جامعة الحدود الشمالية
NORTHERN BORDER UNIVERSITY

… Program Specification

NCAAA 2024 Template

من الشمال...إلى الوطن

Program Specification

(Bachelor)

Program:	**Double Major in Computer Science**
Program Code (as per Saudi university ranking):	**061901**
Qualification Level:	Undergraduate
Department:	Computer Science
College:	College of Science
Institution:	Northern Border University
Program Specification:	New ☒ updated* ☐
Last Review Date:	write here

*Attach the previous version of the Program Specification.

Table of Contents

A. Program Identification and General Information

1. Program's Main Location:

College of Science, Arar

2. Branches Offering the Program (if any):

NIL

3. Partnerships with other parties (if any) and the nature of each:

NIL

4. Professions/jobs for which students are qualified

- Programmer
- Systems Analyst
- Web Developer
- Network Administrator
- Database Developer
- Database Administrator
- Research Assistant
- Instructor
- Programs developer

5. Relevant occupational/ Professional sectors:

- Banking and Finance
- The Ministry of Communications and Information
- Hospitals
- Factories

6. Major Tracks/Pathways (if any):

Major track/pathway	**Credit hours** (For each track)	**Professions/jobs** (For each track)
1.		
2.		
3.		
...		

7. Exit Points/Awarded Degree (if any):

exit points/awarded degree	**Credit hours**
1.	
2.	
3.	

8. Total credit hours: (.....)

B. Mission, Objectives, and Program 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 to serve the local community.

2. Program Goals:

1. Create a distinct academic environment to increase the competitiveness of the other majors' students in the Computer Science program.
2. Enable the other majors to recognize the limits of their knowledge and initiate self-directed learning opportunities.
3. Prepare other majors' students to satisfy the labor market needs and community services in the field of computer Science.

3. Program Learning Outcomes*

Knowledge and Understanding	
K1	Define and explain fundamentals of computing and related appropriate discipline
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
Values, Autonomy, and Responsibility	
V1	Recognize 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 the program's discipline

* Add a table for each track or exit Point (if any)

C. Curriculum

1. Curriculum Structure

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required			
	Elective			
College Requirements	Required			
	Elective			
Program Requirements	Required	12	36	%92
	Elective	0	0	%0
Capstone Course/Project	Required	1	3	%8
Field Training/ Internship				
Residency year				
Others				
Total		13	39	%100

* Add a separate table for each track (if any).

2. Program Courses

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
	CS101	Programming Fundamentals	Required		3	program
	CS202	Object Oriented Programming	Required	CS101	3	Program
	CS203	Data Structures	Required	CS101	3	Program
	CS221	Design and Analysis of Algorithms	Required	CS202	3	Program
	CS240	Database	Required	CS202	3	Program
	CS311	Computer organization and Architecture	Required	CS210	3	Program
	CS312	Operating Systems	Required	CS211	3	Program
	CS305	Web programming	Required	CS240	3	Program
	CS350	Software Engineering	Required	CS240	3	Program
	CS370	Computer Networks	Required	CS202	3	Program
	CS471	Cyber Security	Required	CS370	3	Program
	CS474	Artificial Intelligence	Required	CS240	3	Program
	CS498	Graduation Project 2	Required	Department Approval	3	Program

* Include additional levels (for three semesters option or if needed).

** Add a table for the courses of each track (if any)

3. Course Specifications:

Insert hyperlink for all course specifications using NCAAA template (T-104)

Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)	LINK
CS101	Programming Fundamentals	Required		3	program	CS101
CS202	Object Oriented Programming	Required	CS101	3	Program	CS202
CS203	Data Structures	Required	CS101	3	Program	CS203
CS221	Design and Analysis of Algorithms	Required	CS202	3	Program	CS221
CS240	Database	Required	CS202	3	Program	CS240
CS305	Web programming	Required	CS240	3	Program	CS305
CS311	Computer organization and Architecture	Required	CS210	3	Program	CS311
CS312	Operating Systems	Required	CS211	3	Program	CS312
CS350	Software Engineering	Required	CS240	3	Program	CS350
CS370	Computer Networks	Required	Cs202	3	Program	CS370
CS471	Cyber Security	Required	CS370	3	Program	CS471
CS474	Artificial Intelligence	Required	Cs240	3	Program	CS474
CS498	Graduation Project 1	Required	Department Approval	1	Program	CS498

4. Program learning Outcomes Mapping Matrix:

Align the program learning outcomes with program courses' according to the following desired performance levels *(I = Introduced & P = Practiced & M = Mastered).*

