutions. |
| K3 | |
| K4 | |
| K... | |
| **Skills** | |
| S1 | Implement a computing-based solution to meet a given set of computing requirements in the context of cybersecurity. |
| S2 | Apply security principles and practices to maintain operations in the presence of risks and threats. |
| S3 | Communicate effectively in a variety of professional contexts. |
| S4 | |
| S... | |
| **Values** | |
| V1 | Respect professional responsibilities and make informed judgments in computing practice based on legal and ethical principles. |
| V2 | Function effectively as a member or leader of a team engaged in activities appropriate to cybersecurity. |
| V3 | |
| V4 | |
| V... | |

* Add a table for each track or Exit Points/Awarded Degree (if any)

# C. Curriculum

## 1. Study Plan Structure

| Program Structure | | No. of Courses | Credit Hours | Percentage |
|---|---|---|---|---|
| Course | Required | 5 | 15 | 35.7% |
| | Elective | 7 | 21 | 50.0% |
| Graduation Project (if any) | | 1 | 6 | 14.3% |
| Thesis (if any) | | - | - | |
| Field Experience(if any) | | - | - | |
| Others (.....) | | - | - | |
| Total | | **13** | **42** | 100% |

* Add a table for each track (if any)

## 2. Program Courses:

| Level | Course Code | Course Title | Required or Elective | Pre-Requisite Courses | Credit Hours |
|---|---|---|---|---|---|
| Level 1 | CE0600 | Advanced Cyber Security | Required | | 3 |
| | CS0651 | Operating Systems Security | Required | | 3 |
| | CE0603 | Advanced Computer and Networks Security | Required | | 3 |
| | | | | | |
| | | | | | |
| | | | | | |
| Level 2 | CE0602 | Wireless and Mobile Security | Required | | 3 |
| | CExxxx | Elective 1 | Elective | | 3 |
| | CExxxx | Elective 2 | Elective | | 3 |
| | CExxxx | Elective 3 | Elective | | 3 |
| | | | | | |
| | | | | | |
| Level 3 | CExxxx | Elective 4 | Elective | | 3 |
| | CExxxx | Elective 5 | Elective | | 3 |
| | CExxxx | Elective 6 | Elective | | 3 |
| | CS0617 | Research Ethics and Methods | Required | | 3 |
| | | | | | |
| | | | | | |
| Level 4 | CExxxx | Elective 7 | Elective | | 3 |
| | CE0616 | Research Project | Required | | 6 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Elective Courses List | | | |
|---|---|---|---|
| No | Course Code | Course Name | Credit Hours |
| 1 | CS0655 | Computer Forensics | 3 |
| 2 | CE0606 | Cloud Computing Security | 3 |
| 3 | CE0607 | IoT Security | 3 |
| 4 | CE0608 | Hardware Security | 3 |
| 5 | CE0609 | Selected Topics in Cyber Security 1 | 3 |
| 6 | CE0610 | Selected Topics in Cyber Security 2 | 3 |
| 7 | CE0611 | Network Security and Perimeter protection | 3 |
| 8 | CE0612 | Advanced Malware Reverse Engineering | 3 |
| 9 | CE0613 | Cryptographic Processors | 3 |
| 10 | CS0656 | Advanced Ethical Hacking and Countermeasures | 3 |
| 11 | CE0615 | Cybersecurity with Blockchains | 3 |

* Include additional levels if needed
** Add a table for each track (if any)

## 3. Course Specifications
Insert hyperlink for all course specifications using NCAAA template

https://drive.google.com/file/d/1k9e2_bzJT0CWd1d5LeeS0VOSjkXmNO4x/view?usp=sharing

## 4. Program learning Outcomes Mapping Matrix
Align the program learning outcomes with program courses, according to the following desired levels of performance
(**I = Introduced   P = Practiced   M = Mastered** )

| Course code & No. | Program Learning Outcomes | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Knowledge and understanding | | | | Skills | | | | Values | | |
| | K1 | K2 | --- | --- | S1 | S2 | S3 | --- | V1 | V2 | |
| CE0600 | | I | | | I | I | P | | I | I | |
| CS0651 | | I | | | I | I | I | | P | P | |
| CE0603 | I | P | | | I | I | P | | P | M | |
| CE0602 | P | M | | | P | P | | | | P | |
| CS0617 | M | | | | P | P | P | | P | M | |
| CS0655 | | M | | | M | M | M | | M | M | |
| CE0606 | M | | | | M | M | M | | M | M | |
| CE0607 | | M | | | M | M | M | | M | M | |
| CE0608 | | M | | | M | M | M | | M | M | |
| CE0609 | | M | | | M | M | M | | M | M | |
| CE0610 | | M | | | M | M | M | | M | M | |
| CE0611 | M | M | | | M | M | | | | M | |
| CE0612 | M | | | | M | M | M | | M | M | |
| CE0613 | | M | | | M | M | M | | M | M | |
| CS0656 | M | | | | M | M | M | | M | M | |
| CE0615 | M | | | | M | M | M | | M | M | |

| Course code & No. | Program Learning Outcomes | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Knowledge and understanding | | | | Skills | | | | Values | | |
| | K1 | K2 | --- | --- | S1 | S2 | S3 | --- | V1 | V2 | |
| CE0616 | | | | | M | M | M | | M | M | |

