BOARD OF HIGHER EDUCATION

REQUEST FOR COMMITTEE AND BOARD ACTION

COMMITTEE: Academic Affairs NO: AAC 19-10

COMMITTEE DATE: January 15, 2019

BOARD DATE: January 22, 2019

APPLICATION OF NORTH SHORE COMMUNITY COLLEGE TO AWARD THE ASSOCIATE IN SCIENCE IN DATABASE MANAGEMENT AND SECURITY

MOVED: The Board of Higher Education hereby approves the application of

North Shore Community College to award the Associate in

Science in Database Management and Security.

Upon graduating the first class for this program, the College shall submit to the Board a status report addressing its success in reaching

program goals as stated in the application and in the areas of

enrollment, curriculum, faculty resources, and program effectiveness.

Authority: Massachusetts General Laws Chapter 15A, Section 9(b)

Contact: Winifred M. Hagan, Ed.D., Associate Commissioner for Academic

Affairs and Student Success

BOARD OF HIGHER EDUCATION January 2019 North Shore Community College

INTENT AND MISSION

The North Shore Community College (NSCC) proposed Associate in Science in Database Management and Security (AS/DBMS) is reported to be consistent with the College's mission of providing excellence in education and responsive to the changing needs of the communities served. NSCC also reports that the proposed program is in alignment with the Board of Higher Education's Vision Project outcome to align programs with workforce needs in the state, region and local municipalities. The proposed program aligns with the College's strategic plan to develop effective, innovative and dynamic programs that meet student, community, civic, and workforce needs.

The major objective of the proposed AS/DBMS program is to prepare graduates with database and computer security skills to enter the workforce on the MA north shore and in the greater Boston region. The importance of database technology and cybersecurity has increased and impacts all areas of information technology as well as across all industry sectors. NSCC plans that AS/DBMS graduates will have a solid foundation in database knowledge and security infrastructure along with data analysis skills. The proposed program is initially designed to serve students planning to go directly into careers. NSCC reports that a transfer pathway for the program is under discussion for future implementation.

The proposed program has obtained all necessary governance approvals on campus and was unanimously approved by the North Shore Community College Board of Trustees on March 21, 2018. The required letter of intent was circulated on April 12, 2018. The Department received no comments.

NEED AND DEMAND

National and State Labor Market Outlook

According to the *Northeast Workforce Investment Board Blueprint Report* (March 2018), "Professional, Scientific, and Technical services related occupations also show significant need for new workers because of high replacement demand as the occupations face high levels of retirement. The PST sector covers a broad range of industries that provide specialized opportunities including legal, accounting, engineering, architectural, advertising, consulting, and computer services. In addition, the presence of PST occupations across all industries, i.e., IT jobs, increases the importance of this sector across the entire northeast economy."

NSCC notes that the professional and technical services industry is important to the MA northeast region's economy for several reasons, including the earning potential of professionals in the field (over \$105,000 on average for the sector), and its large footprint serving other industries such as

¹ <u>https://masshire-northshorewb.com/wp-content/uploads/Northeast-Regional-Labor-Market-Blueprint-FINAL.pdf</u> Accessed Dec. 19, 2018.

manufacturing and health care.² It is anticipated that supporting and enhancing the tech sector will benefit many other industries and the overall regional economy. NSCC indicated that the North Shore Workforce Investment Board (NSWIB) regional data shows job listings for the database query language SQL and software development to be in high demand. SQL (Structured Query Language) programming/development is reportedly listed as a leading needed IT skill. According to U.S. News Ranking of Best Jobs in IT rankings, Database Administrator is listed as one of the best IT jobs.³ NSCC's Computer Science and Information (CIS) Department researched job openings in the north shore and the greater Boston area using various online search engines to find the related job listings. The positions posted included SQL programmers, SQL developers, database administrators, database analysts, database specialists, and related security positions.⁴

Student Demand

The college conducted a survey of alumni and current students in computer science degree and certificate programs and determined 50% had interest in taking additional coursework in the new degree. In addition, the college also surveyed their advisory board members and found 70% would recommend the new program to existing employees.⁵

NSCC noted that the CSI enrollment reflects the institution's demographic profile of 42 percent of students from minority racial and ethnic groups, and that the program's percent of Pell-eligible students is slightly higher that the campus average, at 40 percent. It is planned that the proposed program will be located on NSCC's Lynn campus for convenient access to Lynn residents. NSCC anticipates the proposed new degree will provide pathways into a growing and well-compensated field for underserved populations.