Course Code & No.	Program learning Outcomes												
	Knowledge and understanding					Skills						Values, Autonomy, and Responsibility		
	K1					S1	S2	S3				V1	V2	
CS101	I					I	I	I						
Cs202	I					I	I	I						
CS203	I					I	I	I						
CS221	P					P	P	P						
CS240	I					P	P					I	I	
CS305						P	P	P						
CS311	p					P	P	p					p	

CS312	P					P		P				I		
CS350	P					P	P					P	P	
CS370	P					P		P				P		
CS471	M						M	M				M		
CS474	M					M	M	M					M	
CS498	M					M	M	M				M	M	

* Add a separate table for each track (if any).

5. Teaching and learning strategies applied to achieve program learning outcomes.

Describe teaching and learning strategies and curricular and extra-curricular activities adopted to achieve the Program's learning outcomes in all areas.

PLOs		Teaching& Learning Strategies
Knowledge:		
K1	Define and explain the fundamentals of computing and mathematics appropriate to the discipline.	• Class / Group discussion • Problem-based learning • Reciprocal teaching • Self-learning • Collaborative learning • Observation • Storytelling • Peer learning
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.	• Problem-based learning • Reciprocal teaching • Lab-based learning • Model-based learning • Self-learning • Observation • Peer learning • Collaborative learning • Storytelling • Generative 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.	
S3	Use current techniques, skills, and tools necessary for Computing practices	
Values, Autonomy and Responsibility:		
V1	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles	• Problem-based learning • Model-based learning. • Collaborative learning • Self-learning • Peer learning • Generative learning
V2	Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline	

6. Assessment Methods for program learning outcomes.

Describe assessment methods (Direct and Indirect) that can be used to measure the achievement of program learning outcomes in all areas.
The Program should devise a plan for assessing Program Learning Outcomes (all learning outcomes should be assessed at least twice in the bachelor program's cycle and once in other degrees).

PLOs		Assessment Methods (Direct and Indirect)
Knowledge:		
K1	Define and explain the fundamentals of computing and mathematics appropriate to the discipline.	Direct: • Written exams (essay) • Objective exams • Checklist. • Case Study. • self-assessment • Oral exams • Reports • Presentations Indirect: Program assessment survey
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.	Direct: • Objective Structured Practical Examination (OSPE). • Laboratory Exams. • Checklist. • Case Study. • Discussion • self-assessment • Presentations • Reports • Problem-based Assessment • Projects • Oral exams Indirect: 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	
Values, Autonomy and Responsibility:		
V1	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles	Direct: • Objective Structured Practical Examination (OSPE). • Checklist. • Case Study. • Discussion • self-assessment • Presentations • Reports • Problem-based Assessment • Projects • Oral exams Indirect: Program assessment survey
V2	Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline	

D. Student Admission and Support:

1. Student Admission Requirements

To be considered for admission, the applicant shall meet the following requirements:

1) Registered in an academic program in one of the faculties of the Northern Border university that accepts students with a high school scientific major .
2) Passing at least 36 hours of core specialization.
3) GPA of at least 3 out of .5
4) The student is not entitled to combine a double major and a minor at the same time.
5) The applicant shall meet any other requirements specified by the University Council and announced at the time of application.

2. Guidance and Orientation Programs for New Students

(Include only the exceptional needs offered to the students of the Program that differ from those provided at the institutional level).

The new students will be invited to an academic guidance meeting, in the first week, aimed to shed some light on the regulations and the registration process at the faculty of science, computer science department.
An agenda will be introduced to the new students that provide an introduction to student's rights and responsibilities. In addition, some information about the university life through campus; visits, meetings, lectures, and other activities. This could be done via the cooperation with different academic & support departments in the faculty.

3. Student Counseling Services

(Academic, professional, psychological, and social)
(Include only the exceptional needs offered to the students of the Program that differ from those provided at the institutional level).

- 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, faculty 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 students).

1. The teaching staff member should take into account the individual differences between the students who are low achievers and talented ones during their lectures.
2. The low achievers' students can take advantage of the office hours of the teaching staff member which have been defined since the beginning of the semester.
3. The talented students have the chance to finish their studies in short times compared to their peers.
4. Urged the employees of the college not to use the facilities and equipment meant for people with special needs. Besides, the availability of facilities for people with special needs in all buildings of the college and parking.
5. Preparing and approving plans for preventive and curative awareness programs.
6. Each academic advisor, through periodic meetings with students, follows up on psychological and social problems and raises them to the Academic Advising Committee (The Link).

