



## Program Specification

<b>Program Name: Bachelor of Science in Computer Sciences</b>
<b>Qualification Level: Bachelor's Degree (Level 6)</b>
<b>Department: Computer Sciences</b>
<b>College: Faculty of Computing and Information Technology</b>
<b>Institution: Northern Border University</b>

## **Content**

<b>A. Program Identification and General Information</b>	<b>3</b>
<b>B. Mission, Goals, and Learning Outcomes</b>	<b>4</b>
<b>C. Curriculum</b>	<b>11</b>
<b>D. Student Admission and Support:</b>	<b>17</b>
<b>E. Teaching and Administrative Staff</b>	<b>19</b>
<b>F. Learning Resources, Facilities, and Equipment</b>	<b>20</b>
<b>G. Program Management and Regulations</b>	<b>21</b>
<b>H. Program Quality Assurance</b>	<b>22</b>
<b>I. Specification Approval Data</b>	<b>28</b>



## A. Program Identification and General Information

<b>1. Program Main Location:</b>		
Faculty of Computing and Information Technology, Rafha.		
<b>2. Branches Offering the Program:</b>		
Nil		
<b>3. Reasons for Establishing the Program:</b>		
(Economic, social, cultural, and technological reasons, and national needs and development, etc.)		
The aim of CS department is to bring scientific, research and practical advancement in the CS field, especially in computer systems, network computing, programming systems, intelligent systems, computer graphic, high performance computing and software engineering. The CS department encourages multi-disciplinary research and activities to give in depth knowledge and comprehension of CS related subjects, hands-on experience with latest development tools and techniques, an understanding of social and ethical issues related to the field of CS and development of strong communication and problem solving skills.		
<b>4. Total Credit Hours for Completing the Program: ( 136 )</b>		
136 credit hours (12 levels) based on three-semesters/year.		
<b>5. Professional Occupations/Jobs:</b>		
<ul style="list-style-type: none"> <li>▪ Programmer</li> <li>▪ Systems Analyst</li> <li>▪ Web Developer</li> <li>▪ Network Administrator</li> <li>▪ Database Developer</li> <li>▪ Database Administrator</li> <li>▪ Research Assistant</li> <li>▪ Instructor</li> </ul>		
<b>6. Major Tracks/Pathways (if any):</b>		
<b>Major track/pathway</b>	<b>Credit hours</b> (For each track)	<b>Professional Occupations/Jobs</b> (For each track)
Nil		
<b>7. Intermediate Exit Points/Awarded Degree (if any):</b>		
<b>Intermediate exit points/awarded degree</b>	<b>Credit hours</b>	
Nil		



## B. Mission, Goals, and Learning Outcomes

### 1. Program Mission:

To provide quality education of computer science by a combination of theoretical and applied foundations, that enables students to solve real-world problems, conduct scientific research in the field, and prepare them for employment and service the local community.

### 2. Program Goals:

1. Practice the foundational knowledge of the computational domain in a professional manner.
2. Participate Effectively and ambitiously in the higher education level and contribute to the scientific research in the field of computer science.
3. Enable the student to recognize the limits of their knowledge and initiate self-directed learning opportunities.
4. Encourage the students to respect their ethical and social responsibilities and contribute to the economic development of the society.
5. Develop and demonstrate strong communication, teamwork, and leadership skills.

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

#### Alignment of Program Mission/Goals with the College and NBU Missions/Goals:

Level	Mission and Goals	Mission Domains				
		Education	Research	Community Service	Professional Competence	Others
NBU Mission	We are a regionally serving comprehensive university committed to educational excellence. Guided by our core values, heritage, and place, we deliver innovative educational programs characterized by outcomes that leverage the human, economic, cultural, natural resources and mining of the Northern Border's region and beyond.	√	√	√	√	
NBU Goals	G1 Provide distinguished education that foster intellect and professionalism <b>(and related Objectives-See the NBU Strategic Plan)</b> .	√			√	
	G2 Promote research and innovation environment that enables realization of the university research priorities <b>(and related Objectives-See the NBU Strategic Plan)</b> .		√			
	G3 Enhance community partnership <b>(and related Objectives-See the NBU Strategic Plan)</b> .			√		



	G4	Develop administrative and financial system that strengthen efficient management and diversify sources of revenue <b>(and related Objectives-See the NBU Strategic Plan).</b>	√			√	
College Mission		To deliver accredited computing academic programs characterized by learning outcomes that guarantee to prepare professional graduates capable of contributing in scientific research, developing the community, and meeting the needs of the local and regional labor market.	√	√	√	√	
College Goals	G1	Preparing students in the areas of computer science, information technology and computer sciences, to be qualified with necessary scientific and practical skills and graduated with the highest possible competence.	√				
	G2	Contribute to the development of scientific and applied research in the field of computer sciences and information technology.		√			
	G3	Participate in offering advanced training programs for the rehabilitation and refinement of skills in the areas related to computer sciences and their applications to the university employees particularly and to the local community in general.			√		
	G4	Providing scientific counseling in the field of computer sciences and information technology.	√				
	G5	Provide programs and training courses that meet the needs of the labor market and industry.				√	
	G6	Qualifying graduates to complete their higher studies in the scientific disciplines.				√	
	G7	Create the appropriate environment for creativity and innovation in the field of computer sciences and its applications by providing incentives and material and moral rewards.		√			
	G8	Training students in practical training on designing and implementing systems in the private and public sectors before graduation through agreements between the	√			√	



