Operational Plan for Master of Cybersecurity

Program for 2021-2022

Prepared by:

Quality and Academic Accreditation Committee **at the** Collage of Computing and Informatics

Table of Contents

Content	Pages Range
1. Overview	**3**
2. Prince Musaid Bin Abdulrahman University: 2.1 Vision 2.2 Mission 2.3 Goals 2.4 Learning Outcome	**4**
3. Collage of Computing and Informatics: 3.1 Vision 3.2 Mission 3.3 Goals 3.4 Committees 3.4.1 The Quality Assurance committee 3.5 Faculty Members Statistics 3.6 Management Structure	**5-9**
4. The Master of Cybersecurity (MSC) Program 4.1 Vision 4.2 Mission 4.3 Goals 4.4 Study Duration 4.5 Learning Outcomes 4.6 Career Opportunities for Graduates of the Program 4.7 Methods of delivery 4.8 BSIT Program KPIs 4.9 The Action Plan for BSIT program 2021/2022 (Matrix of Initiatives and Performance Indicators) 4.10The Progress of The BSIT Action Plan for 2020-2021 4.11 Initiatives and Responsibilities Summary	**10-18**
5. Acknowledgements	**19**

1. Overview

The College of Computing and Informatics (CCI) at the Prince Musaid Bin Abdulrahman University (PMAU) serves as a learning-centered college dedicated to preparing highly competent professionals through innovative academic programs in computer science, information technology, data science and cybersecurity disciplines. One of which is The Master of Cybersecurity (MCS) program. It is a program designed to help students gain a holistic perspective of the cybersecurity landscape.

The roles of cybersecurity specialists have become increasingly vital. There is a universal dearth of competent and skilled cybersecurity specialists, and this shortage is also increasingly evident in the Kingdom of Saudi Arabia. The field of information technology has for the last decade been experiencing tremendous growth both in the demand from the industry for well-trained graduates, and the number of aspiring students to seek education in the discipline. Hence, being at the forefront of cybersecurity studies is a strategic necessity to meet this growing challenge that places the impetus on the CCI to strive for the student's growth and development through an enriched learning-experience. Working towards this objective requires a concerted effort towards cultivating a strong academic and research culture, achieved through addressing crucial factors such as the undergraduate and graduate academic programs, course structure, faculty's teaching performance, and their contribution to research.

To fulfill the mission and goals of, PMAU, CCI and MCS program, strategic planning is needed. Therefore, The Quality and Academic Accreditation committee at CCI is proposing a strong definitive framework in this operational plan for the MCS. After a careful review of PMAU's Strategic 2021-2025 Plan, the various objectives, programs and trends seen in the area of quality and academic planning at numerous academic institutions at the national, regional and international levels, and drawing upon input from the CCI's faculty members and the advisory/action committees that they constitute, the operational plan addresses the relevant areas of concern, their current status, the desired status and, the challenges faced, and details the necessary steps to be taken.

2. *Prince Musaid Bin Abdulrahman University*

2..1. Vision

Lead the utilization of technology in education to contribute to national development.

2..2. Mission

Providing high-quality flexible education which utilizes technology and modern teaching methods to all segments of society, and contributing to the production, dissemination and utilization of knowledge to achieve social, cultural and economic development.

2..3. Goals

1. Provide outstanding education to empower learners to achieve their academic & professional aspirations.
2. Build a leading regional role in e-learning.
3. Grow in digital innovation and Techpreneurship.
4. Enhance engagement with communities across the Kingdom.
5. Achieve fiscal sustainability and expenditure efficiency.

2..4. Learning Outcomes

Upon completion of their degree at PMAU, graduates will be able to:

1. Demonstrate high level understanding of the fundamentals, processes, and contributions associated with the academic discipline.
2. Employ critical thinking skills by applying knowledge to make well-reasoned arguments and effective decisions.
3. Practice the lifelong skills needed in all social, economic, mental, and emotional aspects of life.
4. Illustrate effective utilization of technological tools and methods relating to the program of study.
5. Utilize skills that exhibit ethical behavior to characterize accountable, responsible, and contributing citizens to the society.
6. Recognize the social and environmental responsibilities through the participation of extra-curricular activities.
7. Demonstrate team spirit and leadership skills in a collaborative and inclusive environment.