OVERVIEW OF PROPOSED PROGRAM

NSCC believes the proposed AS/DBMS will prepare students for a wide range of positions within the Information Technology field. NSCC also expects to develop articulations such that students will also be prepared to pursue bachelor's level studies in computer science fields. The proposed program is planned to include courses in general education as well as required courses in computer science, and a three-credit elective.

Duplication

Among the public community colleges, Bunker Hill Community College and Middlesex Community College have similar programs.

² Salary information and sector impact cited in the Northeast Regional Labor Market Blueprint (March 2018), https://masshire-northshorewb.com/wp-content/uploads/Northeast-Regional-Labor-Market-Blueprint-FINAL.pdf Accessed Dec. 19, 2018.

³ See https://money.usnews.com/careers/best-jobs/rankings/best-technology-jobs Accessed Dec. 19, 2018.

⁴ CIS Department members conducted this research in November 2016 using online resources such as http://www.indeed.com, https://www.kforce.com/jobs, and https://massanf.taleo.net/careersection

⁵ This research was conducted using internally developed SurveyMonkey instruments.

ACADEMIC AND RELATED MATTERS

Admission

NSCC expects to use its existing admissions requirements. Students wishing to enroll in the proposed AS/DBMS program must first meet the college-wide communications and math proficiencies prior to being eligible to take courses in the major. NSCC plans that transfer students will be welcome to enroll in the proposed AS/DBMS program.

PROGRAM ENROLLMENT PROJECTION

	# of Students Year 1	# of Students Year 2	# of Students Year 3	# of Students Year 4*
New Full Time	10	10	10	10
Continuing Full Time	0	8	16	16
New Part Time	10	10	10	10
Continuing Part Time	0	8	16	24
Totals	20	36	52	60

Curriculum (Attachment A)

NSCC anticipates that the proposed program will include general education and program specific requirements. It is planned that the program will be housed in the Computer Science Information Department, where the courses are currently or will be taught once approved. To best reflect industry standards and build the needed technical skills, 12 courses in computer science related areas will be required. These courses include: Database Management Using Excel, Introduction to Access, Data Analysis, Database Programming with SQL, Internet Networking and Security, Advanced Network Security, Information System Disaster Recovery and Database Administration.

Assignments and assessments are detailed in the program materials. The external reviewers as well as department staff found the curriculum to be coherent, providing both breadth and depth of study, sequential progression, exposure to a broad range of relevant topics, and rigorous learning expectations.

NSCC plans that students will learn applied knowledge as well as content knowledge, which will be assessed as part of program outcomes; and use of many existing courses and facilities already in place

for existing Computer Science programs. Further, graduates will be prepared to take the Oracle Certification Exam⁶, which provides a technical credential in the field.

Internships and Field Studies

NSCC has developed the program to help students integrate theory and application. The detailed outcomes and syllabi presented in the full application provide clear evidence of attention to this. NSCC plans that there will be an internship developed as part of the program that will be strongly recommended to all students in the program as their elective and expects the Advisory Board in Computer Science will be central to developing both internship and other experiential opportunities for students in the program.

RESOURCES AND BUDGET

Budget (Attachment B)

The program budget assumes that NSCC will use existing faculty to teach most of the courses required by the proposed major, with the addition of one new faculty member who will add expertise in cybersecurity. NSCC projects that program's revenue will exceed expenses consistently by year three.

Faculty and Administration (Attachment C)

Faculty from the existing Computer Science and Mathematics departments will teach in the new program. The qualifications and expertise of these faculty are reported to be well-grounded as assessed both by the external reviewers and department staff. NSCC will hire a new full-time computer science faculty member in Year 2. The program will be overseen by the Chair of the Computer Science Information Department who working with NSCC's Dean of Science, Technology, Engineering and Mathematics (STEM).

Facilities, Library and Information Technologies

NSCC cites as among the resources that will support the experiences of students who participate in the proposed program, the college's library services as well as physical resources at the Lynn campus. The CSI Department is expected to work with the library to identify needed academic resources and journals on an annual basis. Students in this program will be expected to utilize dedicated computer science classrooms and lab rooms in Lynn for their courses when offered in either face-to-face or hybrid formats. NSCC has committed to acquiring additional Oracle software for this program.

