Board of Governors, State University System of Florida
Request to Offer a New Degree Program
(Please do not revise this proposal format without prior approval from Board staff)

University of West Florida	**Fall 2018**
University Submitting Proposal	Proposed Implementation Term
Hal Marcus College of Science and Engineering	**Computer Science**
Name of College(s) or School(s)	Name of Department(s)/ Division(s)
Computer Science	**Bachelor of Science in Cybersecurity**
Academic Specialty or Field	Complete Name of Degree

11.1003
Proposed CIP Code

The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met prior to the initiation of the program.

Date Approved by the University Board of Trustees		President	Date
Signature of Chair, Board of Trustees	Date	Provost and Senior Vice President	Date

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1 in Appendix A. Indicate the program costs for the first and the fifth years of implementation as shown in the appropriate columns in Table 2 in Appendix A. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

Implementation Timeframe	Projected Enrollment (From Table 1)		Projected Program Costs (From Table 2)				
	HC	FTE	E&G Cost per FTE	E&G Funds	Contract & Grants Funds	Auxiliary Funds	Total Cost
Year 1	160	103.34	2,540	262,468	0	0	262,468
Year 2	175	113.02					
Year 3	190	122.71					
Year 4	215	138.86					
Year 5	230	148.54	3,126	464,343	0	0	464,343

Note: This outline and the questions pertaining to each section <u>must be reproduced</u> within the body of the proposal to ensure that all sections have been satisfactorily addressed. Tables 1 through 4 are to be included as Appendix A and not reproduced within the body of the proposals because this often causes errors in the automatic calculations.

INTRODUCTION

I. **Program Description and Relationship to System-Level Goals**

    A. **Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.**

The University of West Florida (UWF) seeks to offer a Bachelor of Science in Cybersecurity degree program consisting of 120 semester credit hours to be delivered in traditional format on the main Pensacola campus. The Hal Marcus College of Science and Engineering's Department of Computer Science at UWF has offered a Cybersecurity specialization within the Computing and Information Sciences degree program, CIP Code 11.0101, since fall 2014. The stand-alone Cybersecurity degree program, CIP Code 11.1003, is broadly designed to prepare students who seek entry-level work in the rapidly expanding field of cybersecurity. In 2016, UWF and the Cybersecurity specialization were designated as a National Center of Academic Excellence in Cyber Defense Education by the National Security Agency and the Department of Homeland Security.

UWF seeks to create a stand-alone Cybersecurity degree program for the following reasons:
- Converting the current Cybersecurity specialization into a stand-alone degree program allows UWF to market its programs more effectively to students.
- The curriculum of the proposed Cybersecurity program conforms to National Security Agency requirements for the designation of UWF as a Center for Academic Excellence. A stand-alone degree program in Cybersecurity will enable the university to highlight distinctions and recognitions received from this designation.
- Cybersecurity skills are in high demand by the public and private sectors.
- Nationwide, universities are not producing enough graduates to meet the cybersecurity job openings.

The Florida Board of Governors has recognized the need to expand cybersecurity education and research within the state and in 2013 established the Florida Center for Cybersecurity for State University System (SUS) institutions to collaborate on cybersecurity related initiatives. UWF is an active member of the Florida Center for Cybersecurity and has been engaging with other SUS institutions on research collaborations and educational programs. The proposed Cybersecurity degree program fits within the Board of Governor's vision for Florida to become a leader in cybersecurity education and research. Opportunities for employment and demand for graduates are discussed in the need and demand sections (II.A and II.B) of this request.

    B. **Please provide the date when the pre-proposal was presented to CAVP (Council of Academic Vice Presidents) Academic Program Coordination review group. Identify any concerns that the CAVP review group raised with the pre-proposed program and provide a brief narrative explaining how each of these concerns has been or is being addressed.**

During its October 5, 2017, conference call, the CAVP workgroup expressed no concerns with UWF developing a stand-alone BS in Cybersecurity degree program (Cip Code 11.1003).

> **C.** **If this is a doctoral level program please include the external consultant's report at the end of the proposal as Appendix D. Please provide a few highlights from the report and describe ways in which the report affected the approval process at the university.**

Not applicable, the Cybersecurity degree program is an undergraduate degree.

> **D.** **Describe how the proposed program is consistent with the current State University System (SUS) Strategic Planning Goals. Identify which specific goals the program will directly support and which goals the program will indirectly support (see link to the SUS Strategic Plan on the resource page for new program proposal).**

Teaching and Learning – Increase the Number of Degrees Awarded in STEM:

State University System Strategic Planning Goals identify Cybersecurity 11.1003 in the SUS Programs of Strategic Emphasis under Science, Technology, Engineering, and Math (STEM). UWF's program will provide students with an extensive background in cybersecurity and will enable graduates to seek employment opportunities in government, industry, and with non-governmental organizations.

Specific sections from the SUS Strategic Plan 2012-2025 that apply to the BS in Cybersecurity degree program, and to the reason for the change from a specialization to a stand-alone degree program, include the following:

> State universities have prioritized the coordination of academic program delivery in order to optimize resources, to expand efficiencies, and to respond to workforce demands for graduates with specific knowledge and skills. Specifically, university goals are being set to increase the number of graduates with degrees in the STEM fields. UWF's proposed Cybersecurity degree program directly supports this goal.

> Florida seeks to become more competitive in the national and global economy. To accomplish this, the state must increase the educational attainment levels of its citizens. State universities including UWF are responding by offering more degree programs in specific high demand fields, particularly the STEM disciplines.

Strategic Priorities for a Knowledge Economy

As part of its strategic planning activities, the Board of Governors, in conjunction with Florida's leading economic and workforce councils, approved areas of programmatic strategic emphasis for targeting degree programs in the State University System. This list of programs includes certain STEM degree programs and programs with critical and/or economic development needs or emerging technologies. These programs serve to assist the state universities in planning for a

degree program array that addresses both workforce and student demands. As a STEM discipline, the BS in Cybersecurity degree program helps the state accomplish this goal.

E. If the program is to be included in a category within the Programs of Strategic Emphasis as described in the SUS Strategic Plan, please indicate the category and the justification for inclusion.

The Cybersecurity degree program, CIP Code 11.1003, is listed in the Florida Board of Governor's Programs of Strategic Emphasis under:
Information Technology - STEM

Please see the Programs of Strategic Emphasis (PSE) methodology for additional explanations on program inclusion criteria at the resource page for new program proposal.

F. Identify any established or planned educational sites at which the program is expected to be offered and indicate whether it will be offered only at sites other than the main campus.

The Cybersecurity degree program will be offered in the traditional face-to-face format on the UWF main Pensacola campus.

INSTITUTIONAL AND STATE LEVEL ACCOUNTABILITY

II.   Need and Demand

A. Need: Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service that the program would fulfill.

Due to high demand for cybersecurity expertise, UWF's Cybersecurity specialization has experienced a steady increase in enrollment. The Department of Computer Science expects enrollment increases to continue (See Appendix A Table 1) through Year 5.

National

The United States Bureau of Labor Statistics, projects career opportunities for graduates with a bachelor's degree in cybersecurity to grow by 18% from 2014 to 2024 with median wages well above the national average. Expected growth should come from government and industries that require specialists due to the barrage of cybersecurity attacks on private and public cyber infrastructure and data. The Bureau of Labor Statistics Occupational Outlook Handbook labels the category for those who work to protect a company's computer systems as Information Security Analyst.

Table 2. National Data for Information Security Analysts

Information Security Analysts - National Data	
National Job Outlook 2014-2024	18% Growth
Typical Entry Level Education Required	Bachelor's Degree
Work Experience in a Related Occupation Required	Less Than Five Years
On the Job Training Required	None
2014 Median Annual Pay	$82,900
2016 Median Annual Pay	$92,600

Bureau of Labor Statistics Occupational Outlook Handbook https://www.bls.gov/ooh/computer-and-information-technology/information-security-analysts.htm

State

In the 12-month period July 2015 – June 2016, Florida had more than 15,000 new job openings in cybersecurity. The state lacks enough qualified job seekers to fill these openings. The dangerous shortage threatens to put Florida's cyber infrastructure at risk.

A 20% growth rate is expected for Information Security Analysts in Florida as can be seen in *Table 3, Projections for Information Security Analysts (Standard Occupational Code: 151122) in the State of Florida*. At all levels (entry level, average and experienced), Florida wages are well above average for this employment sector.

Table 3. Projections for Information Security Analysts (Standard Occupational Code: 151122) in the State of Florida

Information Security Analyst - Florida		
2017 Wages		
Entry	**Average**	**Experienced**
$55,508	$85,503	$100,500
Occupational Projections - Florida		
2025 Projected Employment	**Growth Rate**	**Total Job Openings**
5,987	20%	3,713

Florida Department of Economic Opportunity http://www.floridajobs.org/labor-market-information/data-center/statistical-programs/employment-projections

Local

Northwest Florida is home to numerous military bases and contractors as well as a variety of companies and government agencies with high-tech needs. The Department of Homeland Security and large defense contractors including Northrop Grumman, Raytheon, and Lockheed Martin have recently expanded their cybersecurity operations in the region. UWF students who graduate with a BS in Cybersecurity degree will be able to contribute to the needs of those employers and provide a positive impact on the local economy.

B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with prospective students.

As the proposed stand-alone Cybersecurity degree program is replacing an existing specialization, there are data from past years. Fall 2014 enrollment was 21 students, fall 2015 enrollment increased three-fold to 64, and for fall 2016, enrollment nearly doubled to 118 individuals. In fall, 2017 more than 140 students enrolled in UWF's Cybersecurity specialization. Due to the availability of high paying positions for graduates with cybersecurity skills, UWF expects enrollment increases for the stand-alone Cybersecurity degree program to continue.

C. If substantially similar programs (generally at the four-digit CIP Code or 60 percent similar in core courses), either private or public exist in the state, identify the institution(s) and geographic location(s). Summarize the outcome(s) of communication with such programs with regard to the potential impact on their enrollment and opportunities for possible collaboration (instruction and research). In Appendix C, provide data that support the need for an additional program.

No other SUS institution offers a bachelor's degree program in CIP Code 11.1003. Florida International University offers a master's degree program in Computer and Information Systems Security/Information Assurance in CIP Code 11.1003. UWF's program follows the Department of Homeland Security/National Security Agency curriculum guidelines and will be the first baccalaureate level degree program of its kind in the state. Due to the absence of a similar program in the SUS, no communication with other institutions has been undertaken. During its October 5, 2017, conference call the CAVP workgroup expressed no concerns with UWF's proposed BS in Cybersecurity degree program.

D. Use Table 1 in Appendix A (1-A for undergraduate and 1-B for graduate) to categorize projected student headcount (HC) and Full Time Equivalents (FTE) according to primary sources. Generally undergraduate FTE will be calculated as 40 credit hours per year and graduate FTE will be calculated as 32 credit hours per year. Describe the rationale underlying enrollment projections. If students within the institution are expected to change majors to enroll in the proposed program at its inception, describe the shifts from disciplines that will likely occur.

As the proposed Cybersecurity degree program is replacing an existing specialization, there are enrollment data from past years from the Cybersecurity specialization. The Department of Computer Science expects enrollment to increase, as the field is relatively new and in an area of substantial interest to students seeking a computer-related career (Appendix A, Table 1).

As shown in Appendix A Table 1, the Department of Computer Science anticipates Year 1 enrollment in the stand-alone Cybersecurity degree program to be 160 students with an FTE of 103.34. Continual growth places Year 5 enrollment at 230 students with an FTE of 148.54.

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E. Indicate what steps will be taken to achieve a diverse student body in this program. If the proposed program substantially duplicates a program at FAMU or FIU, provide, (in consultation with the affected university), an analysis of how the program might have an impact upon that university's ability to attract students of races different from that which is predominant on their campus in the subject program. <u>The university's Equal Opportunity Officer shall review this section of the proposal and then sign and date Appendix B to indicate that the analysis required by this subsection has been completed.</u>

Consistent with its mission, UWF has admissions policies that balance attention to access, inclusiveness, and quality. In addition, UWF encourages applications from qualified persons and does not discriminate on the basis of age, color, disability, gender (including gender identity and sex), marital status, national origin, race, religion, sexual orientation, or veteran status. UWF's New Academic Program Approval Policy requires that programs appropriately address diversity. Therefore, the university and its degree programs take proactive measures to achieve a diverse student body.

To ensure the desired outcome for student diversity, recruiting efforts initially focus on the university's eight-county service area: Escambia, Santa Rosa, Okaloosa, Walton, Holmes, Washington, Bay, and Gulf. Recruitment efforts also extend to other geographic regions having larger underrepresented populations of prospective students.

The proposed Cybersecurity degree program will be marketed to multiple student segments: first-time-in-college, entering freshmen and transfer students, professionals desiring to enhance their credentials, and military personnel desiring to enhance their skills and enter the civilian workforce. Program faculty and staff employ multiple outreach methods to ensure diversity in the program. The faculty have attended and will continue to attend new student orientations to showcase UWF's Cybersecurity degree program and to discuss coursework and career goals with new students. The Hal Marcus College of Science and Engineering will implement a comprehensive marketing campaign to promote the proposed Cybersecurity degree program to the aforementioned student segments.

The Hal Marcus College of Science and Engineering currently attracts a diverse student body to the Department of Computer Science, and program coordinators anticipate a continued trend of increasing diversity of students in the stand-alone degree program (Figure 1).
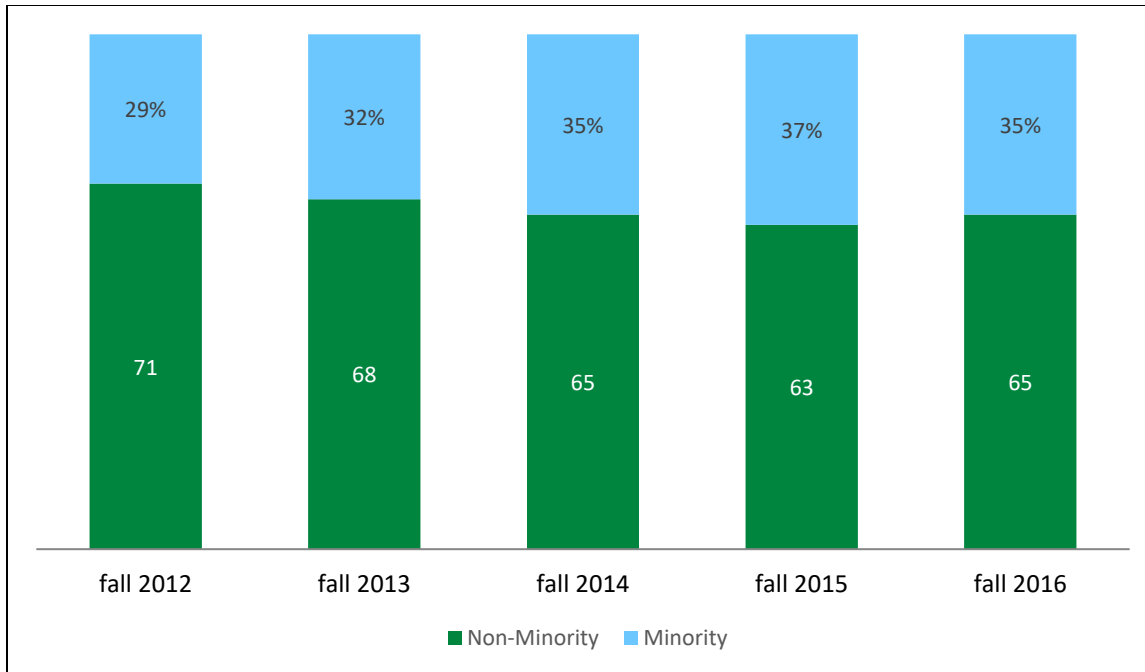
Figure 1. Five-year comparison of diversity in UWF's current Computer Science degree program.

III.   Budget

A. Use Table 2 in Appendix A to display projected costs and associated funding sources for Year 1 and Year 5 of program operation. Use Table 3 in Appendix A to show how existing Education & General funds will be shifted to support the new program in Year 1. In narrative form, summarize the contents of both tables, identifying the source of both current and new resources to be devoted to the proposed program. (Data for Year 1 and Year 5 reflect snapshots in time rather than cumulative costs.)

