Ph.D. Computing
CIP 11.0101
University of North Florida

Board of Governors
Staff Analysis

May 2024

STATE UNIVERSITY SYSTEM OF FLORIDA

Program Description and Overview

The University of North Florida (UNF) is proposing a Ph.D. in Computing. The proposed program will offer two concentrations: one in intelligent systems and a second in cybersecurity. The intelligent systems concentration will focus on high-level theoretical concepts of artificial intelligence with machine learning and natural language processing to conduct research. The cybersecurity concentration is designed to center upon the concepts and security foundations of computing and communication systems to develop innovative solutions for improving the security of computing environments.

The proposed program has been developed to extend the current research-based Master of Science in Computer and Information Science, which requires students to complete 30 credit hours. The proposed Ph.D. in Computing will require students to complete 72 credit hours beyond undergraduate coursework. Forty-eight credit hours will include courses such as artificial intelligence, machine learning, data mining, software architecture and engineering, operating systems, and security. Up to 30 credits from a prior master's degree in computing may apply to the proposed program's 48 credit hours of coursework. The remaining 24 credit hours will consist of dissertation research, which the student must successfully defend to a faculty committee.

Program graduates with a concentration in intelligent systems will have the knowledge and skills necessary for career opportunities as artificial intelligence researchers in the financial and healthcare sectors, big data researchers, business intelligence specialists, and machine learning researchers. Program graduates with a concentration in cybersecurity will be prepared to work as chief technology and information security officers, cybersecurity researchers, and information security architects and directors. Graduates from both concentrations will also be prepared for faculty positions in computer science at the postsecondary level. The proposed program is a Program of Strategic Emphasis.

The University of North Florida's Board of Trustees approved the proposed program on December 8, 2023. If approved by the Board of Governors, the proposed Ph.D. in Computing will be the sixth Ph.D. program in the System in CIP 11.0101. Table 1 provides a summary overview of the Ph.D. in Computing.

Table 1: Proposed Program Summary

Ph.D. in Computing	
Tuition per Credit Hour	$493.53 Florida Resident $1,044.27 Non-Resident
Delivery Mode	Traditional
Location	Main Campus
Graduation Requirements	72 Graduate Credit Hours (30 credit hours may be applied from a master's program)
Effective Date	Fall 2024

Source: University of North Florida Ph.D. in Computing Proposal

Need for Graduates in the Labor Market

Programs of Strategic Emphasis are one of several tools for aligning the degree production goals of the State University System with the economic and workforce needs of Florida and are also included in the Performance-Based Funding Model. During 2023, the Board of Governors did a comprehensive review and revision of the Programs of Strategic Emphasis. The Board approved a new list in November 2023 focusing on Florida's most critical workforce shortages. To be included on the new list, academic programs had to meet certain labor market demand thresholds for projected growth and unfilled job openings. The proposed UNF program is included on the new Programs of Strategic Emphasis list.

The proposed program will position graduates for jobs such as computer and information research scientists and computer science faculty. According to UNF, the two proposed concentrations, intelligent systems and cybersecurity, were selected to fill a need in northeast Florida, which spans the sectors of logistics, healthcare, financial technology, and advanced manufacturing. The UNF Computing Advisory Board, comprised of professionals in the information technology sector in Jacksonville, provided a letter of support for the program. According to the proposal, the Computing Advisory Board is actively involved in providing feedback on the program curriculum to align with industry-driven competencies and provide feedback on the performance of program graduates. The advisory board supports this program due to the need for highly skilled graduates prepared to assume leadership roles in the fast-evolving technology industry and to contribute to the economic growth of the northeast Florida region. The managing director and chief information officer of PGIM Real Estate in Jacksonville provided a letter of support. The letter includes an acknowledgment of support from Jacksonville business and industry partners, including Nemours Children's Health, CSX, and Google Cloud.

Workforce Demand

The workforce demand for computer information and research scientists is expected to grow significantly in Florida and nationally. Though the minimum education required for the occupation is a master's degree, graduates will meet the demand for advanced research and development positions in intelligent systems and cybersecurity. As shown in Table 2, the number of jobs for computer and information research scientists is expected to increase by more than 23 percent in Florida over the next eight years, with an average of 244 job openings each year. The current median salary for computer information and research scientists in Florida is $115,000.