Affiliations and Partnerships

The AS/DBMS proposal was developed with input from and the approval of NSCC's existing Computer Science Advisory Board. The proposal also referenced input from the North Shore Workforce Investment Board and their "Blueprint Report" in its construction. Overall, the advisory board's

⁶ Oracle is a hardware and software engineering corporation offering a wide range of products, services, research, trainings and certificates. Oracle University's Oracle Certification Program (OCP) is one certification offered by Oracle to technical professionals in the information technology marketplace.

assessment of career opportunities for graduates of this program was that they would be very successful and are not limited to opportunities in IT companies, but that graduates could find available job openings in almost every sector. NSCC provided a complete list of the advisory members and their affiliations as part of the full proposal.

NSCC, Lynn Public Schools (LPS), and Salem State University have partnered for the last five years through the CommUniversity initiative, with the goal of aligning PK-16 transfer in the city of Lynn. The first pathway developed was in Computer Science/Information Technology. In 2015, NSCC and LPS launched an early college and continue to have extensive articulation agreements in computer science and information technology courses. Several free early college computer science courses are offered on the Lynn campus taught by NSCC faculty to LPS high school students. The College plans to expand early course offerings aligned to the proposed AS/DBMS degree option. In addition, NSCC reports working on articulation agreements with Salem State University, the University of Massachusetts Lowell and the University of Massachusetts Boston.

PROGRAM EFFECTIVENESS

The proposed AS/DBMS was developed to include detailed objectives as well as set overall program goals, with measurable outcomes. This will help the institution track and develop the program in its first few years. The department chair will be responsible for gathering, analysis, and sharing of relevant data regarding program outcomes and attainments.

PROGRAM GOALS

Goal	Measurable Objective	Strategy for Achievement	Timetable
Maintain healthy program enrollment that grows annually.	Launch the program with a minimum of 20 students in year one.	Promote the program through existing channels with Marketing and Public Relations Department	January- August 2019
Students who graduate from this program receive high levels of proficiency on the Oracle Certification Exam	90% of graduates of the program pass the Oracle Certification Exam	Courses taught are in alignment with student learning outcomes at the program level and course levels that map back to the competencies assessed in the Oracle Certification Exam	September 2019- May 2021 and beyond
Students who graduate from this degree are employed in field	85% of graduates of the program are employed in field	Curriculum is aligned to labor market needs. Program coordinators to work with advisory board members, business and industry, career placement counselor and internship coordinator to	September 2019- May 2021 and beyond

		support job placement	
		opportunities	
Students who graduate	A minimum of one	Work with the 4-year	September
from this degree can	articulation agreement is	partner to convene faculty	2019
transfer to a 4-year	developed with a partner	in field to lay out and	
institution with seamless	4-year public university in	develop an articulation	
credit transfer in related	Massachusetts to provide	agreement.	
baccalaureate degree	students a transfer option.		
program.			
Program will have the	The program will submit	The program will undergo	Fall 2020
opportunity to routinely	a report after the end of	program review and	and
evaluate their viability,	its first year of	analyze their quantitative	September
outcomes and	operation that will detail	and qualitative data to	2023- 2024
effectiveness	progress on its goals.	determine current trends,	
	The program will also be	viability, outcomes and	
	on NSCC's program	effectiveness and make	
	review cycle for 2023-	recommendations for	
	2024 academic year.	continuous improvement,	

EXTERNAL REVIEW AND INSTITUTIONAL RESPONSE

The program was review by Dr. Michael Diehl, Associate Professor of Math/Computer Science at Endicott College, and Dr. Ming Ouyang, Associate Professor and Undergraduate Program Director of Computer Science, University of Massachusetts Boston. Both reviewers found that the proposed program met the review standards, fits within the mission of NSCC, and would provide strong preparation to its graduates. Strengths of the proposal included its thoroughness, the balance of breadth of offering and depth of preparation, currency of the offerings in programming languages and skill sets such as data analysis, and the intent to prepare students to take the Oracle certification exam, and close connection with existing Computer Science offerings. The reviewers made suggestions regarding having a guided program pathway and having a recommended internship component be part of the proposed program. NSCC responded to these suggestions. The proposal submitted for staff review reflected adjustments to the program design consistent with these responses in each of the areas identified by the external reviewers.

STAFF ANALYSIS AND RECOMMENDATION

Staff thoroughly reviewed all documentation submitted by **North Shore Community College** and the external reviewers. Staff recommendation is for approval of the proposed **Associate of Science in Database Management and Security** program.