\* Add a table for each track (if any)

## 5. Teaching and Learning Strategies to Achieve Program Learning Outcomes

Describe policies, teaching and learning strategies, learning experience, and learning activities, including curricular and extra-curricular activities, to achieve the program learning outcomes.

| Code | Program Learning Outcomes | Teaching Strategies |
|---|---|---|
| **1.0** | **Knowledge and Understanding** | |
| 1.1 | Describe complex computing problems related to cybersecurity. | - Lectures.<br>- Homework assignments.<br>- Group Discussions,<br>- Presentations |
| 1.2 | Recognize the principles of computing applications and optimum security solutions. | - Lectures.<br>- Homework assignments.<br>- Group Discussions,<br>- Presentations |
| … | | |
| **2.0** | **Skills** | |
| 2.1 | Implement a computing-based solution to meet a given set of computing requirements in the context of cybersecurity. | - Lectures.<br>- Homework assignments.<br>- Group Discussions,<br>- Presentations |
| 2.2 | Apply security principles and practices to maintain operations in the presence of risks and threats. | - Lectures.<br>- Homework assignments.<br>- Group Discussions,<br>- Presentations |
| 2.3 | Communicate effectively in a variety of professional contexts. | Report assignments.<br>Group Discussions,<br>Presentations |
| **3.0** | **Values** | |
| 3.1 | Respect professional responsibilities and make informed judgments in computing practice based on legal and ethical principles. | Report assignments.<br>Group Discussions, Presentations |
| 3.2 | Function effectively as a member or leader of a team engaged in activities appropriate to cybersecurity. | Report assignments.<br>Group Discussions, Presentations |
| 3.3 | | |

## 6. Assessment Methods for Program Learning Outcomes.

Describe assessment methods (Direct and Indirect) that can be used to measure achievement of program learning outcomes in every domain of learning.

| Code | Program Learning Outcomes | Assessment Methods |
|------|---------------------------|---------------------|
| **1.0** | **Knowledge and Understanding** | |
| 1.1 | Describe complex computing problems related to cybersecurity. | Quizzes, Midterm and Final Exams, Home Assignments, Reviews of Research Papers, Reports, individual and group presentations, group reports, lab reports, speeches, case studies |
| 1.2 | Recognize the principles of computing applications and optimum security solutions.. | Quizzes, Midterm and Final Exams, Home Assignments, Reviews of Research Papers, Reports, individual and group presentations, group reports, lab reports, speeches, case studies |
| … | | |
| **2.0** | **Skills** | |
| 2.1 | Implement a computing-based solution to meet a given set of computing requirements in the context of cybersecurity. | Quizzes, Midterm and Final Exams, Home Assignments, Reviews of Research Papers, Reports, individual and group presentations, group reports, lab reports, speeches, case studies |
| 2.2 | Apply security principles and practices to maintain operations in the presence of risks and threats. | Quizzes, Midterm and Final Exams, Home Assignments, Reviews of Research Papers, Reports, individual and group presentations, group reports, lab reports, speeches, case studies |
| 2.3 | Communicate effectively in a variety of professional contexts. | Quizzes, Midterm and Final Exams, Home Assignments, Reviews of Research Papers, Reports, individual and group presentations, group reports, lab reports, speeches, case studies |
| **3.0** | **Values** | |
| 3.1 | Respect professional responsibilities and make informed judgments in computing practice based on legal and ethical principles. | Quizzes, Midterm and Final Exams, Home Assignments, Reviews of Research Papers, Reports, individual and group presentations, group reports, lab reports, speeches, case studies |

| | Function effectively as a member or leader of a team engaged in activities appropriate to cybersecurity. | Quizzes, Midterm and Final Exams, Home Assignments, Reviews of Research Papers, Reports, individual and group presentations, group reports, lab reports, speeches, case studies |
|---|---|---|
| 3.2 | | |
| 3.3 | | |

## D. Thesis and Its Requirements (if any)

**1. Registration of the thesis:**
(Requirements/conditions and procedures for registration of the thesis as well as controls, responsibilities and procedures of scientific guidance)