The workforce demand for postsecondary faculty in computer science is also projected to grow in Florida and nationally. As shown in Table 2, the demand for postsecondary faculty in computer science is projected to grow by more than 11 percent in Florida over the next eight years. This growth amounts to an average of 937 job openings in Florida each year. The current median salary for postsecondary teachers in computer science in Florida is $82,000.

Table 2: Labor Market Demand, CIP Code 11.0101

Occupations	Percent Change in Job Openings		Annual Average Job Openings		Total # of New Jobs		Education Level Needed for Entry
	FL 2023-31	U.S. 2022-32	FL 2023-31	U.S. 2022-32	FL 2023-31	U.S. 2022-32	
Computer and Information Research Scientists	23.5%	22.7%	244	3,400	537	8,300	Master's Degree
Computer Science Teachers, Postsecondary	11.7%	5.3%	937	3,600	1,068	2,200	Doctoral or Professional Degree

Sources: U.S. Bureau of Labor Statistics, https://data.bls.gov/projections/occupationProj; Florida Department of Commerce, http://www.floridajobs.org/labor-market-information/data-center/statistical- programs/employment-projection
Date Retrieved: 3/12/2024

Student Demand and Projected Enrollment

The University of North Florida surveyed current undergraduate and graduate students in computing to determine their interest in the proposed program. Of the 67 survey respondents, 57 students expressed their interest in pursuing UNF's Ph.D. in Computing. Fifty-four students surveyed wanted more information about the proposed program.

The University of North Florida anticipates enrolling three students in Year 1 and growing incrementally to an expected enrollment of 12 students in Year 5, as shown in Table 3.

Table 3: Projected Student Enrollment

	Student Headcount	Student FTE
Year 1	3	2.25
Year 2	6	4.5
Year 3	9	6.75
Year 4	12	9
Year 5	12	9

Source: University of North Florida Ph.D. in Computing Proposal

Alignment with Institutional and System Strategic Priorities

The proposed program will address northeast Florida's need for computing professionals and advanced-level researchers and is aligned with UNF's mission. The University of North Florida's 2023-2028 Strategic Plan identifies data science, cybersecurity, and information technologies as one of five areas of focus for the institution. The proposed program aligns with the plan to work with industry leaders to enhance programming to address cybersecurity, technology management, and evolving technology trends.

The proposed Ph.D. program in Computing supports the 2025 System Strategic Plan's goals in teaching and learning; scholarship, research, and innovation; and community and business engagement. The program aligns with the System's goals to increase degrees in science, technology, engineering, and mathematics (STEM) and Programs of Strategic Emphasis. The proposed program concentrations in this advanced research-based degree will prepare graduates to meet the workforce demands and promote economic and technological development.

Estimate of Investment

The proposed program will be funded through Education and General funds. As shown in Table 4, the institution intends to expend $36,279 in Year 1 and $75,485 in Year 5. The program will charge students the standard approved graduate tuition rates, which are currently $493.53 per credit hour for resident students and $1,044.27 for non-resident students.

Table 4: Projected Program Costs

Total Costs		Source	Cost per FTE
		E&G	
Year 1	$36,279	$36,279	$16,124
Year 5	$75,485	$75,485	$8,387

Source: University of North Florida Ph.D. in Computing Proposal

Appendix A

Assessment of the University Review Process in accordance with Board of Governors Regulation 8.011
Prior to submitting a program proposal to the Board of Governors' office, the institution and its board of trustees are required to ensure that all programs meet the requirements of Board of Governors Regulation 8.011. Section C is an assessment of the university's review process to ensure that all criteria have been considered.

ACCOUNTABILITY

Check either the "yes" or "no" box and make comments beneath the criterion as appropriate.

1. *Overall* – *The proposal is in the correct format, includes all necessary signatures, and contains complete and accurate tables for enrollment projections, faculty effort, and the proposed budget.*

YES   NO

☒   ☐   **The proposal has been approved by the university board of trustees and includes all required signatures.**

The University of North Florida Board of Trustees approved the program proposal at their December 8, 2023, meeting.