ATTACHMENT A: CURRICULUM

North Shore Community College Curriculum Outline Associate of Science in Database Management and Security

Required (Core) Courses in the Major (Total # courses required = 20)							
Course Number	Course Title	Credit Hours					
CPS 100	Information Technology and Its Applications	3					
CPS 173	Data Management Using Excel	3					
CPS 138	Internet Networking and Security	4					
CPS 168	Introduction to Access	2					
CPS 170	Database Theory and Applications	4					
CPS 122 or CPS 218	Operating Systems or Unix	4					
CPS 177	Database Programming with SQL	3					
CPS 250	Advanced Network Security	3					
CPS 219	Data Analysis	3					
CPS 134	Introduction to Computer Networks	2					
CPS 182	Information System Disaster Recovery	2					
CPS 221	Database Administration	4					
	37						
Elective Cou	rses (Total # courses required = 0) (attach list of choices if	needed)					
OPN	Open Elective	1					
	1						
Distribution of Ger Attach List of Gener Credits) CMP 101- Composit CMP 102-150- Com	# of Gen Ed Credits 6						
	Elective, including Literature and Foreign Languages	3					
Mathematics and the Math 143- Statistics MAT 151- Pre-Calcu Lab Science Elective	10						
Social Sciences	3						
Social Science Elec	Social Science Elective- 3 credits						
	Sub Total General Education Credits	22					
	Curriculum Summary						

Total number of courses required for the degree	20
Total credit hours required for degree	60

Prerequisite, Concentration or Other Requirements: Students must meet institutional graduation thresholds of Communications and mathematical proficiencies which can be achieved through college placement testing or successfully completing coursework with equivalent student learning outcomes.

Attachment B: Budget

NEW ACADEMIC PROGRAM BUDGET

One Time/ Start Up Costs		Annual Expenses					
	Cost Categories	Year 1	Year 2	Year 3	Year 4		
	Full Time Faculty (Salary & Fringe) Year two reflects addition faculty member's workload	56,533	97,663	98,817	99,993		
	Part Time/Adjunct Faculty (Salary & Fringe)	N/A	N/A	N/A	N/A		
	Staff	N/A	N/A	N/A	N/A		
	General Administrative Costs	7,351	7,498	7,648	7,801		
	Instructional Materials, Library Acquisitions	1,500	1,500	1,500	1,500		
	Facilities/Space/Equipment	N/A	N/A	N/A	N/A		
	Field & Clinical Resources	N/A	N/A	N/A	N/A		
	Marketing	1,000	1,000	N/A	N/A		
***	Other (Specify) Initial software installation	3,000	N/A	N/A	N/A		
	TOTALS	69,384	107,661 1	107,965	109,294		

One Time/Start- Up Support			Annual Income				
	Revenue Sources	Year 1	Year 2	Year 3	Year 4		
	Grants	N/A	N/A	N/A	N/A		
	Tuition	5,250	9,450	13,650	14,850		
	Fees	39,900	71,820	103,740	112,860		
	Departmental	2,500	2,500	2,500	2,500		
	Reallocated Funds	N/A	N/A	N/A	N/A		
	Other (specify)	N/A	N/A	N/A	N/A		
	TOTALS	47,650	83,770	119,890	130,210		

ATTACHMENT C: FACULTY

Summary of Faculty Who Will Teach in the Proposed Program							
Name of faculty member (Name, Degree and Field, Title)	Check if Tenure d	Courses Taught Put (C) to indicate core course. Put (OL) next to any course currently taught online.	Number of section s	Division of College of Employme nt	Full- or Part- time in Program	Full- or part- time in other department or program (Please specify)	Sites where individual will teach program courses
Guan, Huiwei. Ph.D. Computer Science. Professor		CPS 122 Operating Systems CPS 218 Unix (OL/in seat) CPS 250 Advanced Network Security (OL/in seat) CPS 134 (OL) Introduction to Computer Networks CPS 138 Internet networking and security CPS 182 (Ol/ in seat) Information System Disaster Recover	1 1 1	Day	Full Time	No	• Lynn, Hybrid, OL

Hassan, Abier. M.S.		• CPS 168 (OL/in	1	Day	Full Time	No	• Lynn, Hybrid, OL
Computer Sciences.	—	seat)					, , , , -
Associate Professor		Introduction to					
		Access	1				
		• CPS 177					
		Database					
		Programming					
		with SQL					
		• CPS 221	1				
		Database					
		Administration					
		• CPS 170 (OL/In	1				
		seat) Database					
		Theory and					
		Applications					
Wermers, Lynn. M.S.	\boxtimes	• CPS 100:	3	Day	Full Time	No	• Lynn, Hybrid, OL
Mathematics with		Information					
Computer Option.		Technology and					
Professor		Applications (OL,					
		in seat)					
		• CPS 173: Data	1				
		Management					
		Using Excel;					
		• CPS 219: Data					
		Analysis	1				
		-					