As the proposed Cybersecurity degree program is replacing in purpose and resource use an existing specialization, the funds currently utilized for the specialization will be shifted to the stand-alone degree program. The total reallocated base for the program shown in Appendix A Table 3 is $262,468. The main costs for the program are faculty salaries and benefits ($215,182 Year 1, $429,555 Year 5), A&P salaries and benefits ($10,500 Year 1, $13,400 Year 5), and adjunct expenses ($30,000 Year 1, $15,000 Year 5). Adjunct expenses decrease in Year 5 as the department will add two new faculty lines in fall 2019 and fall 2020 respectively. All costs are based on current and projected use in the current Cybersecurity specialization and come from E&G funds.

B. **Please explain whether the university intends to operate the program through continuing education on a cost-recovery basis, seek approval for market tuition rate, or establish differentiated graduate-level tuition. Provide a rationale for doing so and a timeline for seeking Board of Governors' approval, if appropriate. Please include the expected rate of tuition that the university plans to charge for this program and use this amount when calculating cost entries in Table 2.**

UWF does not intend to operate the program through continuing education on a cost-recovery basis, seek approval for market tuition rate, or establish differentiated graduate-level tuition.

C. **If other programs will be impacted by a reallocation of resources for the proposed program, identify the impacted programs and provide a justification for reallocating resources. Specifically address the potential negative impacts that implementation of the proposed program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants). Explain what steps will be taken to mitigate any such impacts. Also, discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate research opportunities, improved quality of instruction associated with cutting-edge research, improved labs and library resources).**

As the proposed Cybersecurity degree program is replacing an existing specialization, the Department of Computer Science does not expect any impact to other programs by converting to a stand-alone degree program.

D. **Describe other potential impacts on related programs or departments (e.g., increased need for general education or common prerequisite courses, or increased need for required or elective courses outside of the proposed major).**

As the proposed Cybersecurity degree program is replacing an existing specialization, no impact on related programs is anticipated by converting the specialization into a stand-alone degree program. No additional general education courses will be needed to fulfill this requirement of the stand-alone degree program.

E. **Describe what steps have been taken to obtain information regarding resources (financial and in-kind) available outside the institution (businesses, industrial organizations, governmental entities, etc.). Describe the external resources that appear to be available to support the proposed program.**

Support for students in the stand-alone degree program in Cybersecurity is already in place. The Center for Cybersecurity, located within UWF's Innovation Institute, is the regional hub for

cybersecurity education and research, outreach activities, and industry partnerships. Each year, the Center for Cybersecurity provides support to approximately 16 cybersecurity students. Eligible students receive $1,000 in the fall and spring semesters and $500 in the summer semester, up to $2,500 total for the year (http://uwf.edu/centers/center-for-cybersecurity/education/scholarships/).

IV.   Projected Benefit of the Program to the University, Local Community, and State

> **Use information from Tables 1 and 2 in Appendix A, and the supporting narrative for "Need and Demand" to prepare a concise statement that describes the projected benefit to the university, local community, and the state if the program is implemented. The projected benefits can be both quantitative and qualitative in nature, but there needs to be a clear distinction made between the two in the narrative.**

Cybersecurity is an important, emerging, and expanding field. The proposed degree program will prepare students for entry into cybersecurity work. Year 1 through Year 5 program enrollment is based on past and current enrollment in the Cybersecurity specialization. Students in the specialization will shift to the stand-alone Cybersecurity degree program, continuing the same benefits to the university, community, and state. The Cybersecurity specialization was awarded the National Security Agency and the Department of Homeland Security Center for Academic Excellence in Cybersecurity designation in 2016.

V.   Access and Articulation – Bachelor's Degrees Only

> **A. If the total number of credit hours to earn a degree exceeds 120, provide a justification for an exception to the policy of a 120 maximum and submit a separate request to the Board of Governors for an exception along with notification of the program's approval. (See criteria in Board of Governors Regulation 6C-8.014)**

Not applicable, the proposed undergraduate Cybersecurity degree program is 120 credit hours.

> **B. List program prerequisites and provide assurance that they are the same as the approved common prerequisites for other such degree programs within the SUS (see link to the Common Prerequisite Manual on the resource page for new program proposal). The courses in the Common Prerequisite Counseling Manual are intended to be those that are required of both native and transfer students prior to entrance to the major program, not simply lower-level courses that are required prior to graduation. The common prerequisites and substitute courses are mandatory for all institution programs listed, and must be approved by the Articulation Coordinating Committee (ACC). This requirement includes those programs designated as "limited access."**

> **If the proposed prerequisites are not listed in the Manual, provide a rationale for**

a request for exception to the policy of common prerequisites. NOTE: Typically, all lower-division courses required for admission into the major will be considered prerequisites. The curriculum can require lower-division courses that are not prerequisites for admission into the major, as long as those courses are built into the curriculum for the upper-level 60 credit hours. If there are already common prerequisites for other degree programs with the same proposed CIP, every effort must be made to utilize the previously approved prerequisites instead of recommending an additional "track" of prerequisites for that CIP. Additional tracks may not be approved by the ACC, thereby holding up the full approval of the degree program. Programs will not be entered into the State University System Inventory until any exceptions to the approved common prerequisites are approved by the ACC.

Common Prerequisites

UWF's proposed stand-alone degree program in Cybersecurity will be the first baccalaureate level program on the Board of Governor's Approved Academic Program Inventory in CIP Code 11.1003. The Department of Computer Science selected prerequisite courses to meet requirements for the Center for Academic Excellence in Cybersecurity designation. On October 16, 2017, University of West Florida's Common Prerequisite Liaison submitted a Common Prerequisite Application on behalf of the proposed Cybersecurity degree program CIP 11.1003. In spring 2018, the Education Faculty Discipline Committee for Common Prerequisites will be voting on these prerequisites.

The Cybersecurity degree program will require students to complete the common prerequisites prior to graduation. The common prerequisites will not be required for admission to the degree program.

Table 3. Common Prerequisites for the Cybersecurity Degree Program

Course Prefix and Number	Title of Course	Semester Credit Hours (SCH)
COPXXXX	Introductory Programming in C, C++, Java, or equivalent language	3
MACX311	Analytic Geometry & Calculus I	4
MACX312	Analytic Geometry & Calculus II	4
PHYX048L	University Physics I and Lab	4
STAX023	Elements of Statistics	3
XXXXXXX	Science course for science majors	3

> **C. If the university intends to seek formal Limited Access status for the proposed program, provide a rationale that includes an analysis of diversity issues with respect to such a designation. Explain how the university will ensure that Florida College System transfer students are not disadvantaged**

by the Limited Access status. NOTE: The policy and criteria for Limited Access are identified in Board of Governors Regulation 6C-8.013. Submit the Limited Access Program Request form along with this document.

Not applicable, the proposed Cybersecurity degree program will not be limited access.

D. If the proposed program is an AS-to-BS capstone, ensure that it adheres to the guidelines approved by the Articulation Coordinating Committee for such programs, as set forth in Rule 6A-10.024 (see link to the Statewide Articulation Manual on the resource page for new program proposal). List the prerequisites, if any, including the specific AS degrees which may transfer into the program.

Not applicable, the proposed Cybersecurity degree program will not be an AS-to-BS capstone.

INSTITUTIONAL READINESS

VI.   Related Institutional Mission and Strength

A. Describe how the goals of the proposed program relate to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan (see link to the SUS Strategic Plan on the resource page for new program proposal).

Our mission at UWF is to:
- Provide high-quality undergraduate and graduate education,
- Conduct teaching and research that services the body of knowledge, and
- Contribute to the needs of professions and society.

As is demonstrated by its designation as a National Center of Academic Excellence in Cyber Defense Education by the National Security Agency and the Department of Homeland Security, UWF's proposed Cybersecurity degree program fulfills the university's mission to provide high-quality undergraduate education. The Cybersecurity degree program's curriculum provides a solid background for graduates to enter the cybersecurity field, fulfilling UWF's goal of contributing to the needs of professions and society. Graduates of the program will be well positioned to fill cybersecurity employment opportunities locally, regionally, and nationally thereby enhancing the quality of life in the region, state, and nation.

B. Describe how the proposed program specifically relates to existing institutional strengths, such as programs of emphasis, other academic programs, and/or institutes and centers.

The Center for Cybersecurity, located within UWF's Innovation Institute, is the regional hub for cybersecurity education and research, outreach activities and industry partnerships. The Center for Cybersecurity Pathways to Cyber Program offers two combination camps for high school students and teachers. The stand-alone degree program in Cybersecurity will serve as a platform

for the statewide initiative to increase interest in cybersecurity careers and workforce diversity, enhance cybersecurity awareness as well as improve cybersecurity content and teaching methods for high school curricula. Many of the activities sponsored by the UWF Center for Cybersecurity directly support the proposed stand-alone Cybersecurity degree program.

The Department of Computer Science department also offers degree programs in traditional Computer Science and in Computer Information Systems. Most faculty in the Computer Science Department teach courses that are taken by students in all degrees and specializations, and are available as mentors for undergraduate research experiences in all degrees/specializations. Due to the broad background required in science and mathematics, students in the undergraduate Cybersecurity degree program will also interact with faculty in the departments of Physics, Mathematics, and other natural sciences.

> **C. Provide a narrative of the planning process leading up to submission of this proposal. Include a chronology in table format of the activities, listing both university personnel directly involved and external individuals who participated in planning. Provide a timetable of events necessary for the implementation of the proposed program.**

As the proposed Cybersecurity degree program is replacing in purpose and resource use an existing specialization, the basic structure of the program is already in place. The planning process included consultation with Department of Computer Science faculty and members of the Hal Marcus College of Science and Engineering's Dean's Office. The major planning steps included:
- defining how the Department of Computer Science will reorganize its specializations into separate degree programs,
- reviewing the Cybersecurity degree program curriculum to ensure that it is clearly distinctive from the other proposed programs, and
- collecting background data for completion of the Request to Offer a New Program application.

Table 5. Planning Process for UWF's Cybersecurity Degree Program

Date	Participants	Planning Activity
Fall 2013 – Summer 2014	Computer Science Faculty	Development of Cybersecurity Curriculum
Fall 2014	Computer Science Faculty	Launch of the Cybersecurity specialization
December, 2015 – April 2016	Computer Science Faculty	Proposal and approval of National Center of Academic Excellence in Cyber Defense Education by the National Security Agency and the Department of Homeland Security

Date	Participants	Planning Activity
June 2017 - September 2017	Computer Science Faculty and members of ASPIRE	UWF Internal pre-proposal, CAVP proposal, and discussion of changes from Cybersecurity specialization to a stand-alone degree program
August, 2017 - December 2017	Computer Science Faculty and members of ASPIRE	Preparation of the Request to Offer the stand-alone degree program.

Table 6. Events Leading to Implementation

Date	Implementation Activity
October 2017	CAVP Conference Call
January-February 2018	Dean's Office and Provost's Office review
February, 2018	University of West Florida, BOT Education Subcommittee approval (prospective)
March 2018	University of West Florida, BOT approval (prospective)
June, 2018	Florida Board of Governor's approval (prospective)
August 2018	Start of fall 2018 semester with stand-alone program (prospective)

VII.   Program Quality Indicators - Reviews and Accreditation

Identify program reviews, accreditation visits, or internal reviews for any university degree programs related to the proposed program, especially any within the same academic unit. List all recommendations and summarize the institution's progress in implementing the recommendations.

Pursuant to Florida Board of Governor's Regulation 8.015, all academic departments at UWF conduct program reviews every seven years. The Department of Computer Science conducted its last program review in 2013-2014, prior to the implementation of the Cybersecurity specialization. The Department of Homeland Security and the National Security Agency granted Center of Academic Excellence status for the curriculum on April 27, 2016 (Appendix D).

VIII.   Curriculum

A. Describe the specific expected student learning outcomes associated with the proposed program. If a bachelor's degree program, include a web link to the Academic Learning Compact or include the document itself as an appendix.

See Appendix C for the Cybersecurity degree program Academic Learning Compact and Curriculum Map.

Student Learning Outcomes

UWF Cybersecurity graduates should be able to do the following:

Content
- Identify and analyze threats and vulnerabilities in systems, and develop secure computing solutions.

Critical Thinking
- Employ computing strategies to analyze and solve problems.

Communication
- Create and deliver effective oral presentations and written reports with appropriate tools and technologies.

Integrity/Values
- Describe ethical issues and responsibilities that relate to a computing professional.

Project Management
- Employ effective project-management skills to develop computing solutions either individually or through interdisciplinary teams within a global and societal context.

> **B. Describe the admission standards and graduation requirements for the program.**

The proposed Cybersecurity degree program is a traditional undergraduate degree program with no special considerations for admission other than those used by the University of West Florida. The department requires a minimum, grade of C- in all courses in the major to satisfy the 120 credit hours for graduation.

Admission and graduation requirements are available from the University of West Florida Catalog (Appendix F) (http://catalog.uwf.edu).

> **C. Describe the curricular framework for the proposed program, including number of credit hours and composition of required core courses, restricted electives, unrestricted electives, thesis requirements, and dissertation requirements. Identify the total numbers of semester credit hours for the degree.**

The Bachelor of Science in Cybersecurity degree program requires a total of 120 semester credit hours of coursework. The lower level portion of the degree program includes the common prerequisites, general education courses, and electives to total 60 semester credit hours. The upper level portion of the degree program includes the 48 semester credit hour Cybersecurity

core as well as 12 semester credit hours of 3000/4000 level advisor approved major-related electives to total 60 semester credit hours.

Cybersecurity Core Courses

CAP 4136	Malware Analysis[+]	3
CDA 3101	Introduction to Computer Organization [+]	3
CEN 4078	Secure Software Development [+]	3
CIS 4368	Introduction to Database Security [+]	3
CIS 4385	Ethical Hacking and Penetration Testing [+]	3
CIS 4595C	Capstone Systems Project [+]	3
CNT 4007	Theory and Fundamentals of Networks[+]	3
CNT 4403	Computer and Network Security [+]	3
CNT 4416	Cyber War Gaming [+]	3
COP 3014	Algorithm and Program Design [+]	3
COP 3022	Intermediate Computer Programming [+]	3
COP 3530	Data Structures and Algorithms I [+]	3
COP 4610	Theory and Fundamentals of Operating Systems[+]	3
COP 4710	Database Systems [+]	3
COT 3100	Discrete Structures[+]	3
CTS 4348	Linux System Administration [+]	3

Required Course Not Completed in Common Prerequisites

CIS 2530	Introduction to Cyber Security	

Total Hours	48

+ Indicates courses included in the major GPA

Major-Related Electives	12

Four 3000/4000 level advisor approved electives including courses in computer science, electrical and computer engineering, management information systems, criminal justice, applied sciences and industry certification courses.

Total semester credit hours (sch) lower level   60
Total semester credit hours upper level   60
Total semester credit hours for the degree program   120

      D. Provide a sequenced course of study for all majors, concentrations, or areas of emphasis within the proposed program.

The following is a four-year degree plan for the proposed BS in Cybersecurity degree program.