**NA**

**2. Scientific Supervision:**
(The regulations of the selection of the scientific supervisor and his/her responsibilities, as well as the procedures/ mechanisms of the scientific supervision and follow-up)

**NA**

**3. Thesis Defense/Examination:**
(The regulations for selection of the defense/examination committee and the requirements to proceed for thesis defense, the procedures for defense and approval of the thesis, and criteria for evaluation of the thesis)

**NA**

## E. Student Admission and Support:

**1. Student Admission and Transfer Requirements, and Courses Equivalency**

Student admission Requirements:

1- Student should have Bachelor degree in Computer Engineering specialization or related majors such as: electrical engineering, computer science, information systems, software engineering, and information technology from Prince Sattam bin Abdulaziz University or from another recognized university.
2- Student should have a GPA of at least 3.5 of 5.
3- Student should have TOEFL (TOEFL-IBT) with a score of no less than 60, or IELTS with a score of 5.5, or STEP with a score of 75, or passing a language level test determined by the foreign language department of the university in agreement with the department as a requirement for admission to the program.

Transfer Requirements, and Courses Equivalency

Transfer students are subject to the rules and regulations of admission imposed by the Prince Sattam bin Abdulaziz University (PSAU). Acceptance of transfer courses are subject to the approval of the Chairman of the Department of Computer Engineering or program coordinator after consulting the faculty responsible of that particular course. Courses that match 80% of the content of the course offered by the program are generally accepted as equivalent to our courses. Transferred credits are not included in the CGPA of the students and a pass grade is assigned to those courses.

The transfer of a student may be accepted under the following conditions:

1. The student should have been enrolled at a recognized college or university.
2. The student must not have been dismissed from that institution for disciplinary reasons.
3. The student must satisfy the transfer provisions as determined by the University Council.

Transfer students are evaluated as follows:
- If a student wishes to transfer courses, the Deanship of Postgraduate Studies forwards to all concerned departments the relevant materials for evaluation stating the courses the student desires credit in.
- The Department chairman requests the program coordinator to perform these evaluations and to maintain consistency in evaluating transfers.
- The College Council reviews the courses taken by the student based on the recommendations of the department, which offer equivalent courses.
- If the student has earned grades of 'C' or the equivalent or higher in courses taken at a recognized university which are judged sufficiently equivalent to individual course requirements listed in the student's chosen degree program at PSAU, the corresponding PSAU courses are waived and the "C" grade or above gained elsewhere are transferable as pass grades.
- The evaluation of academic transcripts from other institutions is done by the academic department concerned.
- The Deanship of post graduate Studies coordinates this evaluation for the final transfer of credits.

## 2. Student Counseling Services
(academic, career, psychological and social )

At the beginning of his/her lifetime in CCES a student is assigned a faculty member who will be his/her an academic advisor. The rolls of both student and the academic advisor are clearly described in PSAU publications such as the Academic Advisor for the University Student guide. At the beginning of each semester the student is expected to see the advisor so that he can select and register for best courses combination that helps him to graduate in the appropriate period with the best performance that is reflected in the graduation grade.

Students are required to see their academic advisors during the registration period to ask for help in selecting the best combination of courses to register for, beside that students are advised to visit their academic advisors frequently specially for the following reasons:
- Discuss the academic progress from time to time.
- Having academic difficulties during study
- Discuss any social issues affecting the study
- When there is a need to change the field of study
- When there is a need to change the time table
- Discuss any issues regarding the study or the future career

The university was keen on its alumni by following them and taking feedback from their job authorities. In this matter, the university's alumni unit was formed, which works on the following:
- Developing the skills, competencies, and personal characteristics of students and graduates necessary for competition in the labor market.
- Helping graduates to find their jobs and vocational training opportunities.
- Effective and continuous communication with graduates, employment, and vocational training authorities.

- Providing data and statistics and analyzing the necessary questionnaires for graduates and employment authorities.

In coordination with the university's alumni unit, the college's alumni units were formed, which works on professional training, job qualification, career guidance, and following up with graduation projects. The job qualification includes a set of activities that are offered for the students and graduates to provide search skills for appropriate job and gaining the requirements for success and job stability, as well as working to establish partnerships with employment agencies. The job qualification aims to:

1. Introduce and host local and international professional organizations to hold meetings with students and organize field visits.
2. Provide graduate students with the skills to search for suitable employment opportunities and prepare them to pass personal interviews and elaborate their CVs.
3. Establish partnerships with jobs agencies and host them to form meetings with students and alumni and organize visits to those agencies in an attempt to provide employment opportunities.
4. Establish meetings between community leaders and graduates to get involved with high experienced professionals.
5. Introduce employment programs and services, especially the virtual platform for the labor market in the Kingdom of Saudi Arabia.
6. Guide students about the roles of the graduates after obtaining the job.
7. Announce employment opportunities for graduate students.