3. College of Computing and Informatic

3..1. Vision:

A pioneer college in education and academic research at local and regional levels in the areas of computer science and information technology and through offering locally and internationally accredited programs using modern learning methods.

3..2. Mission

To prepare qualified, professional, and excellent talents in the field of computer science and information technology, and contribute in serving the community by offering various learning programs, conducting scientific research that contribute in solving community problems in technology and informatics, as well as offering consultancy and training services in the college fields with the availability of qualified faculty members and excellent learning environment.

3..3. Goals

1. To keep pace with the academic and scientific advances in international universities in the field of computation and informatics.
2. To increase learners' academic and practical experience in their areas of specialization.
3. To enable graduates to compete in the fields of computation and informatics by providing them cognitive skills.
4. To support continuous development through local and international partnerships.
5. To connect programs through integrated courses that represent the most recent scientific and technological in the field.
6. To integrate academic programs and bridging the gap between applied science and information technology.
7. To participate in offering consultation and training programs in the fields of computer science to promote the college's role in serving the community.

3..4. Committees

	Committee	Main responsibility	Chair
1	**Executive Committee**	Supervising and following-up the BSIT program and all academic aspects of it.	Dr. Mohamed Kutbi
2	**Student Affairs Committee**	Following-up students affairs including academic advising and guidance, increasing awareness, and extracurricular activities.	Dr. Samah Alhazmi
3	**Quality Assurance Committee**	Maintaining the university's approved quality standards, which lead the college to achieve academic accreditation.	Dr.Ahmed Abukhadrah
4	**Teaching & Faculty Development Committee**	Setting up the teaching best practices in the university blended learning model. The committee also develops the required skills for the teaching faculty and should provide supporting materials for the new faculty members. It also monitors & evaluates teaching effectiveness of faculty members of the department including members of the committee.	Dr. Mohamed Kutbi
5	**Curriculum Committee**	Considering suggested changes to the courses of undergraduate and graduate studies, including the addition of new courses, omission of old courses, and development of courses content. The committee is also responsible for evaluating courses e-content developed by Franklin University.	Dr. Samah Alhazmi
6	**New Programs & Planning Committee**	Searching, proposing & planning new undergraduate & graduate programs.	Dr. Mohamed Kutbi
7	**Academic Advising Committee**	Implementing and activating academic advising and distributing students among academic supervisors of the teaching staff.	Dr. Soha Alhelaly
8	**Student Activities Committee**	Developing an operational plan for the extracurricular activities in CCI and follow up on its implementation and report on each activity, and encouraging the students of the department to participate in it.	Dr. Soha Alhelaly
9	**Senior Projects Committee**	Establish a clear mechanism for how projects are proposed, selected, distributed, implemented, followed up and evaluated.	Dr. Abdulaziz Alhubaishy

3..4.1. The Quality Assurance committee

The Prince Musaid Bin Abdulrahman University is continuously aiming to provide quality education that is intrinsically linked to the various needs of the Saudi Arabia's communities. The foundation of quality is at the forefront of PMAU where academic accreditation is one of the University's main goals. In this context, the University is taking a quantum leap in the field of capacity development and the quality of performance in order to address the urgent demand for improvement and continuous development in various areas to cope up with the rapid developments taking place in the education environment.