		faculty and these sectors to provide all facilities and possibilities for students.					
	G9	Integration with the community through providing necessary information to companies and public and private establishments about outstanding students to facilitate their professional integration after graduation and coordinate between these companies and graduating students.			√		
Program Mission		To produce specialists in integrating computer sciences solutions with administrative operations, who can serve business organizations with their requirements of information technologies, who are characterized by the sense of community service and having knowledge of recent research directions.	√	√	√	√	
Program Goals	G1	Make a substantial technical contribution to the economic growth and welfare of the organizations they are part of, through their knowledge of computer sciences	√				
	G2	Be capable of identifying and analyzing a problem requiring a computer sciences based solution, in various application environments and of designing, implementing and evaluating a solution using state of the art tools and techniques.	√	√			
	G3	Be consensually recognized as ethical, professional, and responsible computer sciences practitioners by their peers and superiors.	√			√	
	G4	Demonstrate adequate communication and problem-solving skills, in their professional practice of computer sciences, and an ability to effectively work in a team to achieve a common goal.			√		
<b>4. Graduate Attributes:</b>							
The graduate's attributes of the university are the reference in which the graduate's attributes of the program are determined.							
<b>Northern Border University Graduates' Attributes</b>							



<b>NBU's Graduates' Attributes (GAs)</b>	<b>Learning Outcomes of NBU's Graduates' Attributes (GAs) for Bachelor Programs</b>
National identity	<b>GA1:</b> demonstrate high standards of ethical and socially responsible behavior, as well as academic and professional honesty and integrity; contribute to finding solutions to social problems; and commit to being a responsible citizen.
Self-management	<b>GA2:</b> Demonstrate self-management skills, self-learning and critical thinking, the ability to take initiative to self-develop according to specific standards, and ability to present evidence and arguments to make a decision unbiasedly.
Critical thinking	
Digital culture	<b>GA3:</b> Effectively use information technology, analytical, mathematical, and statistical tools to perform data analysis, suggest solutions, and solve problems using critical thinking.
Teamwork	<b>GA4:</b> Have the ability to lead a team, assume responsibility for performing tasks and developing work, achieve goals effectively, and promote health, psychological and social aspects.
Entrepreneurship	<b>GA5:</b> Identify the function of entrepreneurship and its requirements in the successful, commercial application.
Communication skills	<b>GA6:</b> Effectively communicate both verbally and in writing, using appropriate presentation forms, scholarly language, adequate reasoning for various issues and dealing with beneficiaries.

#### **Alignment of the Program's Graduates Attributes (GAs) with the Program's Goals(G)**

Program Goals (G)		G1	G2	G3	G4	G5
Program's Graduates Attributes	GA1				√	
	GA2			√		
	GA3	√	√			
	GA4					√
	GA5				√	
	GA6					√

The matrix above illustrates the consistency between program's graduates' attributes (GAs) and program goals (Gs). All of the program goals map to at least one of the GAs.

#### **Alignment of program graduates' Attributes with the National Qualifications Framework (NQF)**

<b>NQF Graduate Attributes (Level 6, Bachelor's Degree)</b>	<b>program graduates' Attributes (GAs)</b>					
	<b>GA1</b>	<b>GA2</b>	<b>GA3</b>	<b>GA4</b>	<b>GA5</b>	<b>GA6</b>
Take initiative in identifying and resolving problems and issues both individually and in group situations exercising leadership in pursuit of innovative and practical solutions.		√	√	√		



Apply the theoretical insights and methods of inquiry from their field of study in considering issues and problems in other contexts.	√		√			
Recognize the provisional nature of knowledge field and take this into account in investigating and proposing solutions to academic or professional issues.		√	√			√
Participate in activities to keep up to date with developments in their academic or professional field and continue to enhance their own knowledge and understanding.					√	√
Consistently demonstrate a high level of ethical and responsible behavior and provide leadership in academic professional and community environments.	√			√	√	
Behave in ways that are consistent with Islamic values and beliefs, and reflect high levels of loyalty, responsibility, and commitment to service to society.	√			√		

\* This matrix is unified on all bachelor's degree programs.

### 5. Program learning Outcomes\*

#### Knowledge and Understanding

**K1** Define and explain fundamentals of computing and mathematics appropriate to the discipline.

**K2** Recognize a variety of topics on the basic and advanced computer science disciplines.

#### Skills

**S1** Analyze a problem and identify the computing requirements appropriate to its solution while being aware of the impact of that solution on individuals, organizations, and society.

**S2** Design, implement, and evaluate a computing-based solution to meet a given set of requirements in the context of the program's discipline.

**S3** Use current techniques, skills, and tools necessary for Computing practices.

**S4** Communicate effectively in a variety of professional contexts.

**S5** Apply computer science theory and software development fundamentals to produce computing-based solutions.

#### Values

**V1** Recognize professional, ethical, legal, security and social issues and responsibilities

**V2** Function effectively in teams to accomplish a common goal

**V3** Recognize and explore recent technology as needed, using appropriate lifelong learning strategies

#### Alignment of the program's learning outcomes (PLOs) with the Program's Graduates Attributes (GAs)

PLOs		K1	K2	S1	S2	S3	S4	S5	V1	V2	V3
Program's Graduates Attributes (GA)	GA1								√		
	GA2			√				√			√
	GA3	√	√	√	√	√		√			
	GA4									√	
	GA5		√								√