E. Faculty and Administrative Staff:

1. Needed Teaching and Administrative Staff

Academic Rank	Specialty		Special Requirements / Skills (if any)	Required Numbers		
	General	Specific		M	F	T
Professor	Computer Science	Artificial Intelligence (AI)		1	1	2
Associate Professor		Cyber Security		1	1	2
		Software Engineering				
		Networking		1	1	2
Assistant Professor				2	2	4
Lecturer				1	1	2
Teaching Assistant						
Technicians and Laboratory Assistants				**1**	**1**	**2**

Academic Rank	Specialty		Special Requirements / Skills (if any)	Required Numbers		
	General	Specific		M	F	T
Administrative and Supportive Staff				1	1	2
Others (specify)						

F. Learning Resources, Facilities, and Equipment:

1. Learning Resources

Learning resources required by the Program (textbooks, references, e-learning resources, web-based resources, etc.)

- Required Textbook
- Essential Reference Material
- Electronic Resources- Websites, Blackboard: Communications between students and faculty members is usually done via Blackboard (BB) web portal (www. https://lms.nbu.edu.sa/) . Blackboard is a very powerful tool that allows posting course materials, announcements, assignments, discussion forums and virtual classes.

2. Facilities and Equipment

(Library, laboratories, classrooms, etc.)

- Library

The boys' section of the campus contains a main library. The Main library contains a variety of information resources such as books, periodicals, digital libraries, documents, manuscripts and digital resources. For students it is the main source of accessing their required reading materials. The library is responsible for organizing (classifying, cataloging, indexing, and shelving) books, and making them available to the University faculty and students in both boys' and girls' sections, through a range of services such as reading areas and a digital library system. Accounts are provided to both faculty members and students to access these online resources. The Deanship of Library Affairs is the governance body for the main library. The Deanship of Library affairs arrange all the latest required books and reading materials.

- Laboratories

All computing labs in the boy section are located on the second floor. There exist 6 regular computer labs of varying capacities and equipment, and a specialized "digital logic and design lab". The equipment in these labs is described in the next section. In addition to the computing resources, "Digital Logic and Design Lab'' includes resource for the design, analysis and testing of digital circuits as well as programmable 8086 processors for the study of machine language.

Labs in the girl section are located on second and third floor. There are 6 regular computer labs of varying capacities and equipment, and a "digital logic and design lab". The labs in the girls' section are very similar to the labs in the boys' section in terms of computing resources and capacity.

- Classrooms

There are 12 lecture rooms in the boy section. As the computing labs are also equipped with the same facilities as the classrooms, they are also used for lectures. There is an auditorium in the boys' section which can accommodate up to 200+ students. The auditorium is equipped with an extra-large white screen and a modern projection system. To comply with the Kingdom's norms regarding gender separation in the workplace and to encourage the higher education of females while respecting the cultural norms of the region, there are two types of classrooms in the girls' section: the classrooms which are equipped to host male instructors and female-only classrooms. There are 12 classrooms of the former type. These classrooms have a separate entrance to be used by male instructors and there is a separation glass.
between male instructor and female students. These classrooms are equipped with a multimedia projector on the students' side and two white boards, one on the students' side and the other on the male instructor's side. These classrooms can be used like a standard classroom by female instructors.
There are 21 female-only classrooms, located on the second and third floors of the girls' section building. The faculty of computing and IT shares these classrooms with other colleges in the campus. There is a large hall in the girl section which can accommodate 200+ students and is used for cultural events.
All classrooms in both boys and girl sections have a maximum capacity of around 35 students. Each classroom is equipped with a large whiteboard, individual chairs for students, an instructor desk and a high-resolution multimedia projector. Internet access is available in all the classrooms through both wireless and wired networks. The whole building (classrooms, offices, and labs) is centrally heated/cooled and hence provides a comfortable working environment to students, faculty and other staff (temperatures outside can be as high as 50°C in summer and as low as -1°C in winter).

3. Procedures to ensure a healthy and safe learning environment

(According to the nature of the Program)

The facilities, computing resources, and equipment comply with the national legislation and regulations pertaining to fire, building, and safety requirements and health codes. The compliance to these standards is verified on a regular basis by the authorized services of the University. The University additionally includes a safety department and an emergency response team that regularly carries out fire drills and lockdown procedures. Finally, in case of a health hazard or emergency, the University possesses medical facilities and can also request the assistance of public hospitals which includes an emergency service. Both health facilities are located at a walking distance from the campus.