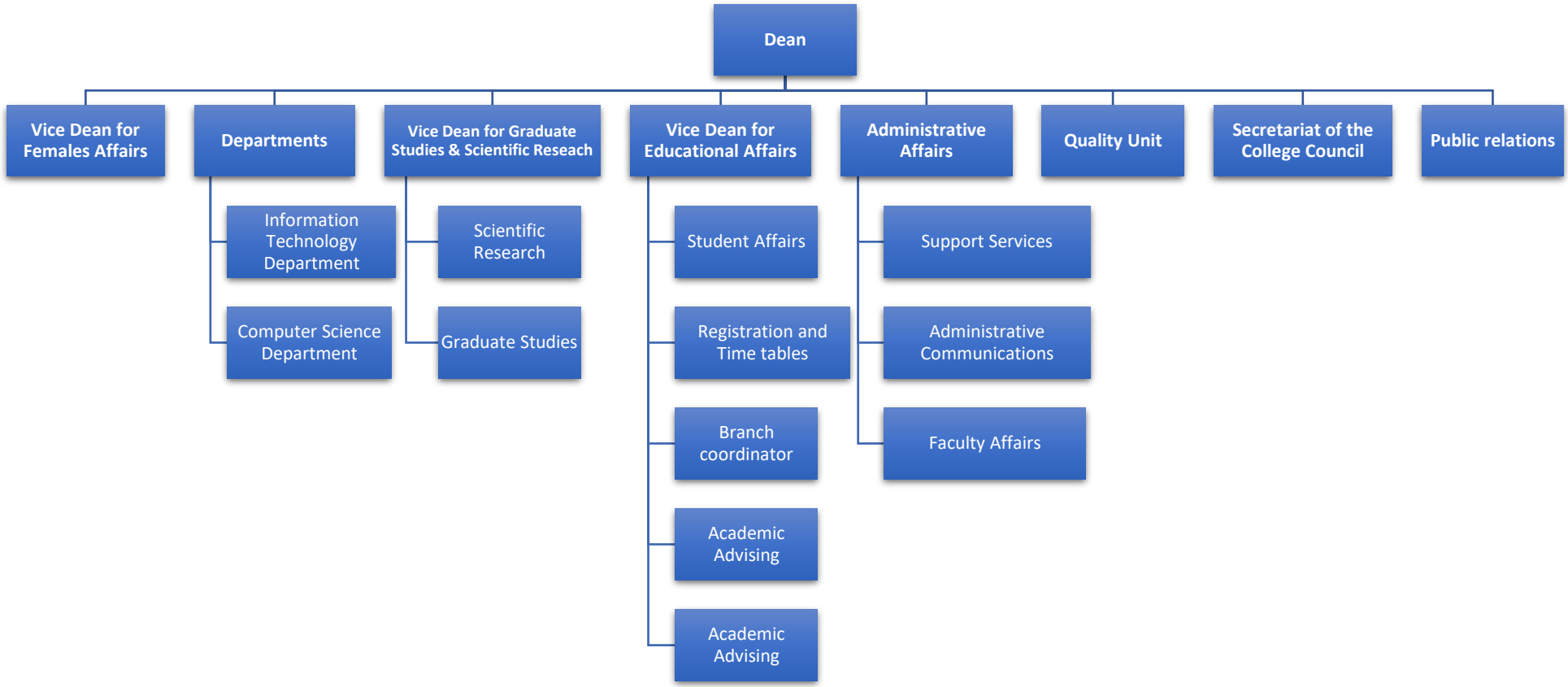
To this purpose, the Collage of Computing and Informatics (CCI) has established the Quality and Academic Accreditation Committee to understand, enhance and strengthen the academic programs of CCI to elevate the University to an unprecedented level that is recognized locally, regionally, and globally. The establishment of the committee reflects the CCI's determination to raise the level of quality in performance, achievement in education, research, and community service, and demonstrates its commitment to elevate the overall quality of the CCI programs, while ensuring the quality of academics, administration, and training necessary to reach the highest standards. The committee plays a crucial role in the process of continuous improvement of quality education at CCI. Its responsibilities include the following:

1. Work on CCI programs to fulfill the requirements of the National Commission for Assessment and Academic Accreditation (NCAAA).
2. Evaluate CCI programs periodically to be sure they are in line with continuous scientific and practical developments.
3. Preparing the annual reports and operational plans for CCI programs.
4. Supervise quality improvement, training and development at the CCI.
5. Preparing academic program accreditation requirements forms.
6. Submitting suggestions for initiatives to develop the educational process in the CCI.
7. Continuously evaluating the study plans to analyze their suitability with the objectives of the programs in the department, and presenting proposals for development, if needed.
8. Continuous coordination with CCI's committees, such as Teaching & Faculty Development Committee, Curriculum Committee, and New Programs & Planning Committee to follow-up, discuss and review the progress of Study Plans and Programs.
9. Work on applying quality standards in the administrative and academic aspects that support the educational process.