### Alignment of program learning outcomes (PLOs) with the Saudi Qualifications Framework (NQF)

NQF	PLOs alignment with NQF
<p><b>Knowledge and Understanding</b></p> <ol style="list-style-type: none"> <li>1. Broad in-depth integrated body of knowledge and comprehension of the underlying theories, principles, and concepts in one or more disciplines or field of work,</li> <li>2. In-depth knowledge and comprehension of processes, materials, techniques, practices, conventions, and/or terminology,</li> <li>3. A broad range of specialized knowledge and understanding informed by current developments of a discipline, profession, or field of work,</li> <li>4. Knowledge and comprehension of research and inquiry methodologies.</li> </ol>	<p><b>Knowledge PLOs</b></p> <p><b>K1:</b> Define and explain fundamentals of computing and mathematics appropriate to the discipline.</p> <p><b>K2:</b> Recognize a variety of topics on the basic and advanced computer science disciplines</p>
<p><b>Skills</b></p> <p><b>Cognitive Skills:</b></p> <ul style="list-style-type: none"> <li>• Apply integrated theories, principles, and concepts in various contexts, related to a discipline, profession, or field of work,</li> <li>• Solve problems in various complex contexts in one or more disciplines or fields of work,</li> <li>• Use critical thinking and develop creative solutions to current issues and problems, in various complex contexts, in a discipline, profession or field of work,</li> <li>• Conduct inquiries, investigations, and research for complex issues and problems</li> </ul> <p><b>Practical and Physical Skills:</b></p> <ul style="list-style-type: none"> <li>• Use and adapt advanced processes, techniques, tools, instruments, and/or materials in dealing with various complex practical activities,</li> <li>• Carry out various complex practical tasks and procedures related to a discipline, professional practice, or field of work.</li> </ul> <p><b>Communication and ICT Skills:</b></p> <ul style="list-style-type: none"> <li>• Communicate effectively to demonstrate theoretical knowledge comprehension and specialized transfer of knowledge, skills, and complex ideas to a variety of audiences,</li> </ul>	<p><b>Skills PLOs</b></p> <p><b>S1:</b> Analyze a problem and identify the computing requirements appropriate to its solution while being aware of the impact of that solution on individuals, organizations, and society.</p> <p><b>S2:</b> Design, implement, and evaluate a computing-based solution to meet a given set of requirements in the context of the program's discipline.</p> <p><b>S3:</b> Use current techniques, skills, and tools necessary for Computing practices.</p> <p><b>S4:</b> Communicate effectively in a variety of professional contexts.</p> <p><b>S5:</b> Apply computer science theory and software development fundamentals to produce computing-based solutions.</p>



<ul style="list-style-type: none"> <li>• Use mathematical operations and quantitative methods to process data and information in various complex contexts, related to a discipline or field of work,</li> <li>• Select, use, and adapt various standard and specialized digital technological and ICT tools and applications to process and analyze data and information to support and enhance research and/or projects.</li> </ul>	
<p><b>Values, Autonomy and Responsibility</b></p>	<p><b>Values PLOs</b></p>
<p><b>Values and Ethics:</b></p> <ul style="list-style-type: none"> <li>• Demonstrate commitment to professional and academic values, standards, and ethical codes of conduct, and represent responsible citizenship and coexistence with others.</li> </ul> <p><b>Autonomy and Responsibility:</b></p> <ul style="list-style-type: none"> <li>• Effectively plan for and achieve academic and/or professional self-development, assess own learning and performance, and autonomously make decisions regarding self-development and/or tasks based on convincing evidences.</li> <li>• Autonomously and professionally manage tasks and activities related to the discipline and/or work,</li> <li>• Collaborate responsibly and constructively on leading diverse teams to perform a wide range of tasks while playing a major role in planning and evaluating joint work,</li> <li>• Actively participate in advancing the discipline and society</li> </ul>	<p><b>V1:</b> Recognize professional, ethical, legal, security and social issues and responsibilities.</p> <p><b>V2:</b> Function effectively in teams to accomplish a common goal.</p> <p><b>V3:</b> Recognize and explore recent technology as needed, using appropriate lifelong learning strategies.</p>

Knowledge, skills, and values as defined in NQF are very comprehensive. In the table above we have underlined the key terms and phrases present in learning outcomes and their equivalent in NQF. The PLOs under knowledge, skills, and values align well with NQF as all the important points from NQF are covered by one or more PLOs.

**Alignment of the Program’s Learning Outcomes (PLOs) with the Program’s Goals (G)**

Program Goals		G1	G2	G3	G4	G5
Program’s Learning Outcomes (PLOs)	K1	√				√
	K2	√		√		√
	S1	√				
	S2	√				
	S3	√				√
	S4		√			



	S5	√				
	V1				√	
	V2	√	√		√	√
	V3			√		

The above matrix maps Program's learning outcomes (PLOs) with Program's Goals (G). We already have the following two mapping before this matrix.

- Alignment of the program's learning outcomes (PLOs) with the Program's Graduates' Attributes (GAs)
- Alignment of the Program's Graduates Attributes (GAs) with the Program's Goals(G)

This PLOs to Goals mapping is consistent with these two mappings. For example S1 and V1 both map to GA1 which in turn maps to G3 based on the previous mappings. Hence in this PLOs to Goals mapping S1 and V1 should map to G3 and they do. Similar observations can be made about other PLOs and Goals.