Table 7. Example of Four-Year Cybersecurity Degree Program Sequence

Freshman Year					
Semester 1			Semester 2		
Course No.	Course Name	SCH	Course No.	Course Name	SCH
ENC1101	English Comp. I	3	ENC1102	English Comp. II	3
GEN ED	Humanities	3	MAC1147	Precalc/Trig	4
GEN ED	Social Science	3	COPXXXX	Intro to Programming (P)	3
MAC1105	College Algebra	3	GEN ED	Social Science	3
GEN ED	Natural Science (P)	3	GEN ED	Humanities	3
		15			16*
Sophomore Year					
Semester 3			Semester 4		
Course No.	Course Name	SCH	Course No.	Course Name	SCH
CIS2530	Intro CyberSec	3	MAC2312	Calculus II (P)	4
MAC2311	Calculus I (P)	4	COP3530	Data Structure & Alg I	3
COP3014	Algorithm & Prog Design	3	COT3100	Discrete Structures	3
STA2023	Intro to Statistics (P)	3	PHY2048/L	University Physics (P)	4
GEN ED	Natural Science	3			
		16*			14
Junior Year					
Semester 5			Semester 6		
Course No.	Course Name	SCH	Course No.	Course Name	SCH
COP3022	Intermed Computer Programming	3	CNT4007	Theory & Fund of Networks	3
COP4710	Database Systems	3	CEN4078	Secure Soft Dev	3
CDA3101	Computer Org	3	COP4610	Theory & Fund OS	3
ELECT	Cybersecurity Elective	3	CAP 4136	Malware Analysis	3
ELECT	Elective	3	ELECT	Elective	3
		15			15
Senior Year					
Semester 7			Semester 8		
Course No.	Course Name	SCH	Course No.	Course Name	SCH

CNT4403	Comp & Net Security	3	CIS4595C	Capstone Systems Project	3
CIS4385	Ethical Hacking	3			
CIS4368	Database Security	3	CNT4416	Cyber War Gaming	3
ELECT	Cybersecurity Elective	3	ELECT	Cybersecurity Elective	3
ELECT	Elective	2**	ELECT	Cybersecurity Elective	3
			CTS4348	Linux SysAdmin	3
		14			15
Total SCH 120					
*Students who enter UWF with less than 60 semester hours must complete nine hours of summer semester enrollment at an SUS institution.					
**A sample of 2 semester hour courses are listed in Section VIII E.					
(P) Indicates the course is a Common Prerequisite					

E. Provide a one- or two-sentence description of each required or elective course.

All courses are in the University of West Florida catalog. The following is a listing by course prefix from the catalog (non-science general education courses not listed):

Prerequisites

COP XXXX Introductory programming in Java, C, C++ or equivalent language
Introduction to computer programming: variables, control constructs, functions or methods, file input and output, arrays.

MAC 2311 Analytic Geometry and Calculus I
Differential and Integral Calculus of Algebraic, Trigonometric, and Transcendental functions of single variables.

MAC 2312 Analytic Geometry and Calculus II
Application of the Definite Integral. Hyperbolic and Inverse Trigonometric Functions. Methods of Integration. Sequences and Infinite Series.

PHY 2048+L University Physics I (+Lab)
Linear and rotational motion of objects in 1, 2, and 3 dimensions, concepts of work and energy, oscillations and waves, heat and thermodynamics. Selected experiments in mechanics, oscillatory motion, and heat.

STA 2023 Elements of Statistics
Fundamental statistical concepts. Probability, inference, estimation, hypothesis testing.

Required

CAP 4136 Malware Analysis
This course covers software reverse engineering of executable code (or malware) to determine its function and affects or to recover the source code implementation.

CDA 3101 Introduction to Computer Organization
Introduction to the organization and operation of a digital computer including the internal representation of data and instructions, processor design and execution along with bus and I-O subsystems and assembly language programming.

CEN 4078 Secure Software Development
Examines the importance of building security into the design, implementation and testing phases of software development. Covers coding techniques that avoid known vulnerabilities and test strategies that can uncover previously unknown weaknesses.

CIS 2530 Introduction to Cyber Security
This course introduces students to cyber security. It provides information related to cyber threats as well as the basic security design and information assurance fundamentals. In addition, the course covers information assurance controlling laws and guidelines.

CIS 4368 Introduction to Database Security
This course is considered a core knowledge unit for institutions to be considered a Center of Academic Excellence. Database Security is designed to teach students how database systems are used, managed, and issues associated with protecting the associated data assets.

CIS 4385 Ethical Hacking and Penetration Testing
This course provides an understanding of how to effectively protect computer networks. Students will learn the tools and penetration testing methodologies used by ethical hackers.

CIS 4595C Capstone Systems Project
Develop a software system for a real-world client while working in small teams. Develop and deliver relevant artifacts such as a project proposal, design, test plan, code, user's manual, and project log with metrics as the software system evolves throughout the course.

CNT 4007 Theory and Fundamentals of Networks
A functional systematic examination of the key components and theories of modern computer networks, including protocol stack, mobile networking, network security, multimedia networking and network management. Emphasizes the Internet for studying network fundamentals and includes the use of tools to analyze network operations.

CNT 4403 Computer and Network Security
The course provides students with an understanding of the options available to mitigate threats within a system and teach students the techniques that can be taken to protect a network and communication assets from cyber threats.

CNT 4416 Cyber War Gaming
This course provides exercises that use different specialties (network, security, visualization, software, etc.) into color-coded red and blue teams that perform specific roles in attacking and defending IT infrastructures.

COP 3014 Algorithm and Program Design
An introduction to designing solutions to scientific problems. Emphasis on the use of basic programming constructs to create correct, efficient algorithms.

COP 3022 Intermediate Computer Programming
An intermediate course in object-oriented programming. Topics include object oriented modeling, algorithms, inheritance, polymorphism, input/output, exception will be on issues of object-oriented design and good programming practices.

COP 3530 Data Structures and Algorithms I
A first course in Data Structures and Algorithms. Topics will include traditional data structures with a major focus on design and analysis of algorithms and will include projects that stress mathematics and science.

COP 4610 Theory and Fundamentals of Operating Systems
A functional systematic examination of the key components and theories of a modern operating system, including process, thread management, synchronization, I/O, and memory management. Emphasizes using several modern operating systems and writing programming scripts to manipulate these operating system.

COP 4710 Database Systems
Introduction to database systems and database management system architectures. Various database models are discussed with an emphasis on the relational model and relational database design.

COT 3100 Discrete Structures
Foundations of Discrete Math with applications to modeling, programming and data structures. Propositional and predicate logic, sets, functions, sequences, summations, algorithms, analysis of algorithms, combinatorics, graphs. Emphasis is on developing programming skills. Can also be taken by CIS majors.

CTS 4348 Linux System Administration
This course focuses on the installation, configuration, and maintenance of modern, open-source operating systems in individual and corporate environments including computer networks that host a variety of servers and workstations.

Electives

CAP4601 Artificial Intelligence
Introduction to Artificial Intelligence principles and techniques. Students will learn about core AI techniques for solving complex problems, including search strategies, knowledge-based techniques, and agent-based systems.

CAP4770 Data Mining
Exposes students to data mining concepts and techniques and different data mining software. Covers data pre-processing and cleaning, concept hierarchy generation, attribute relevance analysis, association rule mining, classification algorithms, and cluster analysis.

CEN 3032 Software Engineering II
Focus on software design, implementation, and testing. Students will work in teams to develop software systems using the design principles discussed in class.

CCJ 3024 Criminal Justice System
Introductory analysis of the American criminal justice system. Structure, organization and process of the criminal justice system, the roles and responsibilities of criminal justice professionals, and the dynamics of the justice system in a democratic society.

CCJ 3014 Criminology
Examines the causes, types, and patterns of crime in society. Major schools of thought and current research are introduced, compared, and contrasted in the study of crime and its social context.

CCJ 4644 White Collar Crime
Considers the question "what is white-collar crime?" and the implications associated with enforcement of laws related to white-collar criminality, investigation and prosecution of such offenses and sentencing of white-collar offenders. Various forms of white-collar crime will be examined and illustrated through case studies and research, including estimates of cost, victim and offender profiles, and legal issues.

CJE 3694 Cybercrime
Cybercrime is a course for students with a beginning interest in studying crimes committed using digital technology. The course explores the etiology of cybercrime, the various types of cybercrime, law enforcement response, and the prevention of digital crime.

CJE 4610 Criminal Investigation
An introduction to criminal investigation. Topics will include investigative theory, collection and preservation of evidence, sources of information, interview and interrogation, uses of forensic sciences and case and trial preparation.

COP3665 Mobile Programming
Concepts and skills related to programming mobile devices, with specific emphasis on at least one modern mobile programming language or framework.

COP4534 Data Structures and Algorithms II
A second course in Data Structures and Algorithms. Topics include mathematical properties of algorithms (complexity, correctness), heaps, height-balanced trees, graphs, greedy algorithms, dynamic programming, and proof techniques pertaining to computational complexity.

COP4027 Advanced Computer Program
The third course in the introductory programming sequence. Addresses advanced topics including multi-threaded programs, the basics of data structures, generic programming, basic client-server programming, XML and web-based applications.

DSC 4013 Homeland Security
Concepts of homeland security in theory and practice; the history and development of the U.S. Department of Homeland Security and its components; terrorism and other threats to U.S. National Security and the issues associated with achieving national security in a free society.

Examples of Two Semester Credit Hour Electives

EME 1660C Engineering Technology Applications in Aviation
Learners will apply engineering technology concepts to successfully plan and execute aviation-related mission scenarios in a high-fidelity fully immersive learning environment at the National Flight Academy in Pensacola, Florida.

ENC 1146 Writing Studio
Writing Studio is a one-hour elective that students may take to workshop writing projects assigned in classes across campus. Students receive one-on-one feedback on their writing in a small group, workshop context.

MAC 3949 Cooperative Education
Alternating full-time or consecutive parallel terms of practical experience in the intended field.

MUT 2361   Jazz Fundamentals I
Provides the musician basic theoretical knowledge and practice methods necessary for jazz improvisation and composition, Chord type and related scales, chord progressions, memorization, and listening are covered. Open to all majors.

PEM 2323   Rock Climbing
Survey of the principles of bouldering, rappelling, and top-rope rock climbing. Skills include climbing techniques, belaying, knot tying, anchor systems, self-rescue, and equipment. This is an experiential course, so a high degree of class participation is mandatory. Most days will involve climbing. Skills are practically tested at the Climbing Center and on the required weekend outdoor climbing trip.

> **F. For degree programs in the science and technology disciplines, discuss how industry-driven competencies were identified and incorporated into the curriculum and indicate whether any industry advisory council exists to provide input for curriculum development and student assessment.**

The Department of Computer Science developed the program's course of study to meet the Department of Homeland Security and the National Security Agency guidelines for cybersecurity curricula. Those agencies have granted UWF Center of Academic Excellence status partially based upon the Cybersecurity specialization curriculum. Since the proposed

stand-alone Cybersecurity degree program is replacing an existing specialization, the department did not make major changes to the curriculum (see section VIII.D.).

> **G. For all programs, list the specialized accreditation agencies and learned societies that would be concerned with the proposed program. Will the university seek accreditation for the program if it is available? If not, why? Provide a brief timeline for seeking accreditation, if appropriate.**

The Department of Homeland Security and the National Security Agency jointly sponsor the National Centers of Academic Excellence program. The agencies designate specific colleges and universities based on their robust degree programs and close alignment to specific cybersecurity-related knowledge units, validated by top subject matter experts in the field. National Center of Academic Excellence in Cyber Defense Education designation awarded to UWF and to the Cybersecurity specialization will carry over to the stand-alone degree program.

> **H. For doctoral programs, list the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?**

Not applicable, the Cybersecurity degree program is a bachelor's level degree program.

> **I. Briefly describe the anticipated delivery system for the proposed program (e.g., traditional delivery on main campus; traditional delivery at branch campuses or centers; or nontraditional delivery such as distance or distributed learning, self-paced instruction, or external degree programs). If the proposed delivery system will require specialized services or greater than normal financial support, include projected costs in Table 2 in Appendix A. Provide a narrative describing the feasibility of delivering the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to shared courses, distance/distributed learning technologies, and joint-use facilities for research or internships.**

The Cybersecurity degree program will be a traditional degree program, delivered face-to-face on the main Pensacola campus. No specialized services will be needed. Since the stand-alone Cybersecurity degree program is replacing in purpose, resource use, and course structure an existing specialization, no new queries have been made of other institutions.

IX. Faculty Participation

> **A. Use Table 4 in Appendix A to identify existing and anticipated full-time (not visiting or adjunct) faculty who will participate in the proposed program through Year 5. Include (a) faculty code associated with the source of funding for the position; (b) name; (c) highest degree held; (d) academic discipline or specialization; (e) contract status (tenure, tenure-earning, or**

multi-year annual [MYA]); (f) contract length in months; and (g) percent of annual effort that will be directed toward the proposed program (instruction, advising, supervising internships and practica, and supervising thesis or dissertation hours).

Full-time faculty who will teach in the Cybersecurity degree program as found in Appendix A Table 4:

Carolyn John, M.S.
Ezhil Kalaimannan, Ph.D.
Amitabh Mishra, Ph.D.
Anthony Pinto, M.S.
Bernd Owsnicki-Klewe, Ph.D.

B. Use Table 2 in Appendix A to display the costs and associated funding resources for existing and anticipated full-time faculty (as identified in Table 2 in Appendix A). Costs for visiting and adjunct faculty should be included in the category of Other Personnel Services (OPS). Provide a narrative summarizing projected costs and funding sources.

As the proposed Cybersecurity degree program is replacing in purpose and resource use an existing specialization, the funds currently being utilized for the specialization will be used for the stand-alone degree program. The total reallocated base for the program is $262,468. The main costs for the program are faculty salaries and benefits ($215,182 Year 1, $429,555 Year 5), Adjunct expenses ($30,000 Year 1, $15,000 Year 5), A&P salaries and benefits ($10,500 Year 1, $13,400 Year 5), all of which are based on current and projected funding levels for the current Cybersecurity specialization from E&G funds. The degree program has received approval to add two new faculty lines to address enrollment increases. Adjunct expenses decrease in Year 5 as the department adds the two new faculty in fall 2019 and fall 2020 respectively (Appendix A Table 4).

C. Provide in the appendices the abbreviated curriculum vitae (CV) for each existing faculty member (do not include information for visiting or adjunct faculty).

Curricula vitarum for the following faculty are in Appendix E:

Carolyn John, M.S.
Ezhil Kalaimannan, Ph.D.
Amitabh Mishra, Ph.D.
Anthony Pinto, M.S.
Bernd Owsnicki-Klewe, Ph.D.

D. Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.

In fall 2016, the department of Computer Science had in excess of 600 majors across two undergraduate (Computing and Information Science and Information Technology) and graduate programs respectively. In that same term, Computer Science faculty conducted a total of 63 individual sections of online and face-to-face courses at the undergraduate level for all four Computer Science specializations. In spring 2017, faculty conducted a total of 69 individual sections of online and face-to-face courses at the undergraduate level for the various Computer Science specializations. Many of the department faculty also teach master's level graduate courses and thesis hours.

In academic year 2016-2017, ten faculty members of the department were involved in published research. For 2016-2017, faculty produced a total of nine journal publications, one book, three book chapters, eight conference proceedings, and eight conference presentations. Many of the publications and conference presentations included students at both the graduate and undergraduate level. Appendix E, Faculty Curricula Vitarum provides an additional account of research and service faculty who will teach in the stand-alone Cybersecurity degree program.

Faculty in the Department of Computer Science have a robust history of grant activity. For example, in the past two years (2016-2017) the collective amount of grants generated as shown in Table 8 is over $400,000.

Table 8. 2016-2017 Department of Computer Science Grant Activity

Faculty	Grant Name	Grant Amount
Thomas Reichherzer	Florida Cybersecurity Center Collaborative Seed Grant	$40,000
Anthony Pinto	NSA-DHS CAE Regional Resource Center for the South-Eastern Region	$200,000
	NSA GenCyber Summer Camp	$90,000
Ezhil Kalaimannan	Florida Cybersecurity Center Capacity Building Grant	$75,000
Two-Year Total		**$405,000**

X.   Non-Faculty Resources

   A. Describe library resources currently available to implement and/or sustain the proposed program through Year 5. Provide the total number of volumes and serials available in this discipline and related fields. List major journals that are available to the university's students. Include a signed statement from the Library Director that this subsection and subsection B have been reviewed and approved.

UWF currently offers Cybersecurity as a specialization for the Bachelor of Science in Computing and Information Sciences degree program.

The libraries shelve more than 800,000 print volumes and house an extensive microforms collection. Electronic resources include more than 160,000 e-books and access to approximately 80,000 journals and other serial titles through a discovery system. An analysis of holdings in relevant Library of Congress classifications for cybersecurity indicate that UWF has approximately 5,000+ books related to this field. Additionally, the library has access to over 1,200 relevant e-journals.

Indexing, abstracting and full text databases relevant to computer science include IEEE/Xplore, Computer Database, and Computer Science Collection. More general resources supporting the Cybersecurity degree program are Science Direct, ProQuest Central, and Engineering Village. Full-text dissertations and theses are available through ProQuest Dissertations and Theses. Using their Argonet accounts, students and faculty may access electronic resources any time from any place.