**3. Special Support**
(low achievers, disabled, gifted and talented)

College of Computer Engineering and Science established the Academic Advising Unit (AAU) to coordinate the advising process and handle any special issues such as the problem of weak students or students under probation. Here a special attention is paid for students with low CGPA. Student with CGPA less than or equals to 3.0 will be under the consideration of the college at various levels. The chairman of the department used to hold a special meeting with a student trying to find the reasons for the low academic performance, students are warned and a report is sent to the dean.

At the end of any semester, students with CGPA less than or equals to 3.5 out of 5.0 are called to meet their academic advisors, a form is filled by both the advisor and the student describing the problems and the suggested solutions. This serves as a warning for the student and from another side as a promise to work hard so that the CGPA will be better next semester

The academic advisor has an access to the records of the students under his/her advising through the university students' information system. This helps the academic advisor to know the situation of his student so that a better future plan may be constructed to help students graduate at time with the best graduation result.

At the university level there is a special unit that is concerned with all issues facing students such as housing and social issues.

## F. Teaching and Administrative Staff

**1. Needed Teaching and Administrative Staff**

| Academic Rank | Specialty | | Special Requirements / Skills ( if any ) | Required Numbers | | |
|---|---|---|---|---|---|---|
| | General | Specific | | M | F | T |
| Professors | Computing and networks | Cybersecurity | - | 3 | 2 | 5 |
| Associate Professors | Computing and networks | Cybersecurity | - | 2 | 2 | 4 |
| Assistant Professors | Computing and networks | Cybersecurity | - | 3 | 3 | 6 |
| Technicians and Laboratory Assistants | Computing and networks | Cybersecurity | - | 3 | 3 | 6 |
| Administrative and Supportive Staff | Secretary | - | - | 1 | 1 | 2 |
| Others ( specify ) | - | - | - | - | - | - |

## 2. Professional Development

**2.1 Orientation for New Teaching Staff**

Describe briefly the process used for orientation of new, visiting and part-time teaching staff

i. Orientation program is held at the beginning of each year for the new members.
ii. Program handbook is an introductory document for teaching staff and visitors.
iii. The course portfolio is considered as a reference for teaching.

**2.2 Professional Development for Teaching Staff**

Describe briefly the plan and arrangements for academic and professional development of teaching staff (e.g., teaching & learning strategies, learning outcomes assessment, professional development, etc.)

The deanship of development and quality has yearlong schedules of workshops to discuss and demonstrate new teaching strategies and assessments techniques, for all faculty members. Also for senior faculty, the university and department support the use of sabbatical leave, for a semester or two semesters, for professional development and to promote research and collaboration with other institutions. Faculty members can also apply for conferences or workshops attendance funds through the ministry of higher education or through research grants from the Deanship of Scientific Research. Also the university supports to attend the conferences or workshops. Among the other choices, faculty members can also apply to work as consultants in the industry if it has no conflict with the curricular activates.

Faculty can get research funding from the Deanship of Scientific Research and postgraduate studies.

Faculty members are motivated to excel through a promotion scheme that takes into account performance in teaching, research, and services. The university faculty promotion guidelines follow international standards in the education profession. Faculty promotion is based on peer evaluation done by external reviewers. Moreover, a university award exists for outstanding faculty performance in research, the Excellence in Research Award.

## G. Learning Resources, Facilities, and Equipment

**1. Learning Resources.**

Policies and Procedure for providing and quality assurance of learning resources (textbooks, references and other resource materials, including electronic and web-based resources, etc.)

i. Faculties can directly request instructor copies from the publishers.

| |
|---|
| ii. Ordering of textbooks can be done via the Department, College and Liberian Deanship. |
| **iii.** Access to the digital library is available for both teaching staff and students. |

| **2. Facilities and Equipment** |
|---|
| Policies and Procedure for providing and quality assurance of Facilities and Equipment (Library, laboratories, medical facilities, classrooms, etc.). |
| i. Every year, teaching staff submit the required list of textbooks and references to the Dept. Chair, who sends the Department needs to the Dean to place an order through the Liberian Deanship. |
| ii. The laboratories' committee has been formed at the College level to handle all lab requirements, where the committee collects the requirements from teaching staff, merges them in a common list and forwards to the dean to place an order through the Purchasing Department. |
| iii. At the beginning of every semester, the College administrative staff figure out and prepare all classrooms requirements. |

| **3. Arrangements to Maintain a Healthy and Safe Environment** (According to the nature of the program) |
|---|
| <ul><li>Hazards associated with the work are identified, analyzed, and categorized.</li><li>Know the location and proper use of the safety equipment (i.e., eyewash unit, safety shower, fire extinguisher, first-aid kit, fire blanket, emergency telephone, and fire alarm pulls).</li><li>Establish methods to use energy more efficiently and prevent accidents.</li><li>Comply with safety rules, regulations, and organizational requirements.</li><li>Improve environmental health and safety (EHS) performance continually.</li><li>Conduct periodic assessments to verify and validate EHS performance.</li></ul> |