## C. Curriculum

### 1. Curriculum Structure

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required	15	41	30.2%
	Elective	0	00	0%
College Requirements	Required	7	20	14.7%
	Elective	1	03	2.2%
Program Requirements	Required	16	50	36.7%
	Elective	3	09	6.6%
Capstone Course/Project	Required	2	04	3 %
Field Experience/ Internship			--	--
Others		3	09	6.6%
<b>Total</b>		47	136	100%

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

### 2. Program Study Plan

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
Level 1	ELCS101	English 1	Required		3	Institution
	MATH110	Mathematics	Required		3	Institution
	BIO110	General Biology	Required		3	Institution



Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
	COMM101	Communications Skills	Required		3	Institution
Level 2	ELCS102	English 2	Required	ELCS101	3	Institution
	PHYS110	General Physics	Required		3	Institution
	CPIT100	Computer Skills	Required		3	Institution
	STAT110	General Statistics	Required		3	Institution
Level 3	CHEM110	General Chemistry	Required		3	Institution
	CPCS202	Programming 1	Required		3	College
	STAT210	Probability Theory	Required	STAT110	3	College
	CPIT201	Introduction To Computing	Required		3	College
Level 4	ISLS101	Islamic Culture 1	Required		2	Institution
	CPIT221	Technical Writing	Required		2	College
	CPCS203	Programming 2	Required	CPCS202	3	College
	CPCS222	Discrete Structures	Required		3	College
Level 5	ISLS201	Islamic Culture 2	Required	ISLS101	2	Institution
	ARAB101	Arabic Language 1	Required		3	Institution
	CPCS204	Data Structures	Required	CPCS202	3	College
	CPCS211	Digital Logic Design	Required	CPIT201	3	Department
Level 6	STAT352	Applied Probability and Random Processes	Required	STAT210	3	Department
	MATH202	Calculus 2	Required	MATH110	4	Department
	CPCS214	Computer Architecture and Organization 1	Required	CPCS211	3	Department
Level 7	CPCS212	Applied Math for Computation	Required	MATH202	4	Department
	CPCS241	Database 1	Required	CPCS204	3	Department
	CPCS301	Programming Languages	Required	CPCS203 & CPCS222	3	Department
	ISLS201	Islamic Culture 3	Required		2	Institution
Level 8	CPCS223	Analysis and Design of Algorithms	Required	CPCS204	3	Department
	CPCS351	Software Engendering 1	Required	CPCS241	3	Department
	CPCS331	Artificial Intelligence 1	Required	CPCS202	3	Department
	CPCS361	Operating System 1	Required	CPCS202 & CPCS214	3	Department
Level 9	CPCS324	Algorithm and Data Structures 2	Required	CPCS223	3	Department
	CPCS302	Compiler Construction	Required	CPCS301	3	Department
	CPCS391	Computer Graphics 1	Required	CPCS203 & CPCS212	3	Department
	CPCS381	Human Computer Interaction	Required		3	Department
Level 10	ISLS401	Islamic Culture 4	Required	ISLS201	2	Institution
	CPCS371	Computer Network 1	Required	CPCS214	3	Department
	-----	Free Course 1	Free		3	Department
	-----	Free Course 2	Free		3	Department
Level 11	CPCS498	Graduation Project 1	Required	90 Credit Units	1	Department
	-----	Department Elective Course 1	Elective		3	Department
	-----	Faculty Elective	Elective		3	Department



Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College or Department)
	ARAB201	Arabic Language 2	Required	ARAB101	2	Institution
Level 12	-----	Free Course 3	Free		3	Department
	CPCS499	Graduation Project 2	Required	CPCS498	3	Department
	-----	Department Elective Course 2	Elective		3	Department
	-----	Department Elective Course 3	Elective		3	Department

### Department electives courses

Course Title	Course Code	Pre-Requisite Courses	Credit Hours
Software Engineering Practice	CPCS353	CPCS351	3
Computer Networks 2	CPCS372	CPCS371	3
Internet Application Programming	CPCS403	CPCS371 AND CPCS324	3
Component Based Computing	CPCS404	CPCS351	3
Software Technology Topics	CPCS405	CPCS351	3
Computer Architecture 2	CPCS413	CPCS241	3
High Performance Computing	CPCS414	CPCS361	3
Theory of Computation	CPCS424	CPCS212 AND CPCS222	3
Information Security	CPCS425	CPCS361 AND CPCS371	3
Artificial Intelligence 2	CPCS432	CPCS331	3
Artificial Intelligence Topics	CPCS433	CPCS331	3
Database 2	CPCS442	CPCS241	3
Object Oriented Analysis and Design	CPCS454	CPCS351	3
Software Engineering Theory	CPCS457	CPCS351	3
Operating System 2	CPCS462	CPCS361	3
Computing System Security	CPCS463	CPCS361 AND CPCS371	3
Dependable Computing	CPCS464	CPCS463	3
Performance and Modelling of Computing Systems	CPCS465	CPCS324 AND CPCS361	3



System Programming	CPCS466	CPCS361	3
Computer Networks Practice	CPCS473	CPCS371	3
TCP/IP and Web Networking	CPCS474	CPCS371	3
Multimedia and User Interface Design	CPCS482	CPCS381	3
Special Selected Topics	CPCS494	--	3

### 3. Course Specifications

Insert hyperlink for all course specifications using NCAAA template

[CS Program Courses](#)

### 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** )

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

Course code & No.	Program Learning Outcomes									
	Knowledge		Skills					Values		
	K.1	K.2	S.1	S.2	S.3	S.4	S.5	V.1	V.2	V.3
CPIT100	I				I					
ELCS101						I				
MATH110	I									
PHYS110	I									
COMM101						I				
ELCS102						I				
STAT110	I									
CHEM110	I									
BIO110	I									
ISLS101								I		
STAT210	I		I			I			I	
CPCS202	I		I	I	I					
CPIT201	I		I							
CPIT221						I			I	
ISLS201								I		
CPCS222	I		I	I		I			I	
CPCS203	I		I	I	I					
MATH202	I	I				I	I		I	
ARAB101						I				
CPCS204	I		I	I	I					
CPCS212	I	I	I		I			I		
CPCS211	I		I	I	I		I		I	
STAT352	P	P	P				P	P		P