3..5. Faculty Members Statistics

Branch	Saudi Faculty Members		Non-Saudi Faculty Members	Adjunct Faculty Members
	Assistant/Associate/Full Professor	Teaching Assistant/Lecturer	Assistant/Associate/Full Professor	Teaching Assistant/Lecturer
Abha - Female	0	2	0	4
Abha - Male	1	1	0	5
Dammam - Female	0	8	0	3
Dammam - Male	2	2	0	5
Jizan - Male	0	1	0	1
Jeddah - Female	5	4	0	0
Jeddah - Male	7	1	0	5
Medina - Female	3	4	0	1
Medina - Male	1	2	0	3
Qassim - Male	1	2	0	3
Riyadh - Female	6	6	0	2
Riyadh - Male	13	4	3	7
Tabuk - Male	1	0	0	1
Total	40	37	3	40
Total	**120**			

3..6. Management Structure



4. The Master of Science in Cybersecurity (MSC) Program

The College of Computing and Informatics at the Prince Musaid Bin Abdulrahman University offers a master's program in cybersecurity, which aims to provide students with advanced knowledge necessary to excel in the contemporary highly competitive technology industry. The program focuses on the security of the institution's cyberspace. The program equips students with the knowledge, skills and capacity to prevent and protect enterprise data from the threat of various forms of digital crime. The courses also focus on critical analysis skills, technical skills and extensive use of virtual laboratories via the Internet. This program is designed for students wishing to pursue their careers as specialists in information technology with the aim of protecting the information of their institutions from any external penetration by integrating theories with practical application. To know the basics of information systems and know how to manage information technology within the framework of the fundamentals of cybercrime. The program covers the field of security and legal aspects that affect information security in cyberspace.

4..1. Vision:

A pioneer college in education and academic research at local and regional levels in the areas of computer science and information technology and through offering locally and internationally accredited programs using modern learning methods.

4..2. Mission

Providing high-quality and flexible educational, scientific and research environment in the field of Cybersecurity to supply the labor market with qualified cybersecurity experts capable of performing professional services and producing innovative scientific research that contributes to the development of a knowledge society, meeting international requirements, solving community problems and facing future challenges in Cybersecurity.

4..3. Goals

1. Provide experts in the field of cybersecurity to help achieving the kingdom long term plan of having experts in the field of cybersecurity.
2. Empower students with soft skills and values to effectively communicate and collaborate with others professionally, ethically and legally and serve society's requirements.
3. Ensure the knowledge and skills of students are in line with state-of-the-art cybersecurity techniques.

4..4. Study Duration

4 semesters, 36 credit hours (12 courses).

4..5. Learning Outcomes

1. Demonstrate a deep understanding of the main concepts and technologies related to information technology.
2. Realize the evaluation and assessment of tasks performed as IT professionals.
3. Describe and analyze the user needs and computing requirements appropriate to problems' solutions.
4. Apply the concepts, methods, tools and technologies mastered during the academic program.
5. Apply theories in modelling and designing IT systems using cutting edge tools and technologies.
6. Apply analysis, design, implementation, testing and evaluation principles of IT solutions to fit industrial requirements and support techpreneurship.
7. Carry out the assigned tasks with quality of work in accordance with international standards.
8. Communicate effectively, both orally and in written form, using appropriate media.
9. Identify the needs for continuous development of professional, legal and ethical skills with the ability to engage all group members.
10. Function effectively on teamwork projects and activities to accomplish a common goal.