Current library resources available to support Cybersecurity as it moves to a stand-alone degree program through year 5 include:
Databases
- ACM Digital Library
- Computer Database (GALE)
- Computer Science Collection (ProQuest)
- Engineering Collection (ProQuest)
- Engineering Village
- IEEE/IET Electronic Library (IEL) (IEEE Xplore)
- Inspec (FLVC)
- SciFinder (CAS)
- Telecommunications (ProQuest)

Each academic discipline is assigned a Reference Librarian to serve as a department liaison, providing library instruction, collection development, and reference assistance for the students and faculty in that discipline. To support the needs of online learners, students may also schedule a research consultation with their liaison via in-person, LibChat, or telephone. The liaison for Cybersecurity is Jane C. Daugherty.

The library provides an Online Learners Library Guide (http://libguides.uwf.edu/online) outlining services and resources that support the increasing number of online learners. The library has also been responsive to the needs of clients who prefer to work from home. In addition to being able to access databases and materials in full-text online, UWF students and faculty may also take advantage of these online library services:
- Read course-required readings on electronic reserves
- Request books and articles from Interlibrary Loan
- Request Intercampus Loan (to/from the Fort Walton Beach Instructional Site library)
- Renew books
- Submit a reference question via text, email, or chat

- Request priority cataloging of an item that is on order
- Suggest the purchase of a particular book or journal
- Request an item to be recalled for use
- Have UWF and Interlibrary Loan books delivered to your home address if you live over 50 miles from campus

B. Describe additional library resources that are needed to implement and/or sustain the program through Year 5. Include projected costs of additional library resources in Table 3 in Appendix A. Please include the signature of the Library Director in Appendix B.

No new library resources will be needed to implement the stand-alone degree program nor does the Dean of Libraries expect the need for more resources through Year 5. Additionally, the program will be able to utilize the already requisitioned complementary databases ordered for the university's engineering programs.

C. Describe classroom, teaching laboratory, research laboratory, office, and other types of space that are necessary and currently available to implement the proposed program through Year 5.

As the proposed Cybersecurity degree program is replacing in purpose and resource use an existing specialization, the stand-alone Cybersecurity degree program will use the same classroom, laboratory, office, and other spaces currently utilized for the Cybersecurity specialization.

The spaces in Building 4 on the main campus of the University of West Florida include:
Classrooms
    Classroom – Room 349
- 1120 square feet of floor space
- 40 Dell PCs

    Classroom – Room 348
- 1120 square feet of floor space
- 40 Mac PCs

In addition to these two classrooms, controlled by the Department of Computer Science, the department has access to other classrooms in Building 4, all of which are equipped with smart podiums and projectors including:
Physical Laboratories
    Cybersecurity Laboratory – Room 250
- 580 square feet of floor space
- 24 Dell PCs plus two instructor PCs

    Multiplatform Laboratory – Room 221
- 930 square feet of floor space
- 24 Dell PCs

    Computing Research Laboratory – Room 247
- 1120 square feet of floor space

- 24 Dell PCs
- 36 Cisco Catalyst 2900XL Switches
- 12 Cisco 3600 Routers
- 18 Cisco 2500 Routers
- 8 electronics workbenches each containing an oscilloscope, power supply, waveform generator, signal filter, multi-meter, and Dell PC

Virtual Laboratories

UWF has license agreements with VMWare and Microsoft that allows our students to install VMWare and Microsoft applications as needed to create virtual environments on their own hardware.

COP2253 Java Programming utilizes a virtual lab administered by Towson University http://cis1.towson.edu/~cssecinj/

Other Workspaces

Server Room – Room 144: The server room hosts database servers and Linux servers that allow students to work on class assignments, projects, and experiments from anywhere on campus.

Data Center – Room 235: The data center provides the infrastructure for an isolated network in the Cybersecurity laboratory. This network allows testing, competitions, and assignments to be conducted without causing harm to the campus computer network and the Internet.

Departmental and Faculty Offices – The Computer Science department shares an office suite that includes space for the department chair and for academic advisors. All full-time faculty have private offices. The department has an adjunct office.

D. Describe additional classroom, teaching laboratory, research laboratory, office, and other space needed to implement and/or maintain the proposed program through Year 5.   Include any projected Instruction and Research (I&R) costs of additional space in Table 2 in Appendix A. Do not include costs for new construction because that information should be provided in response to X (E) below.

No additional office, classroom, or laboratory needs are anticipated for the Cybersecurity degree program through Year 5.

E. If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's fixed capital outlay priority list. Table 2 in Appendix A includes only Instruction and Research (I&R) costs. If non-I&R costs, such as indirect costs affecting libraries and student services, are expected to increase as a result of the program, describe and estimate those expenses in narrative form below. It is expected that high enrollment programs in particular would necessitate increased costs in non-I&R activities.

As the Cybersecurity degree program is replacing in purpose and resource use an existing specialization, no additional capital expenditures will be needed.

F. Describe specialized equipment that is currently available to implement the proposed program through Year 5. Focus primarily on instructional and research requirements.

As the proposed Cybersecurity degree program is replacing in purpose and resource use an existing specialization, the equipment utilized for the specialization will be used for stand-alone degree program. The Department of Computer Science does not anticipate any additional specialized equipment needs through Year 5. The specialized equipment currently available includes:

Server Room – Room 144:
- 6 Dell R210 Rack-mounted Servers
- 1 Dell R720 Rack-mounted Server
- 4 Custom Built ASUS Rack-mounted Servers (dual 12-core AMD Opteron w/ 128GB RAM & 12TB HDD)
- 1 Custom Built SuperMicro Rack-mounted Server (dual 8-core Intel w/256GB RAM & 12TB HDD)
- 1 Dell Precision T5500 Server
- 1 Dell PowerEdge 6400 Server
- 3 Apple Mac Pro 1st Generation (Mid 2007) Servers
- 2 Dell Vostro 430 Desktops
- 1 HP 5500 48-port Switch
- 1 Cisco 3560-E 24-port Switch
- 2 Cisco 3560 24-port Switches

Data Center – Room 235:
- 341 square feet of floor space
- 1 Dell R210 Rack-mounted Server
- 1 Dell R415 Rack-mounted Servers
- 3 Custom Built ASUS Rack-mounted Servers (dual 12-core AMD Opteron w/ 128GB RAM & 12TB HDD)
- 1 NetApp SAN (16TB)
- Dell Hadoop Cluster (6 Dell PowerEdge R720xd nodes, 3 Dell PowerEdge R720 nodes and 2 Force10 S60 Switches)
- 1 Cisco Nexus 5010 48-port Switch
- 1 HP 5500 48-port Switch
- 1 HP A5120 24-port Switch
- 3 HP V1910 24-port Switches

Other equipment is listed above in the descriptions of the classrooms and other workspaces.

G. Describe additional specialized equipment that will be needed to implement and/or sustain the proposed program through Year 5. Include projected costs of additional equipment in Table 2 in Appendix A.

The proposed degree program will not require any additional specialized equipment to implement the program nor to sustain it through Year 5.

H. Describe any additional special categories of resources needed to implement the program through Year 5 (access to proprietary research facilities, specialized services, extended travel, etc.). Include projected costs of special resources in Table 2 in Appendix A.

No additional special categories of resources are needed to implement the Cybersecurity degree program and none are anticipated through Year 5.

I. Describe fellowships, scholarships, and graduate assistantships to be allocated to the proposed program through Year 5. Include the projected costs in Table 2 in Appendix A.

The Center for Cybersecurity at UWF provides scholarships specific to the Cybersecurity degree program. Summer research scholarships currently available to students in the Cybersecurity specialization will be available to students in the Cybersecurity degree program. As this is an undergraduate program, graduate assistantships are not applicable.

J. Describe currently available sites for internship and practicum experiences, if appropriate to the program. Describe plans to seek additional sites in Years 1 through 5.

Internships and practica are not required for the Cybersecurity degree program.

APPENDIXES

Appendix A

Table 1A Projected Headcount from Potential Sources (Baccalaureate Degree Program)

Table 2 Projected Costs and Funding Sources

Table 3 Anticipated Reallocation of E&G Funds

Table 4 Anticipated Faculty Participation

APPENDIX A

TABLE 1-A
PROJECTED HEADCOUNT FROM POTENTIAL SOURCES
(Baccalaureate Degree Program)

Source of Students (Non-duplicated headcount in any given year)*	Year 1		Year 2		Year 3		Year 4		Year 5	
	HC	FTE	HC	FTE	HC	FTE	HC	FTE	HC	FTE
Upper-level students who are transferring from other majors within the university**	9	5.81	10	6.46	10	6.46	15	9.69	15	9.69
Students who initially entered the university as FTIC students and who are progressing from the lower to the upper level***	104	67.17	115	74.27	125	80.73	140	90.42	155	100.1
Florida College System transfers to the upper level***	37	23.9	40	25.83	45	29.06	50	32.29	50	32.29
Transfers to the upper level from other Florida colleges and universities***	5	3.23	5	3.23	5	3.23	5	3.23	5	3.23
Transfers from out of state colleges and universities***	5	3.23	5	3.23	5	3.23	5	3.23	5	3.23
Other (Explain)***	0	0	0	0	0	0	0	0	0	0
Totals	**160**	**103.34**	**175**	**113.02**	**190**	**122.71**	**215**	**138.86**	**230**	**148.54**

* List projected annual headcount of students enrolled in the degree program. List projected yearly cumulative ENROLLMENTS instead of admissions.
** If numbers appear in this category, they should go DOWN in later years.
*** Do not include individuals counted in any PRIOR CATEGORY in a given COLUMN.

APPENDIX A

TABLE 2
PROJECTED COSTS AND FUNDING SOURCES

Instruction & Research Costs (non-cumulative)	Year 1								Year 5						
	Funding Source							Subtotal coulumns 1+...+7	Funding Source						Subtotal coulumns 9+...+ 14
	Reallocated Base* (E&G)	Enrollment Growth (E&G)	New Recurring (E&G)	New Non-Recurring (E&G)	Contracts & Grants (C&G)	Philanthropy Endowments	Enterprise Auxiliary Funds		Continuing Base** (E&G)	New Enrollment Growth (E&G)	Other*** (E&G)	Contracts & Grants (C&G)	Philanthropy Endowments	Enterprise Auxiliary Funds	
Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Faculty Salaries and Benefits	215,182	0	0	0	0	0	0	$215,182	261,555	168,000	0	0	0	0	$429,555
A & P Salaries and Benefits	10,500	0	0	0	0	0	0	$10,500	13,400	0	0	0	0	0	$13,400
USPS Salaries and Benefits	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
Other Personal Services	30,000	0	0	0	0	0	0	$30,000	15,000	0	0	0	0	0	$15,000
Assistantships & Fellowships	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
Library	2,000	0	0	0	0	0	0	$2,000	2,431	0	0	0	0	0	$2,431
Expenses	2,536	0	0	0	0	0	0	$2,536	3,082	0	0	0	0	0	$3,082
Operating Capital Outlay	0	0	0	0	0	0	0	$0	0	0	0	0	0	0	$0
Special Categories	2,250	0	0	0	0	0	0	$2,250	875	0	0	0	0	0	$875
Total Costs	**$262,468**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$262,468**	**$296,343**	**$168,000**	**$0**	**$0**	**$0**	**$0**	**$464,343**

*Identify reallocation sources in Table 3.

**Includes recurring E&G funded costs ("reallocated base," "enrollment growth," and "new recurring") from Years 1-4 that continue into Year 5.

***Identify if non-recurring.

Faculty and Staff Summary

Total Positions	Year 1	Year 5
Faculty (person-years)	1.35	2.85
A & P (FTE)	0.3	0.3
USPS (FTE)	0	0

Calculated Cost per Student FTE

	Year 1	Year 5
Total E&G Funding	$262,468	$464,343
Annual Student FTE	103.34	148.54
E&G Cost per FTE	$2,540	$3,126

<mark>Table 2 Column Explanations</mark>

Reallocated Base* (E&G)	1	E&G funds that are already available in the university's budget and will be reallocated to support the new program. Please include these funds in the Table 3 – Anticipated reallocation of E&G funds and indicate their source.
Enrollment Growth (E&G)	2	Additional E&G funds allocated from the tuition and fees trust fund contingent on enrollment increases.

Worksheet Table 2 Budget

New Recurring (E&G)	3	Recurring funds appropriated by the Legislature to support implementation of the program.
New Non-Recurring	4	Non-recurring funds appropriated by the Legislature to support implementation of the program. Please provide an explanation of the source of these funds in the budget section (section III. A.) of the proposal. These funds can include initial investments, such as infrastructure.
Contracts & Grants (C&G)	5	Contracts and grants funding available for the program.
Philanthropy Endowments	6	Funds provided through the foundation or other Direct Support Organizations (DSO) to support of the program.
Enterprise Auxiliary Funds	7	Use this column for continuing education or market rate programs and provide a rationale in section III.B. in support of the selected tuition model.
Subtotal coulumns 1+...+7	8	Subtotal of values included in columns 1 through 7.
Continuing Base** (E&G)	9	Includes the sum of columns 1, 2, and 3 over time.
New Enrollment	10	See explanation provided for column 2.
Other*** (E&G)	11	These are specific funds provided by the Legislature to support implementation of the program.
Contracts & Grants (C&G)	12	See explanation provided for column 5.
Philanthropy Endowments	13	See explanation provided for column 6.
Enterprise Auxiliary Funds	14	Use this column for continuing education or market rate programs and provide a rationale in section III.B. in support of the selected tuition model.
Subtotal coulumns 9+...+ 14	15	Subtotal of values included in columns 9 through 14.

Worksheet Table 2 Budget

APPENDIX A

TABLE 3
ANTICIPATED REALLOCATION OF EDUCATION & GENERAL FUNDS*

Program and/or E&G account from which current funds will be reallocated during Year 1	Base before reallocation	Amount to be reallocated	Base after reallocation
Reallocated funds from Cybersecurity specialization to stand- alone degree program	262,468	262,468	$0
	0	0	
	0	0	
	0	0	
	0	0	
	0	0	
Totals	$262,468	$262,468	$0

* If not reallocating funds, please submit a zeroed Table 3

Worksheet Table 3 Reallocation

APPENDIX A

TABLE 4
ANTICIPATED FACULTY PARTICIPATION
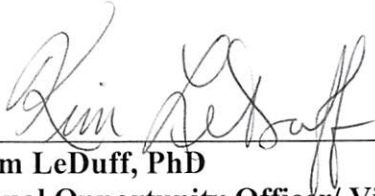
Faculty Code	Faculty Name or "New Hire" Highest Degree Held Academic Discipline or Speciality	Rank	Contract Status	Initial Date for Participation in Program	Mos. Contract Year 1	FTE Year 1	% Effort for Prg. Year 1	PY Year 1	Mos. Contract Year 5	FTE Year 5	% Effort for Prg. Year 5	PY Year 5
A	Carolyn John, M.S. Electrical & Computer Engineering	Lecturer	Non-Tenure Earning	Fall 2018	9	0.75	0.50	0.38	9	0.75	0.50	0.38
A	Ezhil Kalaimannan, Ph.D. Computer Engineering	Assistant Professor	Tenure Earning	Fall 2018	9	0.75	0.50	0.38	9	0.75	0.50	0.38
A	Amitabh Mishra, Ph.D. Computer Science	Assistant Professor	Tenure Earning	Fall 2018	9	0.75	0.10	0.08	9	0.75	0.10	0.08
A	Anthony Pinto, M.S. Computer Science	Lecturer	Non-Tenure Earning	Fall 2018	9	0.75	0.50	0.38	9	0.75	0.50	0.38
A	Bernd Owsnicki-Klewe, Ph.D. Computer Science	Lecturer	Non-Tenure Earning	Fall 2018	9	0.75	0.20	0.15	9	0.75	0.20	0.15
C	New Hire	Lecturer	Non-Tenure Earning	Fall 2019	9	0.75	0.00	0.00	9	0.75	1.00	0.75
C	New Hire	Associate Professor	Tenure Earning	Fall 2020	9	0.75	0.00	0.00	9	0.75	1.00	0.75
	Total Person-Years (PY)							**1.35**				**2.85**

Faculty Code		Source of Funding	PY Workload by Budget Classsification Year 1		Year 5
A	Existing faculty on a regular line	Current Education & General Revenue	1.35		1.35
B	New faculty to be hired on a vacant line	Current Education & General Revenue	0.00		0.00
C	New faculty to be hired on a new line	New Education & General Revenue	0.00		1.50
D	Existing faculty hired on contracts/grants	Contracts/Grants	0.00		0.00
E	New faculty to be hired on contracts/grants	Contracts/Grants	0.00		0.00
		Overall Totals for	**Year 1**	**1.35**	**Year 5** **2.85**

Worksheet Table 4 Faculty

Appendix B

Signatures

Please include the signature of the Equal Opportunity Officer, Vice President of Academic Engagement (General Education), and the Dean of University Libraries.