Course code & No.	Program Learning Outcomes										
	Knowledge		Skills					Values			
	K.1	K.2	S.1	S.2	S.3	S.4	S.5	V.1	V.2	V.3	
CPCS301	P	P	P	P	P			P	P	P	I
CPCS241	P		P	P	P			P			
CPCS214	P	P	P	P	P				P		
CPCS223	P		P	P	P			P			
CPCS324	P	P	P	P	P			P			P
CPCS331	P	P	P	P	P			P			P
CPCS351	P		P	P	P	P		P	P		
CPCS361	P		P		P			P			
CPCS371	P		P		P			P			
ISLS301								P			
CPCS302	M	M	M	M	M			M		M	
CPCS381	M		M	M		M		M	M		
CPCS391	M	M	M	M	M			M		M	
CPCS498	M	M	M	M	M	M	M	M	M	M	M
ISLS401								M			
CPCS499	M	M		M	M	M	M	M	M	M	M
ARAB202							M				

### 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.

**Program Learning outcomes and the teaching and learning strategies used to achieve them.**

PLOs		Teaching & Learning Strategies
<b>Knowledge:</b>		
K1	Define and explain the fundamentals of computing and mathematics appropriate to the discipline	1. Class / Group discussion 2. Self-explanation 3. Observation 4. Concept Maps 5. Mind Maps 6. Semantic Maps 7. Guided discovery 8. Investigation 9. KWLH (Know, Want, Learned, How) technique 10. Reciprocal teaching
K2	Recognize a variety of topics on the basic and advanced computer science disciplines.	
<b>Skills:</b>		
S1	Analyze a problem and identify the computing requirements appropriate to its solution while being aware of the impact of that solution on individuals, organizations, and society.	1. Problem-solving 2. Scientific research 3. Academic debate 4. Generative learning 5. Lab-based learning 6. Project-based learning





S2	Design, implement, and evaluate a computing-based solution to meet a given set of requirements in the context of the program's discipline.	7. Model-based learning 8. Micro-teaching 9. Storytelling
S3	Use current techniques, skills, and tools necessary for computing practices.	
S4	Communicate effectively in a variety of professional contexts	
S5	Apply current technical concepts and practices in the core information technologies and Integrate IT-based solutions into the user environment.	
<b>Values:</b>		
V1	Recognize professional, ethical, legal, security and social issues and responsibilities.	1. Collaborative learning 2. Self-learning 3. Brain storming 4. Peer learning 5. Case studies 6. Team work
V2	Function effectively in teams to accomplish a common goal	
V3	Recognize and explore recent technology as needed, using appropriate lifelong learning strategies.	

**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.

**Program Learning outcomes and the assessment methods used to achieve them.**

PLOs		Assessment Methods (Direct and Indirect)
<b>Knowledge:</b>		
K1	Define and explain the fundamentals of computing and mathematics appropriate to the discipline	<b>Direct:</b> - Writing - Oral  <b>Indirect:</b> - Program assessment survey - Short assignments or reports
K2	Recognize a variety of topics on the basic and advanced computer science disciplines.	
<b>Skills:</b>		
S1	Analyze a problem and identify the computing requirements appropriate to its solution while	<b>Direct:</b> - Writing - Oral - Performance





	being aware of the impact of that solution on individuals, organizations, and society.	- Observation <b>Indirect:</b> Program assessment survey
S2	Design, implement, and evaluate a computing-based solution to meet a given set of requirements in the context of the program's discipline.	
S3	Use current techniques, skills, and tools necessary for computing practices.	
S4	Communicate effectively in a variety of professional contexts	
S5	Apply current technical concepts and practices in the core information technologies and Integrate IT-based solutions into the user environment.	
<b>Values, Autonomy and Responsibility:</b>		
V1	Recognize professional, ethical, legal, security and social issues and responsibilities.	<b>Direct:</b> - Performance - Observation <b>Indirect:</b> - Program assessment survey
V2	Function effectively in teams to accomplish a common goal	
V3	Recognize and explore recent technology as needed, using appropriate lifelong learning strategies.	

## D. Student Admission and Support:

### 1. Student Admission Requirements

Requirements of admission to the computer science program:

- Secondary School Certificate or its equivalent from inside or outside the Kingdom of Saudi Arabia.
- Record of good conduct.
- Certificate of physical fitness.
- Saudi citizen or holding a valid residency permit in the Kingdom of Saudi Arabia.

Students applying for admission that fulfill all the above conditions are considered as applicants. A merit list of all applicants is prepared by the Deanship of Admission and Registration based on the following weights of the score:



- Secondary school certificate score (50%).
- Achievement test score (25%).
- Aptitude test score (25%).

## **2. Guidance and Orientation Programs for New Students**

The guidance and orientation program are carried out in the preparatory year at the beginning of the university enrollment to prepare students ahead of the task, and ability to adjust simultaneously in the competitive environment seen in today's job market after completion of their studies.