☒   ☐   **The university has provided a proposal written in the standard State University System format, which addresses new academic program approval criteria outlined in Board of Governors Regulation 8.011.**

The University of North Florida submitted the proposed program in the correct format.

☒   ☐   Yes checked box**The pre-proposal was reviewed by the Council of Academic Vice Presidents Academic Coordination Group, and any concerns identified by the group have been listed and addressed in the proposal.**

The Council of Academic Vice Presidents Academic Coordination Group reviewed the pre-proposal on April 7, 2021, and no concerns were expressed.

☒   ☐   **The university has provided data that supports the need for an additional program in the State University System, as well as letters of support or concern from the provosts of other state universities with substantially similar programs.**

The proposed Ph.D. in Computing would be the sixth in the System in CIP 11.0101. Additionally, three similar programs in CIP 11.0401 and one in CIP 11.0201 are offered by other universities in the System. The chairs of these programs were contacted in 2021 by the former Director of the University of North Florida's School of Computing, and those chairs had no objection to the proposed program. No impact on those programs is expected.

☒   ☐   **The university has provided complete and accurate projected enrollment, faculty effort, and budget tables that are in alignment with each other.**

The University of North Florida submitted all required tables in Appendix A of the proposal.

☒   ☐   **The university has included a statement in the proposal signed by the equity officer as to how this proposal will meet the need and demand section of the proposal.**

The equity officer signed the proposal on September 11, 2023, regarding the review of the need and demand section of the proposal.

☒   ☐   **The program does not substantially duplicate programs at FAMU; if it does, evidence was provided that consultations have occurred with the university on the impact of the new program on existing programs.**

The proposed program does not duplicate an existing Florida Agricultural and Mechanical University program.

2. Budget – The proposal presents a complete and realistic budget for the program consistent with university and Board of Governors policy and shows that any redirection of funding will not have an unjustified negative impact on other needed programs.

YES   NO

☒   ☐   **The University Board of Trustees has approved the most recent budget for this proposal.**

The budget for the proposed program was approved in conjunction with the full proposal by the UNF Board of Trustees on December 8, 2023.

☒   ☐   **The university has reviewed the budget for the program to ensure that it is complete and reasonable, and the budget appears to align with expenditures by similar programs at other system institutions.**

The university provided estimated enrollment and growth for the proposed program with the projected costs and funding sources.

☐   ☒   **The proposal indicates that the program will follow the cost-recovery or market-rate funding models.   If so, details and timelines for getting approvals for these funding models are included in the proposal.**

The proposed program will operate with E&G funding and will not follow the cost-recovery or market-rate funding models.

YES   NO

☒   ☐   **If resources within the institution are redirected to support the new program, the university has identified this redirection and determined that it will not negatively impact undergraduate education, or the university has provided a reasonable explanation for any impact of this redirection.**

The University of North Florida anticipates that implementation of the program will yield no negative impact on related programs.

READINESS

Check either the "yes" or "no" box and make comments beneath the criterion as appropriate.

3. Program Quality – The proposal provides evidence that the university planning activities have been sufficient, and responses to any recommendations to program reviews or accreditation activities in the discipline pertinent to the proposed program have been addressed.

YES   NO

☒   ☐   **The university has followed a collaborative planning process for the proposed program in accordance with policies and procedures adopted by the university board of trustees.**

The University of North Florida provided a narrative and chronological table of events that occurred during the development of the proposal, as well as a list of the campus constituents involved. The table and narrative provide sufficient evidence that the institution followed a collaborative planning process according to the policies and procedures adopted by the UNF Board of Trustees.

☒   ☐   **An external consultant has reviewed the proposal and supports the department's capability of successfully implementing this new program.**

Dr. Donna Reese, Computer Science Professor Emerita at Mississippi State University, reviewed the proposal. Following the review, Dr. Reese offered feedback and provided a letter of support for the program.

☒   ☐   **The university has found the level of progress that the department has made in implementing the recommendations from program reviews or accreditation activities in the discipline pertinent to the proposed program to be satisfactory.**

The most recent reviews of all these programs in the discipline pertinent to the proposed program are satisfactory. The bachelor's of science program in computing is accredited by the Accreditation Board for Engineering and Technology, and the next review of these programs is anticipated in 2025.