_____
Kim LeDuff, PhD
Equal Opportunity Officer/ Vice President
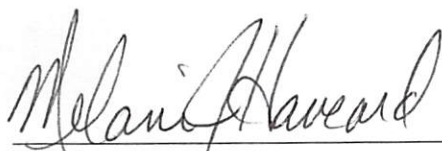**Division of Academic Engagement**

Date 1/5/18
_____

_____
Robert Dugan
Dean of University Libraries

Date 2018 January 4
_____

This appendix was created to facilitate the collection of signatures in support of the proposal. Signatures in this section illustrate that the Equal Opportunity Officer has reviewed section II. E. of the proposal, the VP Division of Academic Engagement has reviewed sections on General Education III. D., V. A. and VIII. B. & D. and the Library Director has reviewed sections X. A. and X. B.

UWF also requires that a Request to Offer a New Degree Program is reviewed by the Chief Technology Officer.

_____
Melanie Haveard
Chief Technology Officer

Date 1/4/2018
_____

Appendix C

Academic Learning Compact, Student Learning Outcomes, and Curriculum Map

CYBERSECURITY

Mission Statement

The mission of the Department of Computer Science is to provide a high-quality, student-oriented educational experience to our undergraduate and graduate students. The department prepares students for successful computing careers by empowering them with the knowledge and skills to contribute responsibly and creatively to a complex and ever-changing world, and to continue professional development and life-long learning.

The Department of Computer Science offers a Bachelor's of Science in Computer Science, Cybersecurity, and Software Design & Development.

Program Descriptions

The B.S. in Cybersecurity degree program prepares graduates to be leaders in the protection of data assets and analysis of potential threats to system and networks. The curriculum focuses on the techniques, policies, operational procedures, and technologies that secure and defend the availability, integrity, authentication, confidentiality, and non-repudiation of information and information systems in local as well as broadly-based domains.

Student Learning Outcomes

Student learning outcomes for students in the Cybersecurity program are listed below. UWF Cybersecurity graduates should be able to do the following:

Content
- Identify and analyze threats and vulnerabilities in systems, and develop secure computing solutions.

Critical Thinking
- Employ computing strategies to analyze and solve problems.

Communication

- Create and deliver effective oral presentations and written reports with appropriate tools and technologies.

Integrity/Values

- Describe ethical issues and responsibilities that relate to a computing professional.

Project Management

- Employ effective project-management skills to develop computing solutions either individually or through interdisciplinary teams within a global and societal context.

Assessment of Student Learning Outcomes

Students pursuing the undergraduate Cybersecurity program will demonstrate skills specific to their degree. Several upper-level courses will give students the opportunity to identify and reflect on degree content, critical thinking, communication, integrity, and project management skills through the completion of assignments that meet departmental standards and integrate what the students have learned. Opportunities to showcase student work will become available as the study progresses, and these include the opportunity to participate in undergraduate research projects with faculty, or to present the results of student work at university or external events.

Job Prospects for Cybersecurity Graduates

Programmer	Network administrator
Cyber security analyst	Network programmer
Systems designer	Security analyst
Database administrator	Software consultant
Database developer	Software systems tester
Data analyst	Forensics specialist
Operations manager	Network manager
Project manager	Software developer

Find Out More about Cybersecurity at UWF:
http://uwf.edu/computerscience/

Cybersecurity   **CYB**

Appendix D

Official Notification of Center of Academic Excellence for the University of West Florida

National Centers of Academic Excellence in Cyber Defense Education
9800 Savage Road
Ft. Meade, MD 20755-6804

The University of West Florida
Dr. Anthony Pinto
11000 University Parkway
Pensacola, FL 32514

Dr. Pinto:

 I am pleased to inform you that the National Security Agency and the Department of Homeland Security have designated the University of West Florida as a National Center of Academic Excellence in Cyber Defense Education (CAE-CDE) through academic year 2021.

 Your ability to meet the increasing demands of the program criteria will serve the nation well in contributing to the protection of the National Information Infrastructure. The Presidents' National Strategy to Secure Cyberspace, 14 February 2003 and the International Strategy for Cyberspace, May 2011, addresses the critical shortage of professionals with these skills and highlights the importance of higher education as a solution to defending America's cyberspace. "Like all nations, the United States has a compelling interest in defending its vital national assets, as well as our core principles and values, and we are committed to defending against those who would attempt to impede our ability to do so." Education is the key to promoting these ideals.

Certificates will be presented during an evening reception at the National Cyber Security Summit in Huntsville, Alabama on June 8, 2016. Details on the Summit, to include a CAE Community Meeting on June 7th, are attached. For those unable to attend the Summit, certificates will also be presented at the November 1-2, 2016 NICE Conference & Expo in Kansas City Missouri. Information on the Expo can be found at: https://www.fbcinc.com/e/nice/default.aspx .   We appreciate your participation in this program and look forward to seeing you in June.

Sincerely,

\s\

Karen Leuschner
National CAE Program Manager, NSA

Appendix E

Cybersecurity Faculty Curricula Vitarum

CAROLINE S. JOHN

ADDRESS

Bldg.4, Room 238
University of West Florida
Department of Computer Science
11000 University Pkwy
Pensacola, FL 32514
Email: cjohn@uwf.edu
Office: (850) 474-2973

PROFESSIONAL PREPARATION

Anna University, India, Electronics, and Communication Engineering B.E., 2007
University of Alabama in Huntsville, Electrical Engineering, M.S., 2012
University of Alabama in Huntsville, Cyber Security, Post-Bachelor Certificate, 2013 University of Alabama in Huntsville, Electrical Engineering, Ph.D., [2012 – Present]

APPOINTMENTS

Since 2016 Faculty Member/Lecturer, Department of Computer Science, University of West Florida, Pensacola, FL
2015 - 2016 Graduate Research Assistant, Department of Electrical and Computer Engineering, University of Alabama in Huntsville, Huntsville, AL
2012 – 2015 Adjunct Instructor, College of Business Administration, University of Alabama in Huntsville, Huntsville, AL
2009 - 2012 Graduate Teaching Assistant, Department of Electrical and Computer Engineering, University of Alabama in Huntsville, Huntsville, AL

SYNERGISTIC ACTIVITIES

- ✦ *Co-PI* for the Capacity Building Program Grant – Florida Center for Cybersecurity (FC2), The University of South Florida, June. 2017 - June.18; Funded Amount $75,212.
  Project Title: *"A Novel Framework to Teach Hands-on Laboratory Exercises in Cybersecurity"*

- ✦ *Co-PI* and Recipient of the 2015 Cooperative Agreement Award for Dual Use Technology Development, sponsored by the Marshall Flight Space Center, NASA; May. 2015 – Aug.16; Funded Amount -$31,992.
  Project Title: *"Optimization of Ferroelectric Ultra-capacitors for Energy Storage"*

PEER-REVIEWED PUBLICATIONS

Journal Articles:

- ✦ Ezhil Kalaimannan and *Caroline S. John*, "Security Development Life Cycle framework for web-based applications," Vol. 3, No. 1, National Cybersecurity Institute Journal, Apr. 2016.

- ✦ *Caroline S. John*, Todd C. MacLeod, Joe Evans, and Fat D. Ho, "Characterization of an autonomous non-volatile ferroelectric memory latch", Journal of Integrated Ferroelectrics, Vol. 132, No. 1, pp. 76-81, 2012.

- ✦ *Caroline S. John*, Todd C. MacLeod, Joe Evans, and Fat D. Ho, "Retention Analysis of a Non-Volatile Ferroelectric Memory Device", Journal of Integrated Ferroelectrics, Vol. 140, No. 1, pp. 23-34, 2013.

- ✦ *Caroline S. John*, Todd C. MacLeod, Joe Evans, and Fat D. Ho, "Temperature Effects on a Non-Volatile Memory Device with Ferroelectric Capacitor", Journal of Integrated Ferroelectrics, Vol. 157, No. 1, pp. 23-30, 2014.

TEACHING EXPERIENCE

Computer Science
- ✦ Discrete Structures (Undergraduate)
- ✦ Introduction to Computer Organization (Undergraduate)

Computer Programming
- ✦ Algorithm and Program Design (Undergraduate)

COLLABORATORS & OTHER AFFILIATIONS

- • **Collaborators and Co-Editors.** Fat D. Ho (UAHuntsville), Hongmei Chi (FAMU), Ezhil Kalaimannan (UWF), Todd C. Macleod (MSFC, NASA).

- • **Graduate Advisors and Postdoctoral Sponsors.** Prof. Jatinder N.D. Gupta, Prof. Earl B. Wells (University of Alabama in Huntsville, Huntsville, AL, USA) and Dr. Terry J. Rolin (Marshall Flight Space Center, NASA, Huntsville, AL, USA).

- • **Thesis Advisor and Postgraduate-Scholar Sponsor.** None.

EZHIL KALAIMANNAN

Address
Bldg.4, Room 241
University of West Florida
Department of Computer Science
11000 University Pkwy
Pensacola, FL 32514
Email: ekalaimannan@uwf.edu
Office: (850) 473-7005

Professional Preparation

Anna University, India, Electrical Engineering B.E., 2006
University of Alabama in Huntsville, Computer Engineering, M.S., 2008
University of Alabama in Huntsville, Cyber Security, Post-Bachelor Certificate, 2012
University of Alabama in Huntsville, Computer Engineering, Ph.D., 2014

Appointments

Since 2014   Assistant Professor, Department of Computer Science, University of West Florida, Pensacola, FL
2010 – 2014   Adjunct Instructor, College of Business Administration, University of Alabama   in Huntsville, Huntsville, AL
2009 - 2012   Graduate Teaching Assistant, Department of Electrical and Computer Engineering, University of Alabama in Huntsville, Huntsville, AL

Synergistic Activities

- Capacity Building Program Grant -- Florida Center for Cybersecurity (FC2), The University of South Florida, Role: Principal Investigator, June. 2017 -- June. 2018; Funded Amount - $75,212.
  - *Research Project Title: A Novel Framework to Teach Hands-on Laboratory Exercises in Cybersecurity.*

- Recipient of the Collaborative seed grant offered by the Florida Center for Cybersecurity (FC2), *The University of South Florida, Mar. 2015* – Dec. 2016, $12,500.
  - *Research Project Title: Exploring Security Attacks in Cache Enabled Tactical Hybrid Networks*

- Recipient of the Cross College Faculty Research (CCFR) grant offered by the Office of Vice President for Research, *The University of Alabama in Huntsville, Aug. 2013* - $5,000/year (Renewable for a total of 24 months and $10,000).

- o *Research Project Title: Computational Optimization Models for Investigating Crime in Digital Forensics*

- Technical Program Committee Member: *Pre-ICIS Workshop on Information Security and Privacy (WISP 2012)*; Annual ADFSL Conference on Digital Forensics, Security and Law (ADFSL 2015, 2016, 2017); 17th International Conference on Computer and Information Technology (ICCIT 2014, 2015); 15th Annual Digital Forensics Research Conference (DFRWS USA 2015, 2016, 2017); Seed Grant Program funded by the Florida Center for Cybersecurity (FC2).

- Journal Referee: Adhoc member of Elsevier Digital Investigation Journal, Journal of Digital Forensics, Security and Law, and International Journal of Computational Intelligence (Advance Computing Science).

Peer-Reviewed Publications

Journal Articles:

- Bagui, S., Fang, X., *Kalaimannan, E.*, Bagui, S.C and Sheehan, J. "Comparison of machine-learning algorithms for classification of VPN network traffic flow using time-related features", Journal of Cybersecurity Technology, Vol. 1, No. 2, pp. 108-126, 2017.

- *Kalaimannan, E* and Gupta, J.N.D. "The Security Development Lifecycle in the Context of Accreditation Policies and Standards", *Security and Privacy, IEEE,* Vol. 15, No. 1, pp. 52-57, 2017. *[Impact Factor: 0.91]*

- *Kalaimannan, E.*, John, S.K., DuBose, T and Pinto, A. "Influences on ransomware's evolution and predictions for the future challenges", *Journal of Cybersecurity Technology*, Vol. 1, No. 1, pp. 23-31, 2016.

- Gupta, J.N.D., *Kalaimannan, E* and Yoo, S-M. "A heuristic for maximizing investigation effectiveness of digital forensic cases involving multiple investigators," *Computers & Operations Research, Elsevier,* Vol. 69, No. 1, pp. 1-9, 2015. *[Impact Factor: 2.188]*

- *Kalaimannan, E* and John, C.S. "Security Development Life Cycle framework for web-based applications," Vol. 3, No. 1, pp. 23-29, 2016.

Articles in Conference Proceedings:

- Prithviraj, S., Sameer, V.U., Naskar, R and *Kalaimannan, E*, "Source Anonymization of Digital Images: A Counter–Forensic Attack on PRNU based Source Identification Techniques",

accepted into 2017 Annual Conference on Digital Forensics, Security, and Law, Daytona Beach, May. 2017.

- Chakraborty, N and *Kalaimannan, E*, "Selective Scheduling: Controlling Non-Preemptive Devices in Smart Grid Environment", Accepted into the 8th Annual IEEE conference on Innovative Smart Grid Technologies, Arlington, Apr. 2017.

- Chi, H., Welch, S., Vasserman, E and *Kalaimannan, E*, "A Framework of Cybersecurity Approaches in Precision Agriculture ", Proceedings of the 12th International Conference on Cyber Warfare and Security, Dayton, pp. 90-95, Mar. 2017.

- Reichherzer, T., Mishra, A., *Kalaimannan, E* and Wilde, N, "A Case Study on the Trade-Offs Between Security, Scalability, and Efficiency in Smart Home Sensor Networks," Proceedings of the 2016 International Conference on Computational Science and Computational Intelligence (CSCI), Las Vegas, NV, 2016, pp. 222-225.

- Chi, H., *Kalaimannan, E* and Hubbard, D, "Integrate Text Mining into Computer and Information Security Education", KSU Conference on Cybersecurity Education, Research, and Practice. Paper 11, Kennesaw, Oct. 2016.

- *Kalaimannan, E*., "Smart Device Forensics - Acquisition, Analysis and Interpretation of Digital Evidences," Proceedings of the 2015 International Conference on Computational Science and Computational Intelligence (CSCI), Las Vegas, NV, 2015, pp. 837-838.

- *Pandey, A., Kalaimannan, E*., and Venkatesan, S., "An Information Diffusion Model to analyze the Behavior of Online Social Network based Malwares," Proceedings of the 2015 International Conference on Computational Science and Computational Intelligence (CSCI), Las Vegas, NV, 2015, pp. 867-868.

- *Kalaimannan, E*., Mitchell, C., Bagui, S., and Bagui, S, "An Automated Method of Classifying and Analyzing Malware based Operating System Calls," Work-in-Progress Abstract in the Annual Computer Security Applications Conference 2015 (ACSAC'15), Los Angeles, Dec. 2015.

- *Kalaimannan, E*., Gupta, J. N. D., and Yoo, S-M., "Maximizing investigation effectiveness in digital forensic cases," Proceedings of the 5th Annual ASE/IEEE International Conference on Privacy, Security, Risk and Trust (PASSAT- 2013), Washington D.C., USA, pp. 618 - 623, Sep. 2013. [Acceptance Rate: 9.6%]

- Gupta, J. N. D., *Kalaimannan, E*., and Patnayakuni, R., "IDS Alarms investigation with limited resources," Pre-ICIS Workshop on Information Security and Privacy (WISP), Orlando, Florida, Dec 2012.