## **3. Student Counseling Services**

(academic, career, psychological and social)

- ❖ Each student is assigned an academic advisor at the start of the program to ensure that students enrolled in the program fulfill all the university, college and department requirements and graduate on time. To realize this, academic performance and progress of the students is continuously monitored. The advisor meets with the student's multiple times during a semester to discuss the following tasks.
  - Selection of courses to meet the degree requirements.
  - Credit transfer processes.
  - Adding/Dropping courses.
  - Withdrawing from a course or a complete semester.
  - Selecting the appropriate elective courses.
  - Resolving any scheduling conflicts
- ❖ During their years of enrollment, students are invited to visit other universities and local companies to provide them with a better understanding of their future professional role and potential career paths.
- ❖ To facilitate the students as per the latest demands, we have career guidance counselors, one for the boy's section and one for the girl's section. The students can discuss their career goals and aspirations with the career guidance counselors. They can additionally receive career advice from their supervisor during their graduation project.

## **4. Special Support**

(Low achievers, disabled, gifted and talented)



## E. 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	Computer Science	-AI -Programming Language		1	0	1
Associate Professors	Computer Science	-Software Engineering -Compiler Theory -Algorithms -Networking -Programming Language		2	0	2
Assistant Professors	Computer Science	-Operating systems, -Computer Architecture, -Computer Graphics, -Networking Security		7	2	9
Lecturers	Computer Science	-Operating systems, -Computer Architecture, -Computer Graphics, -Networking - Computer Security		1	3	4
Teaching Assistants	Computer Science	-Programming Language -Operating systems, -Computer Architecture, -Computer Graphics, -Networking -Computer Security -HCI -Software Engineering		0	1	1
Technicians and Laboratory Assistants	Computer Science	Networking		1	1	2
Administrative and Supportive Staff	Computer Science	Machine learning AI		1	1	2



Academic Rank	Specialty		Special Requirements / Skills ( if any )	Required Numbers		
	General	Specific		M	F	T
Others ( specify )						

## 2. Professional Development

### 2.1 Orientation of New Teaching Staff

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

- - The provision of on-the-job training for new faculty staff members on modern teaching aids and techniques, for example, the use of E-learning methods as well as to provide laboratories with modern equipment necessary to facilitate learning.
- The new staffs are given guidance and directions at the departmental level with reference to the courses and other related activities
- The senior faculty members assist new faculty in learning and teaching activities and assessment methods.
- Quality committee gives workshops and training programs to all faculty members to ease their full involvement in the quality assurance process and expect relevant course learning outcomes assessment, analysis and implement adequate actions to overcome the findings.

### 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 CS Department frequently organizes and conducts activities aimed at enhancing the professional capabilities of the faculty members. Some of these activities are,

- Workshops
- Short courses
- Seminars
- Consultations

These activities are carefully selected to introduce and refresh faculty with new ideas, technology and information. Faculty members are encouraged to continue research in their area of specialization and interest. Yearly, the faculty members actively participate in the competition for the award of funds against the research proposals. The funded projects are for six months to one year covering all aspects of the research activities. In addition to that the faculty members are provided with funds to participate in international conferences and workshops. The research committee arranges regular seminars to share results of research publications of the faculty members with all the faculty members.

## F. Learning Resources, Facilities, and Equipment

### 1. Learning Resources.



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

Required Textbook  
Essential Reference Material  
Electronic Resources- Websites, Blackboard

## **2. Facilities and Equipment**

(Library, laboratories, medical facilities, classrooms, etc.)

- The well spacious classrooms are equipped with data show, white board and chairs to promote comfortable environment adequate to enhance learning.
- The well-built laboratories are equipped with required hardware & software to promote internet access to students.
- The availability of First Aid Medical facility available in campus to give immediate medical care in case of any unforeseen occurrences.

## **3. Arrangements to Maintain a Healthy and Safe Environment** (According to the nature of the program)

All labs are provided with circuit breaker and fire alarms  
Building provided with emergency exit and fire alarms

## **G. Program Management and Regulations**

### **1. Program Management**

#### **1.1 Program Structure**

(including boards, councils, units, committees, etc.)

Councils:

- Computer Sciences Department council

Boards:

- Computer Sciences Advisory Board
- Computer Sciences Student Advisory Board

Units:

- Quality and Academic Accreditation Unit

Committees:

- Strategic Planning Committee
- Plans and Curriculum Committee
- Academic Affairs Committee
- Registration Committee
- Scholarship Committee
- College's Website Committee
- Labs Committee
- Exam Committee
- Senior Project Committee
- Social and Scientific Activities Committee



- Textbook and Library Committee
- Scheduling Committee
- Graduated Student Committee

### 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.)

Questionnaires are distributed to students, professional bodies, scientific societies, alumni, employers and so on to ascertain their learning progress, opinions and satisfaction on 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.)

1. Deanship of admission and registration:  
<http://www.nbu.edu.sa/AR/Deanships/Admissions/Pages/default.aspx>
2. Deanship of student affairs  
[http://www.nbu.edu.sa/AR/Deanships/Student\\_Issues/Pages/default.aspx](http://www.nbu.edu.sa/AR/Deanships/Student_Issues/Pages/default.aspx)
3. Deanship of high studies  
[http://www.nbu.edu.sa/AR/Deanships/High\\_Studies/Pages/default.aspx](http://www.nbu.edu.sa/AR/Deanships/High_Studies/Pages/default.aspx)
4. Deanship of quality and academic accreditation  
[http://www.nbu.edu.sa/AR/Deanships/Quality\\_and\\_Academic\\_Accreditation/Pages/default.aspx](http://www.nbu.edu.sa/AR/Deanships/Quality_and_Academic_Accreditation/Pages/default.aspx)
5. Deanship of E-Learning  
<http://www.nbu.edu.sa/AR/Deanships/E-Learning/Pages/default.aspx>
6. Deanship of Scientific Research  
[http://www.nbu.edu.sa/AR/Deanships/Scientific\\_Research/Pages/default.aspx](http://www.nbu.edu.sa/AR/Deanships/Scientific_Research/Pages/default.aspx)
7. Deanship of preparatory year and supporting studies.  
[http://www.nbu.edu.sa/AR/Deanships/Preparatory\\_Year\\_Supportive\\_Studies/Pages/default.aspx](http://www.nbu.edu.sa/AR/Deanships/Preparatory_Year_Supportive_Studies/Pages/default.aspx)
8. Deanship of Library Affairs  
[http://www.nbu.edu.sa/AR/Deanships/Library\\_Issues/Pages/default.aspx](http://www.nbu.edu.sa/AR/Deanships/Library_Issues/Pages/default.aspx)