4..6. Career Opportunities for Graduates of the Program

1. Project Manager.
2. Information Security Analyst.
3. Cyber Security Manager.
4. Cyber Security Analyst.
5. Information Security Manager.
6. Information Technology Manager.
7. Network Security Manager.
8. Network Security Analyst.
9. Educational and Academic field occupations in General and Higher Education Institutions.

4..7. Methods of delivery

The method of delivery is in line with the university philosophy for teaching and assessment which is utilizing technology and blended learning in order to promote student-centeredness teaching and learning activities and enhance students' critical thinking and lifelong learning skills. Blended learning includes a mix of direct face-to-face interactions and virtual interactions between students, instructors and learning resources. The blended learning model achieves the ideal balance between face-to-face and e-learning activities to provide students with a diverse and integrated learning experience that includes direct lectures, simultaneous virtual lectures, and synchronous/ asynchronous electronic activities on (Blackboard).

In addition, the method of delivery of program are based on the teaching strategies, assessment method used and analysis of results. The following are the major methods to deliver the BSIT program that are used by a faculty member to achieve course objectives and targeted learning outcomes, which vary from one course to another according to the targeted learning outcomes.

1. **Lecturing (Delivery):** The faculty member delivers information and knowledge to the student through a single soundtrack presentation and may use some helpful tools.

2. **Brainstorming:** The faculty member stimulates the student's mind to learn by bringing up a topic with the aim of giving the student the opportunity to think about all possible directions and possibilities so that he can get as many ideas about the lecture as possible, and then the faculty member discusses the proposals collectively.

3. **Cooperative Learning:** The faculty member promotes teamwork among students by dividing them into groups with specific tasks, the achievement of which effectively depends on cooperation in skill exchange between members of each group.

4. **Discussion:** The faculty member asks questions related to a specific topic that is directly or indirectly related to one of the course vocabulary, and encourages them to express their opinions about the topic and interact by answering questions, asking questions, or mentioning aspects related to the topic. A strategy that is an evolution of the lecture method, whereby a faculty member asks questions about a particular subject, is directed by students and encourages them to express an opinion, provide answers and ask questions about a topic.

5. **Project:** A faculty member mandates students to work on a project within a period of time that may extend from one week to a semester, and they jointly solve a real problem or answer a complex question. They show their knowledge and skills by creating a public product or presentation for a real audience.

6. **Laboratory training:** is frequently used to develop skills necessary for more advanced study or research, where students get first-hand experience in observation and manipulation of the materials of science to develop understanding and appreciation.

7. **Problem Solving:** A faculty member provides an educational activity in which the student encounters a matter, question or problem for which the student is working to find solutions. To resolve this problem, the student follows steps arranged in a format that stimulates practical steps in research and ends up finding a logical principle or generalization.

8. **E-Learning:** This strategy is based on using multiple means in the field of information technology and interactive communications to teach students anywhere and at any time.

9. **Self-Learning:** The student will self-learn in order to acquire skills that will contribute to his ability to learn continuously to deal effectively with study tasks, and to deal productively with sources of science and knowledge.

10. **Summer Training:** Designed to provide students with a wide range of learning experience and resources to support their academic development, character building, and soft skills to maximize their future opportunities and reach their full potential.

11. **Mutual Teaching:** Students engage the faculty member in his role, with the student and faculty member leading the discussion on a topic. It includes four strategies that ask students and teachers to share the role of the teacher by allowing both to lead the discussion on a specific reading. Mutual learning includes four sub-strategies that guide the discussion: Forecasting, raising questions, clarifying, and summarizing.

12. **Assignment:** is the most common method of teaching especially in teaching of Science. It is an instructional technique comprises the guided information, self learning, writing skills and report preparation among the learners. Using the assignment method, the teacher creates an assignment with clear instructions, milestones, and grading criteria based on an outcome that students need to achieve. The teacher monitors and advises students as they work on the assignment and provides feedback that challenges students to improve.