- *Kalaimannan, E*., Gupta, J. N. D., and Yoo, S-M., "Maximizing investigation effectiveness for time critical forensic cases" in Operational Excellence: A Key to Performance Excellence, R. K. Jain, B. A. Metri, and J. N. D. Gupta (eds), Excel Books, 2013.

Presentations/Talks

- *Kalaimannan, E* (2016). Integrate Text Mining into Computer and Information Security Education. Paper presented at the KSU Conference on Cybersecurity Education, Research, and Practice, Oct. 2016, Kennesaw, USA.

- *Kalaimannan, E* (2015). Smart Device Forensics - Acquisition, Analysis and Interpretation of Digital Evidences. Paper presented at the *International Conference on Computational Science and Computational Intelligence (CSCI'15)*, Dec. 7-9, Las Vegas, USA.

- *Kalaimannan, E* (2015). An Information Diffusion Model to analyze the Behavior of Online Social Network based Malwares. Paper presented at the *International Conference on Computational Science and Computational Intelligence (CSCI'15)*, Dec. 7-9, Las Vegas, USA.

- *Kalaimannan, E* (2015). An Automated Method of Classifying and Analyzing Malware based Operating System Calls. Work-in-Progress abstract presented at the *Annual Computer Security Applications Conference 2015 (ACSAC'15)*, Dec. 9-12, Los Angeles, USA.

- *Kalaimannan, E* (2013). Maximizing investigation effectiveness in digital forensic cases. Paper presented at the *ASE/IEEE International Conference on Privacy, Security, Risk and Trust (PASSAT),* Sep. 8-14, Washington D.C., USA.

- *Kalaimannan, E* (2012). Maximizing investigation effectiveness for time critical forensic cases. Paper presented at the *6th International Conference on Decision Sciences for Performance Excellence,* Dec. 27-29, Hyderabad, India.

Collaborators & Other Affiliations

- **Collaborators and Co-Editors.** Jatinder N.D. Gupta (UAHuntsville), Ravi Patnayakuni (UAHuntsville), Seong Moo-Yoo (UAHuntsville), Sikha Bagui (University of West Florida), Norman Wilde (University of West Florida), Swapnoneel Roy (University of Central Florida), Hongmei Chi (Florida A&M University), Sumit Kumar Jha (University of Central Florida), Jinpeng Wei (Florida International University), Geethapriya Thamilarasu (University of Washington Bothell), Cyril Raj (M.G.R. Educational & Research Institute, India).

- **Graduate Advisors and Postdoctoral Sponsors.** Prof. Jatinder N.D. Gupta and Dr. Seong Moo-Yoo (University of Alabama in Huntsville, Huntsville, AL, USA).

- **Thesis Advisor and Postgraduate-Scholar Sponsor.** None.

AMITABH MISHRA

amishra@uwf.edu.

SUMMARY
A qualified academic professional with experience in secondary learning environment, and a wealth of knowledge in development and implementation of educational technology tools and applications in college classrooms and labs with a touch of industrial exposure, working for an educational institution currently.

PROFESSIONAL EXCELLENCE SUMMARY
- Have over sixteen years of experience in teaching at the college and university level, both in USA and India.
- Have six years of industrial work experience in coal mining and steel industries as a technical manager, technical evaluator, project coordinator and trainer on computerized automation.
- As the In-charge of Lab development, was responsible for the development of networked computer labs and other labs related to process control and automation with hands-on experience on hardware.
- Implemented innovative methods to develop relations and a better interface between the students, teaching staff and administrative staff.

TECHNICAL SKILLS

- Over **15** years of software development experience of **programming** in: **C**, **C++**, **Java**, **Python**, **Fortran**, **Pascal**, **Assembly** – Microprocessors/Microcontrollers
- Over **10** years of working with **scripting languages**: **HTML/CSS**, **Javascript**, **Shell Scripting** (**bash**), **SQL** and **XML**
- Over **10** years of experience of working with **operating systems**: **Windows**, **Linux**, **Solaris**
- Over **10** years of experience of working with **scientific software**: **LabVIEW**, **MATLAB - Simulink**, **R** Programming, **TinyOS** and **NesC**, **Qualnet**, **OMNET**, **Castalia**

- Experience in working with **computer and communication hardware**: Computer system assembly, setting up wired and wireless network infrastructure, TelosB and Tmote Wireless Sensor Platforms, Toshiba DCS and standalone controllers, Taylor MOD DCS, Siemens PLC, Allen Bradley PLC

EDUCATION

PhD in **Computing Science & Engineering**   September 2008 – July 2015
University of Cincinnati, Cincinnati, OH – GPA 3.89
   Finished with a CGPA of 3.93 and nine publications in international conferences and journals
Selected Coursework: Advanced Programming Concepts, Advanced Operating Systems, Advanced
     Algorithms I/II, Artificial Intelligence I, Data Mining and Warehousing, Advanced
     Mobile Computing, Wireless Ad Hoc & Sensor Networks, Sensor Networks Design.
Research Group: Center for Distributed and Mobile Computing (CDMC) – PI: Prof. Dharma P.
     Agrawal
Research Areas: Wireless Sensor Networks, Heterogeneous Networks, Wireless Control.
Dissertation: Modeling and Performance Evaluation of Wireless Body Area Networks for Healthcare

Applications.

Master of Technology in **Instrumentation** July 1999 – June 2001

Devi Ahilya University, Indore, India – First Class Honors Degree
> Topped the merit list across all semesters in the Class of 2001

PG Diploma **in Personnel Management** July 2002 – August 2004

National Institute of Personnel Management, Kolkata, India – First Class Honors
> Topped the merit list at All-India level and bagged 3 gold medals and a national award

PG Diploma in **Biomedical Informatics** July 2003 – June 2004

Bioinformatics Institute of India, NOIDA, India – First Class Honors

Bachelor of Engineering in **Electronics** August 1986 – July 1990

Ravi Shankar University, Raipur, India – First Class Degree

Certification:
"Internet of Things: Roadmap to a Connected World" – Massachusetts Institute of Technology, May 2016
"Advance Ad-hoc and Sensor Networks" - University of Mumbai, India – 2007
"Computing" – IGNOU, India – 2003
"German Language" – Maxmüller Bhavan, Rourkela, India – 1993

TEACHING EXPERIENCE

University of West Florida, Pensacola, FL, USA, Aug 2015 – Till date
Assistant Professor, Department of Computer Science
- Taught 9 undergrad courses since Fall'15 semester – Algorithm and Program Design in C, Introduction to Computer Organization, Operating System Fundamentals, Data Sturctures and Algorithms – I, Object Oriented Programming
- Teaching 3 undergrad courses in the Spring'17 semester – Data Structures and Algorithms I – 2 sections, Operating System Fundamentals
- Engaged in Cybersecurity research with the Center of Cybersecurity ad working on IoT Security
- Holding a courtesy appointment as a Visiting Research Scientist at the Florida Institute for Human and Machine Cognition, Inc. (IHMC)
- Recipient of the UWF GROW Institute Summer Award for grant-writing; submitted an NSF grant proposal under the Secure and Trustworthy Computing program
- Site Director, Association for Computing Machinery (ACM) International Collegiate Programming Contest
  (ICPC) 2016, Southeast USA Regional Site, UWF, Pensacola, FL [https://ser.cs.fit.edu/ser2016/]
- Faculty In-charge, Computer Science Tutoring, HMCSE-UWF since 2016
- Serving in Growth and Development Committee, UWF, 2016
- Served in Summer Undergraduate Research Project Review Committee, HMCSE, UWF, 2016
- Served in Presidential Scholarship Application Review as an Interviewer, UWF, 2015 and 2016

Northern Kentucky University, Highland Heights, KY, USA, Aug 2012 – May 2013
Lecturer, School of Computing Sciences and Informatics
- Taught 6 courses - Object-Oriented Programming in Java, Data Structures and Algorithms, Information Technology Fundamentals Lab
- Received an average rating ranging between *fair* and *good* in students' feedback

University of Cincinnati, CINCINNATI, OH, USA, 2008 – June 2012
Graduate Teaching Assistant, School of Computing Sciences and Informatics
- Taught 5 courses: **Network and System Programming** – three courses, **Computer Fundamentals: Data Structures** – two courses
- Received an average rating ranging between *good* and *excellent* in students' feedback
- Taught computer programming in **Java** to school kids in the 2-week long summer camps organized by the department for the last three summers
- Assisted in teaching sixteen courses covering **Data Structures**, **Network Programming**, **Computer Architecture**, Programming in **MATLAB**, **C++**, and **Java**, **Computer Networks**, **Wireless and Mobile Networks**, **Ad-hoc and Sensor Networks** – provided help on course associated projects
- Occasionally taught classes in the absence of instructors
- Conducted two training sessions for graduate students on installation of **TinyOS** and **network simulators**
- Developed a web based tutorial for hands-on training on **TinyOS** for other graduate students
- Worked in three projects on application of wireless sensor networks in generation of music for dance in collaboration with College Conservatory of Music, UC.
- In-charge of equipment inventory and acquisition for the CDMC research group [voluntary]
- Handled computer and network troubleshooting for the CDMC research group [voluntary]

Undergraduate Level Courses Taught at UC
1. Network and System Programming – taught three courses
2. Computer Fundamentals: Data Structures – taught two courses **Teaching Assistant at**

UC:
1. Data Structures – one course
2. Network Programming – one course
3. Computer Architecture – one course
4. MATLAB programming– two courses
5. C++ Programming – one course
6. Java Programming – three courses
7. Computer Networks – three courses
8. Wireless and Mobile Networks – two courses
9. Ad-hoc and Sensor Networks – two courses

Associate Professor, Computer Science and Engineering, Bhilai Institute of Technology, Durg (C.G.), INDIA, 1997 – 2008 and 1990 – Jan 1992

Graduate Level Courses Taught in India
1. Design of Industrial Transducers and Sensors — 4 courses
2. Process Control and Industrial Automation — 3 courses
3. Analytical Instrumentation — 2 courses
4. Biomedical Instrumentation — 1 course
5. Business Management — 1 course
6. Microprocessors: Architecture. Programming and Interfacing — 3 course

Undergraduate Level Courses Taught in India
1. Electronic Instrumentation — 9 courses
2. Mobile Communication and Computing — 6 courses
3. Digital Signal Processing — 4 courses
4. Principles of Communication Systems — 3 courses
5. Microprocessors and Interfacing — 2 courses
6. Digital Electronics — 2 courses
7. Advanced Microprocessors — 2 courses
8. Industrial Transducers and Sensors — 2 courses
9. Computer Fundamentals — 1 course
10. Radio Engineering — 1 course
11. Network Analysis — 1 course
12. Electronic Engg. Materials — 1 course

Projects supervised in India: Graduate–12, UG–46 at Bhilai Institute of Technology, Durg (C.G.),
1997 – 2008 and 1990 – Jan 1992

- Taught courses and labs related to computers and communication (Programming courses taught – C, C++, Java, HTML, SQL, LabVIEW, MATLAB, Assembly – 8085, 8086, 8051)

- Supervised undergrad and grad projects in engineering and inspired students to integrate technology into daily classroom activities

- Solely responsible for setting-up the Computer Centre for the school with OFC and UTP wired backbone and wireless networking and Internet services in the institute

- Completed 2 consultancy projects for solving industrial problems

- Chief Organizer for 9 technical and education-oriented workshops, conferences, trainings and special university events

Record of service: Administrative Assignments (BIT, Durg, India)

Coordinator,	M. Tech. Program, Instrumentation and Control.	2006-08
Coordinator,	Depts. of Electronics and Telecom Engg., Computer Science and Engg., Information Technology, and Computer Applications	2007-08
Coordinator,	Continuing Education Cell	2006-08

Prof. In-charge	Students' Association	2000-07
Founder,	Music Club	2005
Head,	Dept. of Computer Science and Engg.	2003-06
Prof. In-charge	Internet Services, BIT	2001-06
Administrator Official Website, BIT		2001-06
Prof. In-charge	Training and Placement, BIT	2004-05
		2001-03
Prof. In-charge	Central Library, BIT	2003-05
Founder	Book Bank	
Prof. In-charge	Alumni Activities	2001-05
Labs developed:	Microprocessors and Microcontrollers Lab, Instrumentation Lab, Computer Hardware Lab Computer Centre, BIT Electronics Workshop	
Team Member	CG State Engineering Admissions	2002-03
Team Member	Examination Control Centre	1997-2008
Examiner	6 universities and 2 autonomous Institutes Conduction of theory and practical examinations. Question paper setter and evaluator	
Expert	University Interview Committees: Faculty and Technical Staff recruitment	2005-08

SELECTED COURSE PROJECTS

Multilevel Encryption-Decryption for Windows CE using Random Number Generator *2006*
- Working on Arduino microcontroller controlled sensing, acquisition and transmission of physiological parameters
- Aiming at cognitive utilization of voice and data networks around the smartphone for transmission of sensed parameters

Virtual 3-D tour engine *2005*
- Developed algorithms for packet shortening in order to save energy and enhance the lifetime of WBANs
- Evaluated energy savings for critical, real-life, real-time physiological data in the suggested WBAN framework

Automatic Speaker Recognition System using pitch and formant analysis   *2004*

- Designed, implemented and tested a testbed involving Tmote sensors for studying link parameters over multiple transmission channels and various power levels
- Studied packet transmission, link quality and received signal strength parameters and analyzed the results received

Selected Publications:

1. **A. Mishra**, and D. P. Agrawal. *Enhancement and Appraisal of Internet of Things Healthcare Networks*. Saarbrücken, Germany: Lap Lambert Academic Publishing, 2017. Print.
2. T. Reichherzer, **A. Mishra,** E. Kalaimannan, N. Wilde, "A Case Study on the Trade-Offs between Security, Scalability, and Efficiency in Smart Home Sensor Networks", The International Conference on Computational Science and Computational Intelligence (CSCI 2016), Las Vegas, NV, USA, December 15-17, 2016.
3. **A. Mishra** and S. Chakraborty, "Energy-efficient design methodologies for Wireless Body Area Sensor Networks in Healthcare Applications", BSN Conference 2016, San Francisco, CA, USA, June 14-17, 2016.
4. **A. Mishra** and D. P. Agrawal, "Energy Conservation and Lifetime Optimization of Wireless Body Sensor Networks for 24x7 Physiological parameters' Monitoring," Journal of Communications, vol. 10, no. 9, pp. 685-695, 2015. Doi: 10.12720/jcm.10.9.685-695.
5. **A. Mishra** and D. P. Agrawal, "Continuous Health Condition Monitoring by 24x7 Sensing and Transmission of Physiological data over 5-G Cellular Channels", International Conference on Computing, Networking and Communications (ICNC 2015), Feb 16-19, 2015, Anaheim, California, USA.
6. A. Jamthe, **A. Mishra**, and D. P. Agrawal, "Scheduling schemes for Interference Suppression in Healthcare Sensor Networks", ICC-2014, Sydney, Australia, 10-14 June 2014.
7. **A. Mishra**, S. Chakraborty, H. Li, and D. P. Agrawal, "Error Minimization and Energy Conservation by predicting data in Wireless Body Sensor Networks using Artificial Neural Network and Analysis of Error", CCNC-2014, Las Vegas, NV, USA, Jan 10-13, 2014.
8. N. Weragama, J. H. Jun, **A. Mishra** and D. P. Agrawal, "Simulation of Mobility Aware Dynamic Virtual Cells Utilizing Multiple Multicast Trees", IEEE ComSoc TCSIM Quarterly Newsletter, vol. 15, pp. 2-4, Dec 2012.
9. D. Agrawal and **A. Mishra**, "Designing Wireless Sensor Networks: from Theory to Applications," WCSN 2011, Seventh IEEE Conference on Wireless Communication and Sensor Networks, Dec 5-9, 2011, Panna, India.
10. M. Helmuth, R. Danard, J. H. Jun, T. Oliveira, **A. Mishra**, and D. P. Agrawal, "Water Birds: Compositional Collaboration with Clarinets, Wireless Sensors, and RTcmix," SEAMUS 2011, 26th Annual Conference of the Society for Electro-Acoustic Music in the United States, January 20–22, 2011, Miami, Florida.
11. M. Helmuth, J. H. Jun, T. Oliveira, J. B. Merkowitz, **A. Mishra**, Ahmad Mostafa, Dharma Agrawal, "Wireless Sensor Networks and Computer Music, Dance and Installation Implementations," International Computer Music Conference 2010, New York, USA, June 1-5, 2010.
12. **A. Mishra** and S. R. K. Rao, "Mathematical Modelling for Auto-running of Discontinuous Heat Exchanger System used for heating of process fluids," special reference to Cowper Stoves, Proceedings of INCON–2004-International Conference on Control and Instrumentation, College of Engineering, Pune, December 2004.
13. **A. Mishra** and S. R. K. Rao, "Control of Adiabatic Flame Temperature in the Raceway Zone in Iron Making using Steam Injection into hot air input," Proceedings of the CISCON — 2004, National Conference on Control and Instrumentation, Manipal Institute of Technology, Manipal, November 2004.