## H. Program Quality Assurance

### 1. Program Quality Assurance System

Provide online link to quality assurance manual

The manual (describing procedures including information about the institutions system of assessing programs and services, the role of the institution's quality center and systems for gathering and analyzing data on quality of performance and planning for improvement) is not available to public.

### 2. Program Quality Monitoring Procedures

1. Faculty members monitoring
  - Selecting qualified faculty members to ensure their quality of teaching and research.
  - Monitoring their performance through student evaluations each semester
2. Teaching process and program plan monitoring



- Monitoring the courses teaching outline through regular achievement reports. These reports should include teaching progress and they should be submitted at least two times during the semester.
3. Measuring learning outcomes
- Measuring student's performance through exams, quizzes, and assignment results

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

The program requires students to take (xx) courses taught by other departments. The computer engineering department do the following activities to Monitor Quality of Courses Taught by other Departments

1. Courses are reviewed periodically to ensure the continuity of their relevance to the needs of computer sciences students.
2. The department is coordinating with all departments concerned, both within the College of Computer Science and with departments outside the College.
3. The quality committee ensures that the course outcomes of other department courses are compatible with the mission, goals and objectives of the program
4. The course specifications of other department courses are collected and verified by the quality committee at the beginning of the semester. The CLOs of other courses are mapped to the PLOs of program in program specification.
5. The teaching & learning activities and assessment of students are done by the course coordinators / HOD of other departments.

The course reports of other department courses are collected and verified by the quality committee at the end of the semester, and these are duly considered in preparation of annual program report

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

1. The syllabus of all courses is available online to all instructors and students.
2. Checking the course outlines for both male and female sections for all university branches to ensure the consistency.
3. Identify a coordinator for each course to maintain quality and consistency for all sections in all branches.
4. For all sections opened to a given course, it's mandatory to follow the same assessment plan.

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

1. The Deanship of Scientific Research funds innovative research projects. Faculties are open to apply for research grants. The applicants can involve external researchers, reviewers, labs etc....
2. The Deanship of Scientific Research provides online access of research articles & papers, journals and conferences through SDL Saudi digital library, a unified national platform partnership
3. The university gives additional increments for the faculty who publish research papers in ISI journals and encourage research activities





4. The Deanship of Scientific Research conduct various workshops and training programs, conferences
5. Academic cooperation between Northern Border University and Turkish University: Signing an agreement for academic and scientific cooperation and exchange of experiences with the two universities of Istanbul and Ankara
6. Framework Agreement for Cooperation and Knowledge Exchange between the Northern Border University and the Japanese University of Kanzawa.
7. Academic cooperation between Northern Border University and Rouen University: Contract of services between the University Medical College and the French University of Rouen
8. Academic cooperation between Northern Border University and Harvard University: Contract of services between the University School of Medicine and the Jocelyn Center of Harvard University

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

1. Assessment plan for Program Learning Outcomes (PLOs):
  - The department council has approved a two-year cycle where each PLO is assessed each semester.
  - The timeline illustrated in the following table demonstrates the assessment plan that provides four cycles of PLOs assessment for the two academic years.

PLOs	Academic Year 1			Academic Year 2		
	Term 1	Term 2	Term 3	Term 1	Term 2	Term 3
K1	X	X	X	X	X	X
K2	X	X	X	X	X	X
S1	X	X	X	X	X	X
S2	X	X	X	X	X	X
S3	X	X	X	X	X	X
S4	X	X	X	X	X	X
S5	X	X	X	X	X	X
V1	X	X	X	X	X	X
V2	X	X	X	X	X	X
V3	X	X	X	X	X	X

**Mechanisms of Using its Results in the Development Processes**

- The CLO-PLO based assessment provides summary of PLOs attainments during a semester. This summary is used by Assessment and Evaluation Committee to identify possible following corrective course of actions:

Revision in pre-requisite as inadequate pre-requisite knowledge.

Revision in course or course material or provide more helping material, modification in text or reference material.





Modifications in course assessment methods.

Revision of the learning accomplishments of a course.

The graduation project addresses most of the Program Learning Outcomes and missing in the presented evaluation. It is the terminal comprehensive activity and provides students with the opportunity to exhibit the acquired skills and knowledge during the program.

- The Quality and Academic Accreditation Unit (QAAU) of the faculty of Computing and Information Technology (FCIT) have implemented the required forms for direct and indirect assessment with the help of Assessment and Evaluation Committee.

The assessment committee is looking into the CLO based assessment method for the student outcomes and determines the reasons of non-achievements. The trigger is initiated with not achievement of PLO in a particular course.

Later, details analysis of course files to assess the achievement of CLO is performed. Then, the Assessment and Evaluation Committee requires from the instructor to provide Continuous Improvement Plan and Strategies.