## H. Program Management and Regulations

| **1. Program Management** |
|---|
| **1.1 Program Structure** |
| (including boards, councils, units, committees, etc.) |
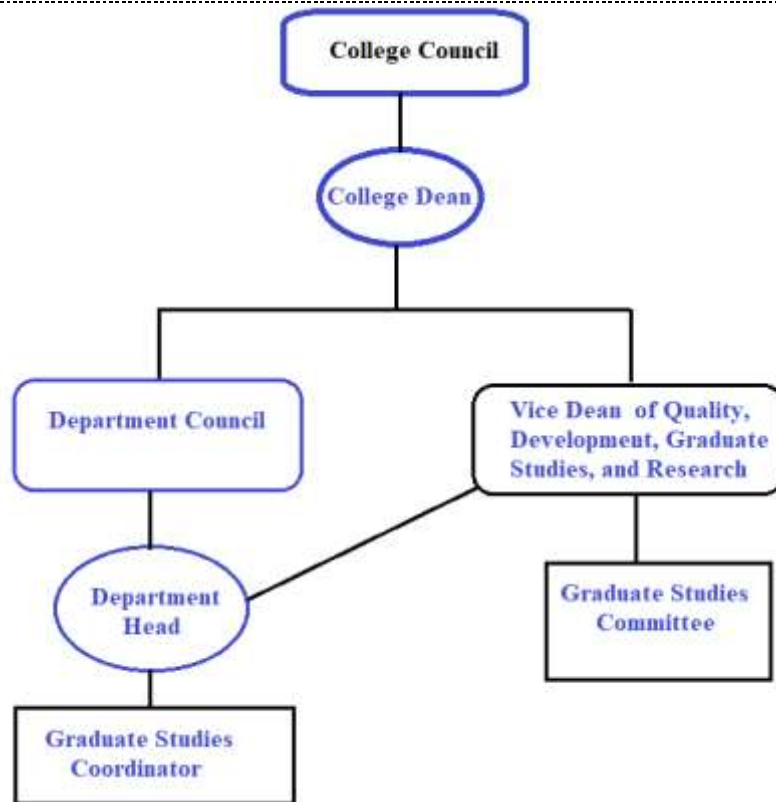
## 1.2 Stakeholders' Involvement

Describe the representation and involvement of stakeholders in the program planning and development. (students, professional bodies, scientific societies, alumni, employers, etc.)

Stakeholders (Students, Alumni, Employer) will be involved in the program planning and development through the following:

1- Conducting surveys to get feedback about the quality and effectiveness of the program to be sure that the program education objectives satisfy their needs.
2- Open discussions to collect their recommendation to help us improve the program.

## 2. Program Regulations

Provide a list of related program regulations, including their link to online version: admission, study and exams, recruitment, appeals and complaint regulations, etc.)

**Admission:**

The admission conditions are stipulated in chapter five of the Unified Regulations for graduate Studies and its executive rules at the university, addition additions are provided by the program as follows:

- The required Grade Point Average (GPA) of at least 3.5 out of 5 (or equivalent)

- The required Specializations for the degree should be bachelor's degree in computer engineering or related disciplines such as: electrical engineering, computer science,

information systems, software engineering, and information technology from Prince Sattam bin Abdulaziz University or from another recognized university.

- IELTS with a score of 5 or its equivalent.

All the admission conditions are posted on the university website.

## Study and Exams:

- Master of Science in Cybersecurity is full-time program consists of 42 credits and should be completed in at least four semesters. Each semester consisting of at least 9 credits.
- In each semester, there is at least one mid-term exam besides other continuous assessments (Quizzes, assignments, group discussions, presentations, etc.) are conducted on regular basis through the semester. At the end of the semester there is final theoretical exam.
- Prince Sattam bin Abdulaziz University study and examinations regulations are the base for conducting and evaluating coursework and final examinations for all courses offered. After computing the total marks for a course, a grade and a Grade Point will be calculated using the following table:

Table 1.1: Prince Sattam bin Abdulaziz University Grading System

| Mark | Letter Grade | Grade in English | Points | Comment |
|---|---|---|---|---|
| 95 – 100 | A+ | Exceptional | 5.0 | |
| 90 and < 95 | A | Excellent | 4.75 | |
| 85 and < 90 | B+ | Superior | 4.5 | |
| 80 and < 85 | B | Very good | 4.0 | |
| 75 and < 80 | C+ | Above average | 3.5 | |
| 70 and < 75 | C | Good | 3.0 | |
| 65 and < 70 | D+ | High pass | 2.5 | |
| 60 and < 65 | D | Pass | 2.0 | |
| < 60 | F | Fail | 1.0 | |
| -- | IP | In-progress | -- | Course continues for next semester |
| -- | IC | Incomplete | -- | Requirements not complete |
| -- | DN | Denial | 1.0 | Attendance < 75% |
| -- | W | Withdrawn | -- | Optionally withdraw |

Course points attained by the student are calculated using the formula:

Grade Points = Credit Hours × Points attained (from the above table)

For example if the course is a three credit hours course and the student mark is 87, then the grade is B+ (4.5 points) and the grade points = 3 × 4.5 = 13.5

Grade Point Average (GPA) is calculated for the semester using the formula:

$$GPA = \frac{\sum Semester\ courses\ Grade\ Points}{\sum Semester\ courses\ Credit\ Hours}$$

The GPA is calculated by the Student Information System at the end of each semester using the above formula. Then the CGPA is updated for the whole semesters spent by the student in the college so far. The following formula is used

$$CGPA = \frac{\sum GPA \; for \, all \; semesters}{\sum Credit \; Hours \; for \, all \; semesters}$$

Prince Sattam bin Abdulaziz University uses a computerized registration system that keeps track of all students' records which is used by the students and the college as well as the university administration to perform different tasks throughout the whole process. One of the benefits of this system is that it prevents the accidental registration of a course when the student did not complete its prerequisite(s). No course can be registered unless all prerequisites were completed.

**Appeals and compliant regulations:**

The policies and regulations for student appeals and compliant are stated in "Student's Right and Responsibilities" guide. It includes articles regulating the investigation of appeals, plagiarism, complaints, and procedures of appealing against the disciplinary action.

## I. Program Quality Assurance

**1. Program Quality Assurance System**

Provide online link to quality assurance manual

The attached quality assurance manual gives more details about the program quality assurance system.

**2. Program Quality Monitoring Procedures**

| Process | Level | Tools | Elements | Responsibilit | Time |
|---|---|---|---|---|---|
| Quality evaluation | Courses level | Course report | - Exam Marks. <br> - Course Evaluation Survey <br> - Course Learning Outcomes (CLOs) assessment (direct and indirect assessment) | All instructors and quality committee | End of each semester |
| | Stakeholders | Surveys | - Students survey <br> - Faculty survey <br> - Alumni Survey <br> - Employer survey | Quality unit | Annually |

| | Program level | Annual Program Report (APR) | - Course reports<br>- Program Learning Outcomes (PLOs) assessment.<br>- Program Exit Survey Indicators | Curriculum and Assessment (CAC) Committee | Annually |
|---|---|---|---|---|---|
| Quality planning | Courses level | Course Improvement action plan | Based on course report | Quality committee | End of each semester |
| | Program level | Program Improvement action plan | Based on APR | CAC Committee | Annually |
| Quality implementation | Course level, program level and all college units are committed to implement the approved action plan. | | | | |
| Quality re-check | Courses level | Next course report | Evaluate results of action plans | Quality committee | Annually |
| | Program level | Next APR | Evaluate results of action plans | CAC Committee | Annually |

**3. Arrangements to Monitor Quality of Courses Taught by other Departments.**

NA

**4. Arrangements Used to Ensure the Consistency between Main Campus and Branches** (including male and female sections)

NA (The program offered only in the main campus)

**5. Arrangements to Apply the Institutional Regulations Governing the Educational and Research Partnerships** (if any).

NA

**6. Assessment Plan for Program Learning Outcomes (PLOs), and Mechanisms of Using its Results in the Development Processes**

6.1 **Assessment Plan for Program Learning Outcomes (PLOs)**

The Assessment Plan for Program Learning Outcomes (PLOs) rely on direct and indirect assessments. The following table illustrates the scheduling for a complete cycle of PLOs using direct measurements based on Course Learning Outcomes (CLOs) of the program core courses. As seen the cycle consists of 4 levels (semesters) or 2 years, where at the end of each semester the contribution of all offered courses to the relevant PLOs will be computed.

| Domain | PLO | First Year | | | | Second Year | |
|---|---|---|---|---|---|---|---|
| | | 1st Level | | | 2nd Level | 3rd Level | 4th Level |
| | | CE0600 | CE0651 | CE0603 | CE0602 | CS0617 | CE0616 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Knowledge | K1 | | | | | | |
| | K2 | | | | | | |
| Skills | S1 | | | | | | |
| | S2 | | | | | | |
| | S3 | | | | | | |
| Values | V1 | | | | | | |
| | V2 | | | | | | |

- A colored cell in each course column indicates that course contributes to the corresponding PLO.
- Each course effectively contributes to 3 to 5 PLOs, and each PLO directly measured by 3 to 4 courses.
- Direct assessment of two PLOs (K2 and V2) is completed by end of the 1st year, while the assessment of the remaining PLOs will be completed by end of the 2nd year.