14. **A. Mishra** et al., "Development of Algorithm for the Analysis of Vibration signal of Rotating Machines," Proceedings of the National Level Conference on Advanced Control and Instrumentation, St. Joseph's College of Engineering, Chennai, January 2004, pp. 110 - 114.

Guest Lectures and Talks delivered/ Technical and Training Sessions conducted
- Delivered two technical lectures on "The concept of Comprehensive Environmental Monitoring and Control System (CEMACS) and typical CEMACS design" and "CEVIACS using Wireless Sensors" in the workshop on – 'Trends of Instrumentation and Control towards environmental challenges', 5th - 6th October 2007, sponsored by Chhattisgarh State Council for Science and Technology, organized by Bhilai Institute of Technology, Durg, India
- Conducted two technical sessions on "Drug Design and Discovery: Steps and Considerations" and "Computer Aided Drug Design" in the short-term course on 'Trends in Antidepressant Drugs - Innovations in Science and Technology: 2007', 5th - 19th July 2007, sponsored by All India Council for Technical Education, organized by Bhilai Institute of Technology, Durg India
- Delivered a talk on "Connectivity for the Youth: Trends, Services and Challenges", in the Symposium on 'World Telecommunications and Information Society Day – 2007', 17th May 2007, organized by BSNL and Institution of Engineers (India), Bhilai Local Chapter, Bhilai, India
- Delivered a talk on "OLEDs - The material and technology that one can fold, roll and wear" in the National Seminar on 'RECENT TRENDS IN ELECTRONIC MATERIALS and PHYSICAL SCIENCES', 15th -16th
September 2006, organized by Department of Electronics and Physics, St Thomas College, Bhilai, India
- Delivered two technical lectures on "Wireless Sensor Networks - Design Considerations, Architecture and Hardware" and "Wireless Sensor Network Applications" in the national workshop on "Sensor Instrumentation for Environmental Pollution Monitoring", 5th -17th June 2006, organized by Chhattisgarh Swami Vivekanand Technical University in collaboration with Centre for Environmental Science and Engineering, Bhilai Institute of Technology, Durg, India
- Delivered two technical lectures on – "Mobile Telephony in a nutshell" and "Emerging trends in Mobile Telephony" in the one-day Seminar on Modern Trends in Mobile Communication, 25th February, 2006, organized by MPC College of Engg. Technology, Bhilai, India
- Conducted a one-day workshop on "MATLAB programming for Engineers" at Rai University, Raipur, India on 15th of January, 2006
- Conducted the Telecom Quiz on 'World Telecommunication Day – 2004', 17th May 2004, organized by Institution of Engineers (India), Bhilai Local Chapter, Bhilai, India
- Presented a technical paper on "E-learning" in the National Seminar and Symposium on 'Education through Net - A new concept', 22nd August 2003, Institution of Engineers (India), Bhilai Local Chapter, Bhilai, India
- Presented a technical paper on "Telecommunication in Medical Health Care" in the National Seminar and Symposium on 'World Telecommunication Day – 2003', 17th May 2003, organized by Institution of Engineers (India), Bhilai Local Chapter, Bhilai, India
- Presented a technical paper on "VoIP and Internet Telephony" in the National Seminar and Symposium on 'World Telecommunication Day – 2002', 17th May 2002 organized by Institution of Engineers (India), Bhilai Local Chapter, Bhilai, India

- Presented a technical paper on "The New Internet Technology - in the face of changing world scenario" in the National Seminar and Symposium on 'World Telecommunication Day – 2001', 17th May 2001, organized by Institution of Engineers (India), Bhilai Local Chapter, Bhilai, India
- Guest faculty for the course titled "Computer Networks and UNIX NOS" for Master of Computers in Management program under DA University, Indore, India during 1999-2000 academic session

Conferences/ Seminars/ Short Term Courses / Training Programs Organized
- Chaired the session on 'Business Process Reengineering and Network Security (26th October. 2007) in the national conference titled "Technological Revolution in Application Development and Intelligent Systems", under 'Technovision-2007', organized by Department of Computer Applications, SS College of Engg. and Technology, Bhilai, India
- Coordinator for the workshop on "Trends of Instrumentation and Control towards environmental challenges", 5th-6th October 2007, sponsored by Chhattisgarh State Council for Science and Technology, organized by Bhilai Institute of Technology, Durg, India
- Resource person and faculty for the ongoing 60-hours refresher program – "Improving on technical and HR skills" meant for pre-final year undergraduate students. (started July 2007)
- Member of the organizing committee and Coordinator for Technical Sessions for the National Conference on "Broadband Communications", under BITCON, organized by Department of Electronics and Telecommunication Engg., Bhilai Institute of Technology, Durg, India, March 2007
- Coordinator for the National Conference on "Innovative Information Technologies and Secure Transactions", under BITCON, organized by Department of Information Technology, Bhilai Institute of Technology, Durg, India, March 2007
- Coordinator for the National Conference on "Technological Advancements in Processing and Decision making", under BITCON, organized by Department of Computer Applications, Bhilai Institute of Technology, Durg, India, March 2007
- Executive Committee for All India Seminars on "Advanced Communication Techniques and Networking: Exploring Challenges", 6th-7th January 2007, organized by Institution of Engineers (India), Bhilai Local Chapter and SS College of Engg. and Technology, Bhilai, INDIA
- Coordinator for the workshop on -MATLAB and S1MULINK programming for Scientists and Engineers", 12th December, 2006 organized by Dept. of Electronics and Telecommunication Engg., Bhilai Institute of Technology, Durg, India
- Conducted a 45-Hour Comprehensive Training Program (Oct-Nov 2006) for undergraduate students in the Pre-final year of their studies in order to improve upon their preparedness for facing job recruitment drives, organized under the banner of Training and Placement Office of the Institute.
- Coordinated a training program on "Virtual Instrumentation using LabVIEW-7 and NI-ELVIS", 4th-5th August 2006, organized by Dept. of Electronics and Telecommunication Engg., Bhilai Institute of Technology, Durg, India
- Coordinator for the workshop on "MATLAB: Toolboxes for Power Systems, Communications, Signal Processing, Neural Networks, Image Processing and Control", July 2006, organized by Dept. of Electronics and Telecommunication Engg., Bhilai Institute of Technology, Durg, India

- Convener for 'Phoenix-2006 - A national level student talent colloquium involving students' technical paper and poster presentation, technical project and computer programming contests organized by Bhilai Institute of Technology, Durg, CG, India on 7th-8th April 2006
- Initiator and Organizer of "Campus Training Forum" (CTF) at Bhilai Institute of Technology. CTF is a forum that works towards all-round development of students as true professionals. (Functioning started on 11th Feb 2006).
- Coordinator for 'ACT-2005', a National Conference on "Advance Communication Techniques" held at Bhilai Institute of Technology, Durg, India on 5th-6th April 2005
- Coordinator for 'Techno-Melange-2004', State-level students' technical paper presentation contest organized by Bhilai Institute of Technology, Durg, India on 23rd-24th August 2004

SELECTED RESEARCH AND CONSULTANCY PROJECTS

Android Smartphone based Coordinator for Wireless Body Area Networks *2014*
- Working on Arduino microcontroller controlled sensing, acquisition and transmission of physiological parameters
- Aiming at cognitive utilization of voice and data networks around the smartphone for transmission of sensed parameters

Lifetime enhancement of Wireless Body Area Networks *2013*
- Developed algorithms for packet shortening in order to save energy and enhance the lifetime of WBANs
- Evaluated energy savings for critical, real-life, real-time physiological data in the suggested WBAN framework

Wireless Sensor Network Testbed *2011*
- Designed, implemented and tested a testbed involving Tmote sensors for studying link parameters over multiple transmission channels and various power levels
- Studied packet transmission, link quality and received signal strength parameters and analyzed the results received
- Used for various other studies by senior members in the research group

Wireless Sensor Network based control of Music *2009*
- Worked on five different projects involving dancers, clarinetists and pianists with College of Music, UC
- Designed, fabricated and tested interface and conditioning circuits for external pressure, IR, optical and 3-axis accelerometer transducers for Tmote and TelosB sensors for use in sensor localization and music control
- Coded the NesC modules for data acquisition, caching and transmission for the TelosB/Tmotes

- The wireless sensor network would sense and relay the control command for playing the music to a base station Mac computer

Plate Mill, Rourkela Steel Plant, Rourkela, India *2005*
- Successfully implemented ***LIVE*** - *Logically Interactive Virtual Eyes* - An optical solution development project for dividing shear problem in Plate Mill, RSP, Rourkela, India
- The project involved image sensing of long plates using multiple cameras, compositing the images in a nonconventional display resolution and projecting them into conventional PAL-TV monitor in the control pulpit for Operator assistance

Blast Furnace 7, Bhilai Steel Plant, Bhilai, India *2001*
- Developed the algorithm, coded and implemented a network inter-process communication mailbox in UNIX for the supervisory computer system
- The mailbox was responsible for communicating sensor data from programmable logic controllers using TCP/IP, via a Terminal Server, through a UNIX server, to a Windows computer

Satpura Power, Jabalpur, India *1999*
- Designed, implemented and commissioned the automatic charging system for the Biomass Gasifier used in the generation of electrical power using firewood
- Responsible for making detailed electrical drawings, equipment planning and procurement, overseeing of installation, testing and commissioning

SELECTED ACADEMIC PROJECTS

Multilevel Encryption-Decryption for Windows CE using Random Number Generator 2006
- Working on Arduino microcontroller controlled sensing, acquisition and transmission of physiological parameters
- Aiming at cognitive utilization of voice and data networks around the smartphone for transmission of sensed parameters

Virtual 3-D tour engine 2005
- Developed algorithms for packet shortening in order to save energy and enhance the lifetime of WBANs
- Evaluated energy savings for critical, real-life, real-time physiological data in the suggested WBAN framework

Automatic Speaker Recognition System using pitch and formant analysis 2004
- Developed algorithms for packet shortening in order to save energy and enhance the lifetime of WBANs
- Evaluated energy savings for critical, real-life, real-time physiological data in the suggested WBAN framework

RF Switching
- ISM Band frequency transmitter and receiver circuits for controlling home consumer electronic appliances
- Transmitter acts as a four-channel NLOS remote controller with a much higher range than conventional IR based remotes

DAQ for Temperature measurement using NI ELVIS 3.0
- Instrumentation system designed for temperature transducers, signal conditioning and linearization, and secondary display devices using NI ELVIS and LabVIEW
- The system can accept RTDs, Thermistors and Thermocouple transducers

DIP using C
- Utilities for edge detection, image transforms, histogram equalization, color to grayscale conversion written in C language
- Use of DFT, DCT, DST, Hadamard, Discrete Walsh and KL Transform for comparison of speed and energy compaction

Optical networking through Dense Wavelength Division Multiplexing
- Optical networking for meeting high BW data demand using DWDM for routing, grooming, optical amplification and restoration at wavelength level and data capacity enhancement
- Optical layer transparent to SONET layer; provides restoration, performance monitoring and provisioning of individual wavelength instead of electrical SONET signals
- Provides ultra-fast communication over a short distance of a few meters, stationary network Capability extension possible up to a Terabit LAN

Design and implementation of a convolutional coder and decoder in FPGA
- 4-state Coder-Decoder pair using FPGA with error detection and correction, tested for noisy conditions (AWGN)
- The pair is designed for convolutional Trellis Coded Modulation for high speed modems operating in bandwidth limited channels

EVM
- Microprocessor 8085 based EVM
- Program and subroutines stored in EPROM

Collapse Indicating Devices
- Checks the pressure on any supporting surface using a piezoelectric crystal/strain gauge and gives out an alarm if the pressure exceeds predetermined unit
- Possible uses in public places, terraces, underground mines, weighing machines and elevators

FM Remote speaker system using PLCC
- HF Audio signals coupled with HV power line; signal travel along the power line and ensuring no attenuation due to bus-bar capacitance
- Isolation of power and communication equipment, power line EMI, modulation issues handled □ FM provides auto-volume control
- Duplex asynchronous serial link between two computers @9600 bauds with error detection and correction

Telephone Remote Control Switch
- ON-OFF control for home appliances through telephone calls via a circuit interfaced to the remote telephone line/device by dialing specific DTMF digits
- Audio feedback/ACK on control action completed

Local Positioning System
- Inertial Guidance - dead reckoning based local reference system from an initial reference

PC Controlled Obstacle detection and collision avoidance in a robotic rover
- Robo-rover using IR sensor TSOP-1738 for obstacle sensing
- Rover control program in C-language (stepper motor control through parallel port)

Parallel Telephones with Auto Secrecy and intercom facility
- Disabling of other parallel phones (3 of the 4 in parallel) when one has been lifted

Anti-Theft Messenger
- Auto messaging in the event of theft or fire
- Fully reconfigurable microcontroller based embedded system with battery support

Microcontroller based access control system
- □ PIC 16F84 microcontroller based lock-unlock system operated by access codes
- □ Programmed in microchip assembly language; secure password reset

Control of Home Appliances through Telephone line using PLC
- DTMF 8-channel switching via power line and Teleremote control via telephone lines
- 4-bit DTMF data sent through power main line for appliance ON/OFF control using 8 relays

Face Recognition using Eigen face method
- Uses image-vector based approach, in which there is statistics-based dimensionality reduction by using Eigen weight method
- The method also uses the extraction of some local features to determine tilt and rotation

PC-based wireless appliance control system
- Parallel port for control of devices through wireless transmitter and receiver ☐ C++ program for control with multiple possible user accounts

Health Monitoring System
- Microcontroller-based, low cost monitoring system for human body parameters

INDUSTRIAL EXPERIENCE

Assistant Manager (Instrumentation), Instrumentation Department

Steel Authority of India Limited, Bhilai Steel Plant, BHILAI, CG, India, 1992 – Nov 1997
- Planned, co-ordinated and controlled the C&I systems overhaul, additions, modifications, revamping
- Head of a team of 30 qualified technicians, responsible for scheduling preventive, shutdown and breakdown maintenance and training the team on the computerized automation systems and safety
- Responsible for implementing ISO-9001:2000 standards of calibration, testing, installation and maintenance of sensor systems, associated electronics, programmable logic controllers and distributed computer control systems
- Responsible for association and co-ordination between engineering agencies involved in the development of green field projects
- Conducted monthly contact classes and training programmes for the development of skilled manpower in the department.