- Track program graduates and taking their feedback and suggestions and use these suggestions for making decision regarding any plan modification.
- Holding regular surveys for current and graduated students to evaluate the program, and to focus on problems that they faced during studying and after graduation.
- Consulting organizations in the field of this program to find out their requirements and what they expect from our graduates

## 7. Program Evaluation Matrix

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
Teaching performance	Students	Surveys	End of each semester
Leadership	Faculty members	Surveys	End of each semester
Learning Resources	Students and faculty members	Meetings and surveys	During the semester
Graduates' performance	Faculty members	Meetings and surveys	End of academic years
Program plan	Faculty members graduates, external reviewers from the industry	Meetings and surveys	End of academic years
Student field training	Faculty members	Visits	During the training program

**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 (4) year.

\* including KPIs required by NCAAA

No	KPIs Code	KPIs	Target	Measurement Methods	Measurement Time
1- Mission and Goals	KPI-P-01	Percentage of achieved indicators of the program operational plan objectives	80%	Data regarding the achievement rate of all the indicators as in the program operational plan should be collected and the overall achievement percentage should be calculated.	End of each academic year
	KPI-P-02	Students' Evaluation of quality of learning experience in the program	3.75	Exit survey should be conducted among the final year students to assess the quality of learning experiences. The percentage of students who strongly agree or agree to the statements in the survey is to be calculated.	End of each academic year
3- Teaching and Learning	KPI-P-03	Students' evaluation of the quality of the courses	4	Online Course Survey should be conducted to the students towards the end of the semester to assess their registered courses. The percentage of respondents who strongly agree or agree is to be calculated from the survey	End of each semester
	KPI-P-04	Completion rate	90%	Data regarding the number of students who registered in the 1 <sup>st</sup> semester of the year 1 (N1) and number of students who completed the graduation in the end of the year 5 (N2) are to be collected. The percentage $(N1/N2)*100$ has to be calculated.	End of each academic year
	KPI-P-05	First-year students retention rate	90%	Data regarding the number of students who registered in the start of the first academic program year (N1) and number of students who registered in the start of the second academic program year (N2) are to be collected. The percentage $(N1/N2)*100$ has to be calculated	End of each academic year
	KPI-P-06	Students' performance in the professional and/or national examinations	85%	Data regarding the number of students who participated in the national and professional exam (N1) and number of students who have succeeded the exam (N2) are to be collected. The percentage $(N1/N2)*100$ has to be calculated	End of each academic year
	KPI-P-07	Graduates' employability and enrolment in postgraduate programs	40%	Data regarding the number of students who graduated (N) at the end of each year, and number of students who are employed (N1)	Start of each next academic year



No	KPIs Code	KPIs	Target	Measurement Methods	Measurement Time
				and the number of students enrolled in graduate studies programs (N2) are to be collected. The percentage $((N1+N2)/N)*100$ has to be calculated.	
	KPI-P-08	Average number of students in the class	15	Data regarding the number of students who registered in the current semester (N) and number of active sections (N1) are to be collected. The average number of students in a class (N/N1) has to be calculated.	Each semester
-4 Students	KPI-P-09	Employers' evaluation of the program graduates' proficiency	80%	Employer survey (Q-GA) should be conducted to assess the proficiency of the graduates. The percentage of employers who strongly agree or agree to the statements in the survey has to be calculated.	End of each academic year
-5 Teaching Staff	KPI-P-10	Students' satisfaction with the offered services	75%	The survey (Q-SS) should be conducted among the students to assess their satisfaction level with the offered services. The percentage of students who strongly agree or agree to the statements in the survey has to be calculated	End of each academic year
	KPI-P-11	Ratio of students to teaching staff	10:1	Data should be collected regarding the number of faculty members and the number of students assigned for each course. The ratio between the number of teachers and the students assigned for each course has to be calculated.	End of each academic year
	KPI-P-12	Percentage of teaching staff distribution	10 % (Prof) 10% (Asso. Prof) 50% (Assist. Prof) 25% (Lect)	Data should be collected regarding the number of teaching staff based on the gender (male/female), based on academic rankings (Prof., associate prof., asst prof, lecturers) and the percentage has to be calculated out of the total teaching staff	End of each academic year
	KPI-P-13	Proportion of teaching staff leaving the program	0%	Data is to be collected from the HoD regarding the number of teaching staff leaving the institution for reasons other than age retirement and the total number of teaching staff in the department. Percentage of number of teaching staff leaving the institution out of the total number of teaching staff has to be calculated	End of each academic year
	KPI-P-14	Percentage of publications of faculty members	80%	Data regarding the total number of teaching staff and number of teaching staff who have at least one	End of each academic year



No	KPIs Code	KPIs	Target	Measurement Methods	Measurement Time
				research publications should be collected and thereby percentage is calculated.	
	KPI-P-15	Rate of published research per faculty member	2	Data regarding the total number of teaching staff and the total number of research publications should be collected from NBU research deanship and percentage should be calculated	End of each academic year
	KPI-P-16	Citations rate in refereed journals per faculty member	4	Data regarding the total number of teaching staff who have research publications and the total number of citations in research publications should be collected from NBU research deanship and percentage should be calculated.	End of each academic year
-6 Learning Resources, Facilities, and Equipment	KPI-P-17	Satisfaction of beneficiaries with the learning resources	90%	Survey (Q-LS) should be conducted among the students to assess the satisfaction level with the learning resources. The percentage of students who strongly agree or agree to the statements in the survey has to be calculated	End of each academic year

### I. Specification Approval Data

Council / Committee	Computer Sciences Department Council
Reference No.	CS_DM_10
Date	23/07/1443 H 24/02/2022