On the other hand, the indirect assessment can be accomplished through a PLOs survey that will be conducted to exit students at the end of the last semester. Also, feedback from alumni and employers can be considered in the assessment and evaluation process after one year from time of graduation or employment.

## 6.2 Using of PLOs Assessment Results in the Development Processes

At the end of the program cycle the overall core courses contributions to all PLOs together with the indirect results will be reported, discussed, and used in the development processes as shown in the following figure.

Thus, the direct and indirect assessment results of all PLOs can be reported within the program cycle (2 years). The program report can be discussed and evaluated by the Curriculum and Assessment Committee (CAC), which may prepare an action plan. The action plan will be approved by the Department Council and hence used as a feedback for developing and improving the program in the next cycle.
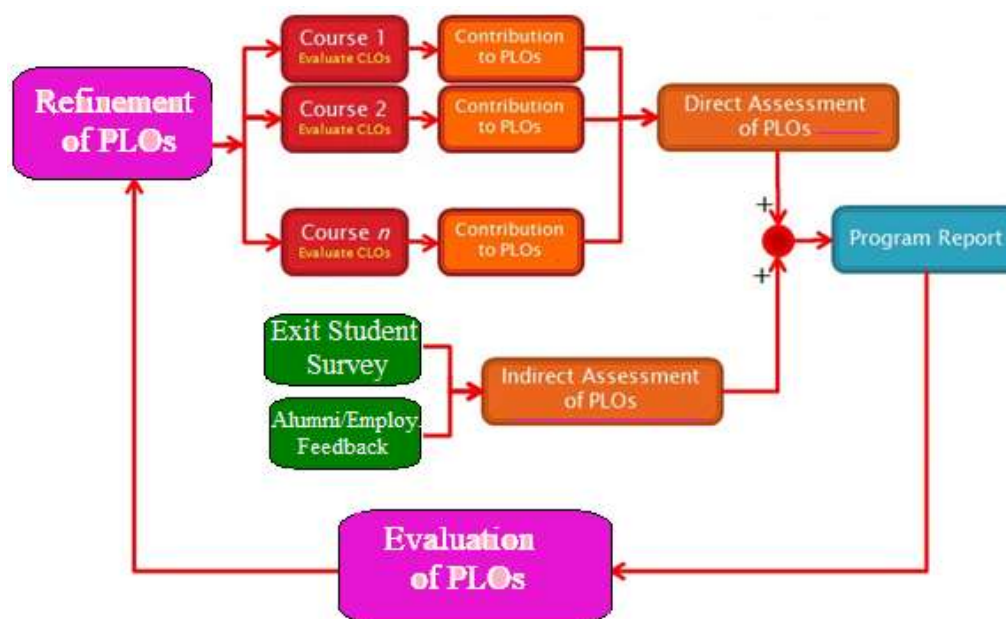


PLOs Development Process Cycle

## 7. Evaluation of Program Quality Matrix

| Evaluation Areas/Aspects | Evaluation Sources/References | Evaluation Methods | Evaluation Time |
|---|---|---|---|
| Effectiveness of teaching | Students | Survey | End of semester |
| Learning outcome assessment | Students | Direct (exams, homework assignments – based on CLOs) | End of semester |
| | Exit Students | Survey | Last semester for exit students |
| Learning resources | Students | Survey | End of academic year (annual) |
| Leadership | Faculties | Survey | End of academic year (annual) |
| Competency of the program graduates | Employers, Alumni | Interviews, Surveys | One year after employment time |

**Evaluation Areas/Aspects** (e.g., leadership, effectiveness of teaching & assessment, learning resources, partnerships, etc.)
**Evaluation Sources** (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others (specify)
**Evaluation Methods** (e.g., Surveys, interviews, visits, etc.)
**Evaluation Time** (e.g., beginning of semesters, end of academic year, etc.)