13. **Quiz:** The Quiz is a very powerful activity that can meet many teaching needs, from simple, multiple-choice knowledge tests to complex, self-assessment tasks with detailed feedback. It can enthuse students to engage in their learning. It can also support differentiation and provide pre-teaching indicators, assessment for learning, rich feedback, self-assessment and summative information about progress. A quiz is also a great way to help with revision**.**

14. **Senior project:** A senior project is a comprehensive project specific to senior students that is typically completed prior to or as a requirement for graduation. It is a combination of experiential activities that personalize learning and guide students through college and career exploration and a way to demonstrate academic knowledge.

4..8. MCS Program KPIs

No	KPI	Target Benchmark	Actual Value	Internal Benchmark	Analysis	New Target Benchmark
1	Percentage of achieved indicators of the program operational plan objectives	100%	100%	100%	Achieved	100%
2	Students' Evaluation of quality of learning experience in the program	4.0	3.5	3.86	Not Achieved	4.0
3	Students' evaluation of the quality of the courses	4.0	4.1	4.1	Not achieved	4.5
4	Students' evaluation of the quality of scientific supervision	4.5	3.89	4.28	Not achieved	4.5
5	Average time for students' graduation	4	4	4	Achieved	4
6	Rate of students dropping out of the program	10%	8.3%	21.9%	Achieved	5%
7	Graduates' employability	94%	94.7%	93.5	Achieved	95%
8	Employers' evaluation of the program graduates' proficiency	4.5	4.6	4.4	Achieved	4.7
9	Students' satisfaction with the offered services	3.5	2.5	3.0	Not achieved	3.5
10	Ratio of students to teaching staff	Less than 25 for male and female	Male : 5.7:1 Female :5:1	Male : 6.2:1 Female: 3.3:1	Achieved	Less than 25 for male and female

No	KPI	Target Benchmark	Actual Value	Internal Benchmark	Analysis	New Target Benchmark
11	Percentage of faculty members' distribution based on academic ranking	Assoc. Pro. = 25% Assist. Pro. = 70% Full Prof 5%	Assoc. Pro. = 23.8% Assist. Pro. = 71.4% Full Prof. 4.8%	Assoc. Pro. = 26.7% Assist. Pro. = 73.3%	Achieved partially	Assoc. Pro. = 30% Assist. Pro. = 65% Full Prof 5%
12	Proportion of teaching staff leaving the program	**1%**	4.8% total (M 0%, F16.7%)	0% total (M 0%, F 0%)	The value increased in 2020/2021	**1%**
13	Satisfaction of beneficiaries with learning resources	4	3.9	4.5	Reduction by 0.6 in 2020/2021	4.5
14	Satisfaction of beneficiaries with research facilities and equipment	4.8	4.4	4.7	Reduction by 0.3 in 2020/2021	4.8
15	Percentage of publications of faculty members	90%	66.67%	86.6%	Not achieved	90%
16	Rate of published research per faculty member	3:1	3: 1	2.9:1	achieved	4:1
17	Citations rate in refereed journals per faculty member	12:1	10.8:1	11.9:1	Not achieved	12:1
18	Percentage of students' publication	Journals: 5% Conference:5%	Journals: 3.4% Conference:0%	Journals: 0% Conference:4.8%	Not achieved	Journals: 5% Conference:5 %
19	Number of patents, innovative products, and awards of excellence	No. Patent: 5 No. awards:5	No. Patent: 4 No. awards:0	No. Patent: 0 No. awards:0	Not achieved	No. Patent: 5 No. awards:5

4..9. The Action Plan for MCS program 2021/2022 (Matrix of Initiatives and Performance Indicators)

To fulfill the mission and goals of, PMAU, CCI and MCS program, strategic planning is needed. Therefore, The Quality and Academic Accreditation committee at CCI is proposing a strong definitive Action plan framework for the MCS in the following table. After a careful review of PMAU's Strategic 2021-2025 Plan, the various objectives, previous CR, surveys, independent opinion, course evaluation, programs and trends seen in the area of quality and academic planning at numerous academic institutions at the national, regional and international levels, and drawing upon input from the CCI's faculty members and the advisory/action committees that they constitute, the operational plan addresses the relevant areas of concern, their current status, the desired status and, and details the necessary steps to be taken as follow:

PMAU Goal	CCI Goal	MCS Program Goal	MCS Program Mission	Priorities for Improvement	Initiative/Actions	Action Responsibility	Date		Achievement Indicators	Target Benchmark
							Start	End		
(PMAU-3): Providing outstanding, distinguished education to empower learners to achieve their academic & professional aspirations	**(CCI-1):** To keep pace with the academic and scientific advances in international universities in the field of computation and informatics. **(CCI-2):** To increase learners' experience by enabling them to solve academic and practical problems in their areas of specialization.	**(MCS -1)** Provide experts in the field of cybersecurity to help achieving the kingdom long term plan of having experts in the field of cybersecurity.	**(MCS-SubMission-1)** Providing high-quality and flexible educational, scientific and research environment in the field of Cybersecurity.	IT industry collaboration to be initiated with active participation of students and faculty for current concepts and understanding.	Development of training programs in collaboration with IBM and other enterprises operating inside the kingdom.	Program coordinator /Head of IT department	09/01/2021	05/31/2022	Number of partnerships	1

Strengthen engagement with communities across the Kingdom	**(CCI-5):** To connect programs through integrated courses that represent the most recent scientific and technological in the field. **(CCI-7):** To participate in offering consultation and training programs in the fields of computer science to promote the college's role in serving the community	**(MCS-2)** Empower students with soft skills and values to effectively communicate and collaborate with others professionally, ethically and legally and serve society's requirements.	**(MCS-SubMission-2)** Supply the labor market with qualified cybersecurity experts capable of performing professional services and producing innovative scientific research.	Content development and feedback from faculty should be carried out for each semester.	The process has already been established and during each semester, faculty feedback is being sought to improve and revise the courses being offered.	Faculty members teaching in the program	09/01 /2021	05/31 /2022	Number of Courses	3
Grow in digital innovation and Techpreneurship	**(CCI-3):** To enable graduates to compete in the fields of computation and informatics. **(CCI-6):** To integrate academic programs and bridging the gap between applied science and information technology	**(MCS-3)** Ensure the knowledge and skills of students are in line with state-of-the-art cybersecurity techniques.	**(MCS-SubMission-3)** Contributes to the development of a knowledge society, meeting international requirements, solving community problems and facing future challenges in Cybersecurity.	Faculty incentives for more research contribution should be announced.	Faculty have already been actively encouraged to participate in research programs offered by university. Research incentives have been offered in form of publication grants and research project support.	Faculty members teaching in the program	09/01 /2021	05/31 /2022	Number of Initiatives	1

4..10. The Progress of The MCS Action Plan for 2020-2021

No.	Planned Actions	Responsibility of Action	Planned Completion Date	Level of Completion		If Not Completed	
				Completed	Not Completed	Reasons	Proposed Actions
1	Lab support for all courses requiring practical training at all levels of the graduate program	Information Technology Department	Sep. 2021	Yes			
2	Specializations courses of level 03 have been reviewed.	Information Technology Department	May 2021	Yes			

1..1. Initiatives and Responsibilities Summary

- **Head of IT department:**
  - ✓ Development of training programs in collaboration with IBM and other enterprises operating inside the kingdom.
- **Program coordinator:**
  - ✓ Development of training programs in collaboration with IBM and other enterprises operating inside the kingdom.
- **Faculty teaching the program courses::**
  - ✓ Content development and feedback from faculty should be carried out for each semester.
  - ✓ Faculty incentives for more research contribution should be announced.

5. Acknowledgements

Being a bottom-up tactical/operational plan, the collage would like to extend a special thanks to all members of the process of planning, including the department chairs, committee chairs, program coordinators, and course coordinators. In addition, many thanks to the quality assurance committee for preparing, reviewing, and documenting the operational plan.