G. Program Quality Assurance:

1. Program Quality Assurance System

Provide a link to the quality assurance manual.

Quality System is used to evaluate and measure the promises and achievements of any institution provided in mission and vision statement and reflected in the strategic directions of that institution. The main idea is to evaluate the satisfaction level of various stakeholders and increase their confidence by established procedures and methods. The Faculty of

Computing and Information Technology is committed to quality education to fulfill the published mission and vision.
The Quality System manual for Faculty of Artificial Intelligence program has been designed in line with the Quality System Manual (QS) of Northern Border University (NBU) as well as considering the guidelines of NCAAA stated in the Quality Handbook. The Quality System described in this manual defines the various policies and procedures that ensure quality assurance and management activities in line with good practices of NCAAA standards are implemented and evaluated. It clearly describes the responsibilities, scope, and domain of various activities.
This manual considers the application of a system of processes throughout the college as well as the identification and interaction of these processes, and their management. This Quality Management System is in line with the regulations and requirements described by the NCAAA .
The policies and procedure defined here are applicable throughout all the activities and level of organization and various units, committees and members are responsible for ensuring the implementation of this Quality System.
The Quality System manual for Faculty of Computing and Information Technology has been designed in line with the Quality System Manual (QS) of Northern Border University (NBU) as well as considering the guidelines of NCAAA stated in Quality Handbook. (The Link).

2. Procedures 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 science students.
2. The program is coordinating with all departments concerned, both within the College of Science and with programs outside the College.
3. The quality committee ensures that the course outcomes of other program 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.
6. The course reports of other program 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.

3. Procedures 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 open to a given course, it's mandatory to follow the same assessment plan.

4. Assessment Plan for Program Learning Outcomes (PLOs),

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.
        1) Learning outcomes are measured at the program level annually by direct method (all kinds of tests) and indirect method (surveys).
        2) Calculating performance indicators of learning outcomes annually.
        3) Based on the results of measuring learning outcomes and performance indicators of learning outcomes, an improvement and development plan that is applied in the following year has been prepared and a report of this plan is written in the program report for the following year.
- 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.

Consult organizations in the field of this program to find out their requirements and what they expect from our graduates.

5. 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, services, partnerships, etc.
Evaluation Sources: students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, etc.
Evaluation Methods: e.g., Surveys, interviews, visits, etc.
Evaluation Time: e.g., beginning of semesters, end of the academic year, etc.

6. Program KPIs*

The period to achieve the target (4) year(s).

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
1	KPI-P-01	Students' Evaluation of quality of learning experience in the program	NA	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
2	KPI-P-02	Students' evaluation of the quality of the courses	NA	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
3				Data regarding the number of students who registered in the 1st semester of the year 1 (N1) and	

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
	KPI-P-03	Completion rate	NA	number of students who completed the graduation at 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
4	KPI-P-04	First-year students retention rate	NA	Data regarding the number of students who registered at the start of the first academic program year (N1) and number of students who registered at 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
5	KPI-P-05	Students' performance in the professional and/or national examinations	NA	Data regarding the number of students who participated in the national and professional exam (N1) and number of students who have succeeded in the exam (N2) are to be collected. The percentage (N1/N2) *100 has to be calculated	End of each academic year
6	KPI-P-06	Graduates' employability and enrolment in postgraduate programs	NA	Data regarding the number of students who graduated (N) at the end of each year, and number of students who are employed (N1) and the number of students enrolled in graduate studies programs (N2) are to be collected. The percentage (N1+N2)/N)*10 has to be calculated.	Start of each next academic year
7	KPI-P-07	Employers' evaluation of the program graduates' proficiency	NA	An 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
8	KPI-P-08	Ratio of students to teaching staff	NA	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
9	KPI-P-09	Percentage of publications of faculty members	70%	Data regarding the total number of teaching staff and number of teaching staff who have at least one research publications	End of each academic year
10		Rate of published research per		Data regarding the total number of teaching staff and the total number of research publications should be	

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
	KPI-P-10	faculty member	2.5	collected from NBU research deanship and percentage should be calculated	End of each academic year
11	KPI-P-11	Citations rate in referred journals per faculty member	1.5	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

*including KPIs required by NCAAA

H. Specification Approval Data:

Council / Committee	**COMPUTER SCIENCE DEPARTMENT COUNCIL**
Reference No.	**Meeting 25th, 1446.**
Date	**May 4th, 2025.**