## 8. Program KPIs*

The period to achieve the target ( ......... ) year.

| KPIs Standard | KPIs Code | KPIs | Target | Measurement Methods | Measurement Time |
|---|---|---|---|---|---|
| -1- MISSION AND GOALS | KPI-PG-1 | Percentage of achieved indicators of the program operational plan objectives | 95% | Percentage of performance indicators of the operational plan objectives of the program that have achieved the targeted annual level to the total number of indicators targeted for these objectives in the same year. | End of academic year (annual) |
| -3- TEACHING AND LEARNING | KPI-PG-2 | Students' Evaluation of quality of learning experience in the program | 3.75 | Average of overall rating of final year students for the quality of learning experience in the program on a five point scale in an annual survey. | End of program cycle (final year) |

| KPIs Standard | KPIs Code | KPIs | Target | Measurement Methods | Measurement Time |
|---|---|---|---|---|---|
| | KPI-PG-3 | Students' evaluation of the quality of the courses | 3.75 | Average students' overall rating of the quality of courses on a five- point scale in an annual survey. | End of academic year (annual) |
| | KPI-PG-4 | Students' evaluation of the quality of scientific supervision | 3.75 | Average students' overall rating of the quality of scientific supervision on a five point scale in an annual survey. | End of academic year (annual) |
| | KPI-PG-5 | Average time for students' graduation | 4 | Average time (in semesters) spent by students to graduate from the program. | End of program cycle (graduation time) |
| | KPI-PG-6 | Rate of students dropping out of the program | 0% | Percentage of students who did not complete the program to the total number of students in the same cohort. | End of program cycle (graduation time) |
| | KPI-PG-7 | Graduates' employability | 90% | Percentage of graduates from the program who within a year of graduation were employed to the total number of graduates in the same year. | One year after graduation time |
| | KPI-PG-8 | Employers' evaluation of the program graduates' competency | 3.75 | Average of overall rating of employers for the competency of the program graduates on a five point scale in an annual survey. | One year after employment time |
| -4- STUDENTS | KPI-PG-9 | Students' satisfaction with the provided services | 3.75 | Average of students' satisfaction rate with the various services provided by the program (food, transportation, sport facilities, academic advising, ...) on a five point scale in an annual survey. | End of academic year (annual) |
| -5- FACU | KPI-PG-10 | Ratio of students to faculty members | 8:1 | Ratio of the total number of students to | End of academic year |

| KPIs Standard | KPIs Code | KPIs | Target | Measurement Methods | Measurement Time |
|---|---|---|---|---|---|
| LTY MEM BERS | | | | the total number of full-time and fulltime equivalent faculty members participating in the program. | (annual) |
| | KPI-PG-11 | Percentage of faculty members' distribution based on academic ranking | Prof: 22.9 % Assoc .: 22.9 % Assist : 54.1 % | Percentage distribution of faculty members participating in the program based on academic ranking. | End of academic year (annual) |
| | KPI-PG-12 | Proportion of faculty members leaving the program | 0% | Proportion of faculty members leaving the program annually for reasons other than age retirement to the total number of faculty members. | End of academic year (annual) |
| -6- Learni ng Resour ces, Faciliti es, and Equip ment | KPI-PG-13 | Satisfaction of beneficiaries with learning resources | 3.75 | Average of beneficiaries' satisfaction rate with learning resources on a five-point scale in an annual survey in terms of: a. a. Their adequacy and diversity (references, journals, databases… etc.) b. The support services provided for their utilization. | End of academic year (annual) |
| | KPI-PG-14 | Satisfaction of beneficiaries with research facilities and equipment | 3.75 | Average of beneficiaries' satisfaction rate with research facilities and equipment (depending on the nature of the program) on a five-point scale in an annual survey. | End of academic year (annual) |
| -7- RESE ARCH | KPI-PG-15 | Percentage of publications of faculty members | 75% | Percentage of faculty members participating in the program with at | End of academic year |

| KPIs Standard | KPIs Code | KPIs | Target | Measurement Methods | Measurement Time |
|---|---|---|---|---|---|
| AND PROJECTS | | | | least one research publication during the year to total faculty members in the program. | |
| | KPI-PG-16 | Rate of published research per faculty member | 2 | The average number of refereed and/or published research per each faculty member participating in the program during the year (total number of refereed and/or published research to the total number of faculty members during the year) | End of academic year |
| | KPI-PG-17 | Citations rate in refereed journals per faculty member | 2 | The average number of citations in refereed journals from published research (total number of citations in | End of academic year |
| | KPI-PG-18: | Percentage of students' publication | 10% | Percentage of students participating in the program with at least one research publication during the year to total students in the program | End of academic year |
| | KPI-PG-19: | Number of patents, innovative products, and awards of excellence | 1 | Number of: a. Patents and innovations b. Awards of excellence obtained by the institution's staff annually | End of academic year |

\* including KPIs required by NCAAA

## j. Specification Approval Authority

| Council / Committee | Council of department of Computer Engineering |
|---|---|
| Reference No. | **Council of the Department No: 06/1442** |
| Date | **20/07/1442 (4/3/2021)** |