☒   ☐   **The university has analyzed the feasibility of providing all or a portion of the proposed program through distance learning.**

The proposed program would be offered via traditional delivery.

YES   NO

☐   ☒   **The university has made allowances for licensure and legislative approval.**

No applicable licensure or legislative approval is required for the proposed program.

4. Curriculum - *The proposal provides evidence that the university has evaluated the proposed curriculum and found that it describes an appropriate and sequenced course of study and that the university has evaluated the appropriateness of specialized accreditation for the program.*

YES   NO

☒   ☐   **The university has reviewed the curriculum and found that the course of study presented is appropriate to meet specific learning outcomes and industry-driven competencies discussed in the proposal.**

The institution has provided the curriculum for the proposed program, and the coursework is designed to meet learning outcomes for the degree and industry-driven competencies. The Computing Advisory Board, consisting of professionals from the information technology sector in Jacksonville, assisted in developing the curriculum.

☐   ☒   **The university anticipates seeking accreditation for the proposed doctoral program or provides a reasonable explanation as to why accreditation is not being sought.**

No specialized accrediting bodies are available for the proposed doctoral program.

5. Faculty – *The proposal provides evidence that the university is prepared to ensure a critical mass of faculty will be available to initiate the program based on estimated enrollments and that faculty, in the aggregate, have the necessary experience and research activity to sustain a doctoral program.*

YES   NO

☒   ☐   **The university has reviewed the evidence provided and found that there is a critical mass of faculty available to initiate the program based on estimated enrollments.**

The institution has identified 16 existing faculty members and plans to hire three faculty members who will contribute to the proposed program in the next four years.

☒   ☐   **The university has reviewed the evidence provided and found that the faculty, in aggregate, has the necessary experience and research activity to sustain the program.**

The institution provided multiple examples showing that the faculty associated with the proposed program has been productive in teaching, research, and service**.**

YES   NO

☒   ☐   **If appropriate, the university has committed to hiring additional faculty in later years based on estimated enrollments.**

The institution reported three new faculty members would be hired in the next four years.

6. Resources – *The proposal provides evidence that the university has ensured the available library volumes and serials, classroom, teaching laboratory, research laboratory, office space, equipment, clinical and internship sites, fellowships, scholarships, and graduate assistantships will be sufficient to initiate the program, and that, if applicable, funding has been secured to make more resources available as students proceed through the program.*

YES   NO

☒   ☐   **The university has provided a signed statement from the library director verifying that the library volumes and serials available are sufficient to initiate the program.**

The library director signed the proposal on August 31, 2023.

☒   ☐   **The university has ensured that the physical space necessary for the proposed program, including classrooms, laboratories, and office space, is sufficient to initiate the program.**

The University of North Florida noted that no specialized space is needed to implement the proposed program. Facilities already used for research by students in the School of Computing will be available for the proposed program.

☒   ☐   **The university has ensured that the necessary equipment is available to initiate the program.**

The University of North Florida indicated that no equipment is needed to implement the proposed program.

☐   ☒   **The university has ensured that fellowships, scholarships, and graduate assistantships are sufficient to initiate the program.**

The University of North Florida reported that two graduate assistantships per year will be available.   The institution has allocated $25,000 per year for the assistantships. Additionally, $5,000 each year will fund student travel, conference registration for students, and other means of student support.

☐   ☒   **If applicable, the university has ensured that the department has arranged a suitable number of clinical sites and internships.**

This is not applicable because the program does not require clinicals or internships.

STATE UNIVERSITY SYSTEM OF FLORIDA

UNIVERSITY of WEST FLORIDA

FLORIDA STATE UNIVERSITY
VIRES ARTES MORES
1851

FAMU [FLORIDA AGRICULTURAL AND MECHANICAL UNIVERSITY]

UNF UNIVERSITY of NORTH FLORIDA.

UCF UNIVERSITY OF CENTRAL FLORIDA

UF | UNIVERSITY of FLORIDA

FLORIDA POLYTECHNIC UNIVERSITY.

UNIVERSITY OF SOUTH FLORIDA

New College THE HONORS COLLEGE of Florida

FLORIDA ATLANTIC UNIVERSITY

Florida Gulf Coast University

FIU