Projects worth mention:
- Designed the logic, programmed and implemented the boiler drum level control loop program for the DCS automation system of a Power Station Boiler using TCL language
- Designed the logic, programmed and implemented the Raceway Flame Temperature Control Loops (assembly level and machine programming) for Blast Furnaces on Toshiba controllers
- Designed the logic, programmed and implemented the automatic model for online control of Blast Furnace Cowper Stoves on Q-Basic language
- Designed and engineered the fabrication of a modified Hot Blast and Stove Dome Thermocouple fixing assemblies for in-situ fixing in very short shutdown time

Coal India Limited, South Eastern Coalfields Limited, BILASPUR, CG, India, Jan – Aug 1992
Junior Executive Trainee, Electronics and Telecommunication Department
- Worked on Strowger and Electronic Automatic Telephone Exchanges, Landline telephone network, VHF Communications Wireless links
- Well versed with telephone system electronics, telephone network wiring and terminations
- Performed a technical evaluation for an upcoming UHF-TDMA Radio Telephony project

ACCOLADES AND AWARDS

1. Project with CCM-UC was the cover story of UC Grad School Yearbook 2009
2. NIPM – PGDPM Examination 2004
   i. Tarneja National Award – Recitation and Cash award
   ii. NIPM Proficiency Gold Medal
   iii. AIOE Gold Medal for highest marks in "Industrial Relations" paper
   iv. Karnataka State Gold Medal for highest percentage of marks in the country
3. University top, M.Tech. (Instrumentation), Class of 2001, Devi Ahilya University, Indore
4. 5th in Post-Training Merit List, SAIL-BSP's Management Trainees (Technical) - 1992 Batch 5. Best Student of the School – BMHS School, Raipur, India - 1983-84

MEMBERSHIPS

- Student Member, IEEE
- Student Member, ComSoc
- Life Member, Indian Society for Technical Education
- Member, Institution of Engineers (India)
- Life Member, Biomedical Society of India
- Life Member, Instrument Society of India
- Member of Panel of Jury, CII Chhattisgarh HR Excellence Awards - 2005
- Member, Board of Studies, Electronics and Telecommunication Engg. Stream, Faculty of Engineering and Technology, CSV Technical University, Bhilai, CG, India, 2006-2008
- Member, Board of Studies, Electronics Stream of studies, Govt. V.Y.T. P.G. Autonomous College, Durg, CG under Pt. RS Shukla University, Raipur, CG, India, 2005-2008

COMMUNITY SERVICE

- Mentor for a Blue Team participating in CyberThon 2016 and the winning UWF team in CyberThon 2017, Pensacola, FL, USA
- Volunteer for preparing the middle-school students' team for the CyberPatriot competitions at Ferry Pass Middle
  School, Pensacola, FL where I teach computer programming and cyber-security basics
- Grad Student Volunteer at University of Cincinnati – Computer Science Summer Camp
  June 2009, June 2011
  Helped in teaching of "Beginners' Java Programming" and in making robotics and sensors projects in two-week long Summer Camp - 2009 for high school students, organized by CS Dept, CEAS, UC.

  June 2010
  Taught "Beginners' Java Programming" and helped in making robotics and sensors projects in two-week long Summer Camp - 2010 for high school students, organized by CS Dept, CEAS, UC.

- Member, Volunteer and Historian for University of Cincinnati – Bhakti Yoga (Aug 2009 - July 2015)
'University of Cincinnati – Bhakti Yoga' is a students' group for general help in life through morals, spirituality, vegetarian food and healthy practices. I have participated and volunteered in all the group events that include lecture events, potlucks and fundraising efforts organized by the group since Fall 2009.
- Member and Historian for University of Cincinnati Vegetarian Club (Aug 2012 - July 2013)
UCVC is a students' group for promoting healthy living and vegetarianism among UC students that was formed in Fall 2012. I was responsible for maintaining and promoting the group as one of the Administrators of the Facebook page for the group. As the Historian, I was responsible for photographing, cataloging and sharing the details of group events on social media. I have also volunteered for monthly vegan potluck events as well as daylong promotion and fundraising events for the group.
- Volunteer for '**Association for India's Development' (AID)**; worked in fundraising events, 2008-2011
- Member, Regional representative and Auditor of a social group '**EhSaaS India**', that takes up specific help tasks for the Institutes for physically and mentally challenged in the country, by surveying their specific needs or problems and helping them out, 2005 – 2008
- Planned and managed a fundraising event in 2005 with the help of BIT Alumni for helping '**Sneh Sampada**', Bhilai, CG, India – a residential institution for the mentally challenged
- Volunteer for '**Anand Niketan**', Bilaspur, CG, India – a residential Institution for the education and development of the hearing challenged, since 1992
- Organizing Committee Member and Volunteer for BIT Durg Alumni Association (July 2001 - June 2008)
Volunteered for and helped organize annual Alumni Meets for my Alma Mater from 2001 - 2008

ANTHONY G. PINTO

apinto@uwf.edu

SKILLS SUMMARY

- Ability to relate equally will with subordinates, peers and supervisors.
- Quick to grasp new concepts, taking a common sense approach to new challenges
- Ability to program in Pascal, **C, C++, Java**, Python, JSP, Java Servlets, Java Server Faces, JDBC, Java Script, Visual Basic, Visual Basic Script, Visual Basic .NET, Perl, Lotus Script, Ada, SQL, PL/SQL, Unix scripting, Cold Fusion, XML, and HTML
- Extensive software applications experience in Windows, Linux, Unix, Lotus Notes and Domino, Oracle, SQL Plus, Eclipse, Net-Beans, MySQL, MySql Work Bench, MS SQL Server, JUnit Testing Framework,Kali Linux tools and Metasplolit
- Extensive knowledge of Ethical Hacking and Penetration testing techniques.
- In-Dept understanding of **Capability Maturity Model Integrated** (CMMI), Extreme Programming (XP) , Software Development Model and UML.
- Detailed knowledge of NSA/DHS CAE Cyber Defense Application Process
- Skilled in Object Oriented Programming.
- Compiled over **23 years as a classroom instructor** and instructor evaluator.
- Certified Technical Trainer with Comptia.
- Negotiation and Presentation Skills.
- Competed twenty years with the United States Marine Corps, with progressively increasing technical and managerial responsibilities.
- Completed 14 years as a graduate and undergraduate Lecturer in Computer Science

EDUCATION

MS, Computer Science (**GPA 3.97**)   1996 - 2002
University of West Florida   *Pensacola, Florida*

- Graduate April 2002.
- Courses include: Data Structures, **Software Engineer Courses** to include (Testing, Verification and Validation, Software Specification, Design, Management), Object Oriented Programming (**Java, C++),** Ada,

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Compiler Construction, Database Programming (**Oracle and SQL**) and Advance Database Programming (Data Mining, PL/SQL and **Oracle**), Research course developing a **Java GUI** Application.

BS, BUSINESS MANAGEMENT (**GPA 4.0**)   1989-1992
University of Maryland   *College Park, Maryland*

- Focus in International Marketing and Japanese American Comparative Management.
- Received University of Maryland Scholarship for GPA and paper on career goals.

AA, ELECTRONIC TECHNOLOGY (**GPA 3.93 SUMMA CUM LAUDE**)   1986-1989
Northern Virginia Community College   *Annandale, Virginia*

U.S. MARINE CORPS/NAVY TRAINING   1979-1997

- 200 classroom hours in **instructional technique** and **curriculum development**.
- 4400 classroom hours in electronic/computer theory and maintenance
- 600 classroom hours in leadership training.
- 120 classroom hours in Total Quality Management Skills.
- Received Leadership Writing Award while attending leadership training course.

PROFESSIONAL TRAINING
- Wireshark Advanced Network Analysis – 2013
- Blackhat Certificate – Hacking by the Numbers Bootcamp – 2013
- Blackhat Certificate – Hacking by the Numbers BlackOps - 2013
- Blackhat Certificate – Pentesting with Kali Lunix – 2013
- Blackhat Certificate – Locking Down Linux – 2014
- Blackhat Certificate – Adaptive Red Team Tactics – 2014
- Quality Matters Course Development - 2017
- NSA/DHS CAE KU Mapping - 2014
- Raytheon Cyber Security Training – 2012-2013
- SEI Introduction to CMMI - 2008
- SEI Intermediate Concepts in CMMI -2008
- SEI Practical Risk Management - 2009
- SEI Mastering Process Improvement -2009

EXPERIENCE

LECTURER   2002 - PRESENT

- Point of Contact –Coordinator for UWF successful effort to achieve the NSA/DHS Center of Academic Excellence Designation in Cyber Defense Education.
- Instructed graduate and undergraduate courses in Computer Science and Software Engineering.fac
- Developed, managed and instructed an intensive (1 day) computer programming course for undergraduate students.
- Lead in coordinating UWF efforts to achieve the NSA/DHS Center of Academic Excellence designation.
- Redesign a Cyber security course including developing 18 laboratory assignments for upper division Cyber Security course involving penetration testing and network defense using Kali Linux and Metasploit.
- Lead in developing a new Computer Science Specialization in Cyber Security, including program and new course design.
- Developed several laboratory assignment for an upper division Computer Science course, designed to improve active learning by providing a more hands on activities.
- Developed and instructed a 1 day orientation for adjunct instructors
- Developed a plan to leverage online meeting software to allow students to increase "Student engagement" and "Active learning" in SE graduate courses.
- Developed new modules in Graduate Database courses to incorporate advanced topics including relational algebra and PL/SQL
- Create an online quiz structure that provided instantiations feedback and allows students to review errors and improve their scores.
- Developed course material to change the database software used in one of our graduate SE courses. Provided students with newer state of the art software.
- Created a lesson learned activity for students in a multiple interation Software Engineering Group Project class.
- Created audio/video recording consisting of an overview that provided insight into solving the complex programming project for a Graduate Java Programming course.
- Designed new laboratory assignments for Intermediate Programming course to expose the student to Software Engineering techniques such as using UML Class and Interactive Diagrams, and incremental design.
- Incorporated demonstration of several complex tasks via on-line videos that provided students with a repeatable video reference to these tasks.
- Created new programming project assignments for Intermediate and Advanced Programming courses that caused students to more thoroughly explore GUI development which is a very marketable skill.
- Requires student in upper level programming courses to develop a users manual for all programming projects, allow student to develop their analytical thinking as well as their writing skills.
- Modified the online quizzes to provide more informative feedback to students.
- Added online quizzes to three face to face courses to provide students with self paced informative feedback.
- Successful in term substitute instructor for a software engineering course.
- Incorporated framework testing via JUnit into Advanced Programming courses laboratory and programming project assignments. Framework testing is a sought after industry skill.
- Completely redesigned the CIS/SE/ITT capstone class to incorporate a clearer, more

comprehensive, staged approach to providing solutions to real world clients. The solution included additional artifacts at each stage to improve communication between the client and the development team.

- Redesigned final exam in Graduate On-line Java programming course to test student's skill in developing complex programming solutions while using open book type resources. This new process provided a more thorough assessment of student's abilities.
- Revised a General Studies Computer Science course to increase student engagement and awareness to how information technology affects their chosen fields.
- Reworked two Graduate SE course to fit into a condensed executive format of eight weeks.
- Reviewed and tested a complex laboratory assignment dealing with Service Oriented Architecture and Cloud Computing
- Developed extensive course material for CMMI base process improvement course.
- Delivered a CMMI based process improvement course to industry professionals.
- Structured the use of On-line meeting software provide a more convenient method for student academic advising.
- Mentored a visiting professor in all aspects of teaching an undergraduate programming course.
- Provided extensive course material and mentorship to an adjunct professor in our Java Programming course.
- Created a successful partnership with Defense Activity for Non-Traditional Education Support (DANTES) at Saufley field to create project opportunities for our Graduate and Undergraduate Capstone Students.
- Setup proctor final exam for out of state adjunct professors class, included all administrative tasks including grades the exams for the adjunct professor.
- Paper on "Creating a Technically-Oriented Course in Web Services and SOA" accepted for publication and presentation by the 2010 International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS'10:July 12-15, 2010, USA)
- Paper on "Supporting Information Systems Education with Open SOA Laboratory" by Norman Wilde, John W. Coffey, Sharon Simmons, Anthony Pinto, and Eric Daniel accepted for publication and presentation by the IADIS International Conference Information Systems 2010, ISBN:978-972-8939-09-0 March 2010, Porto Portugal, pp. 503 – 506.
- Paper on "Influences on ransomware's evolution and predictions for the future challenges" by Ezhil Kalaimannan, Sharon K. John, Theresa DuBose & Anthony Pinto accepted for publication in The Journal of Cyber Security Technology Ref.: Ms. No. TSEC-2016-0002R1 http://www.tandfonline.com/doi/full/10.1080/23742917.2016.1252191
- Database administrator for Oracle Database Server.
- Developed and instructed a comprehensive information technology course covering current and future information technology topics, including new research in computer science.
- Presented a seminar in principles of learning, and instructional technique to the faculty of the Computer Science Department.
- Developed "Hands-on" workshops for Java and C++ Programming courses to increase "Active Learning" and "Student Engagement".
- Create multimedia for use in the Database System course.
- Created an online course project based course which allowed student group interaction in the virtual world of cyberspace.

- Member of the Computer Science Department Graduate Admissions Committee.(2008 – present)
- Member of the UWF General Studies Committee.(2004 – 2010)
- Selected Speaker at the 2005 Student Leadership Conference given by the UWF SGA of FWB.
- Selected Speaker at the 16th International Conference on College Teaching and Learning, March 29 – April 2 2005, Jacksonville, Fl. Presentation on *Why Ethical Themes need to be incorporated in Technology Courses*
- Departmental Representative for SSE recruiting and public relation events
- Coordinated an Memorandum of Understand between SEI and UWF related to teaching SEI CMMI courses to local government and businesses
- Coordinating a UWF entry into the SEI International Consortium of Universities
- Coordinator of outreach program between UWF and West Florida High School, including guest lectures in college level material.
- Active in Departmental Recruiting and public relations
- Developed a program to allow high school students to get Computer Science college credit.
- Developed several fully on-line Software Engineering Graduate Courses, In keeping with "Active Learning" and "Student Engagement" incorporating a virtual classroom technology throughout the course.
- Completed Certification courses in Capability Maturity Model Integrated (CMMI) with the Software Engineering Institute.
- Extremely Active in creating a partnership with Raytheon Corporation to improve our Cyber Security footprint and provide a avenue for further cooperative ventures.
- Invited guest speaker for showing faculty innovative ways to use the virtual classroom education software.
- Identified, coordinated and administered the Sun Micro System's Sun Academic Initiative (SAI) for university students and faculty
- Faculty liaison to Oracle University program that includes informational messages on cutting edge Oracle technologies, access to Oracle Engineers, Discounts on Oracle Certification Exam Self Test Software and Discount on Oracle Certification Exams for Students, Faculty and Staff.
- Members of the SSE Science Showcase presented to several grammar and middle schools in the area.
- Selected member of the Computer Science Department Chair Search Committee.
- Member of the Computer Science New Faculty Search Committee.
- Member of the departmental sub-committee on curriculum revisions.
- Member of the Florida Teachers Certification Examination Computer Science Committee for the Florida Department of Education (DOE).
- AITP Intramural Programming Contest - Develop problems, Monitored and Judged contest
- Member of the departmental sub-committee for Distance Learning.
- Active member of departmental curriculum committee involved in graduate program changes, book selection and coordination of junior college programs.
- Assist the AARP Tax program with vital IT support. Used my profession skill to guide the program coordinator and his volunteers thru issues related to processing, filing tax returns electronically. The program process over 2800 tax returns.
- Liaison between TeleCommunications Systems and UWF to provide student of the DOD Joint Analysis course college credits.

- Catholic Charities - Family Enrichment Program - Tutoring 3rd thru 5th grade in math, reading and English.
- Red Cross Volunteer in Disaster Computer Operations.
- Escambia County School District Mentor
- Children's Home Society Mentor.
- Mentor in the Escambia County School "I Love Science" Program
- Escambia County School's Science Fair Judge
- Episcopal Day School's Science Fair Judge
-
- Fall 2011 No Run-Around Volunteer, this event provided student with information on registration, admittance, financial aid, advising etc.
- Member UWF Military/Veterans Advisory Council
- Activity Coordinator for two activities in the 2012 and 2013 Regional Science Olympics held at UWF.
- Coordinating internships with several organization including Escambia County School System and Raytheon Corporation.
- Elected to CAS Council 2012 – 2014.
- CAS Council Steering committee 2013-2014
- CAS Council Curriculum Change Request Committee 2012- 2014
- CoSEH Council member and Chair of CCR committee – 2015.
- Member of the 2011 – 2013 UWF Growth & Development Committee
- Technical Mentor of Cyber Patriot Team – 2014 - 2016
- Cyberthon 15 and 16 – committee member and Blue Team Leader.
- Faculty Advisor/Mentor – UWF Cyber Security Club/Cyber Competition team.
- Mentor to the club's competition team that took first place honors in the 2016 Florida Center for Cybersecurity Annual Conference Cyber Defense Challenge and the Cyberthon 2017 Cyber Defense Capture the Flag Competition.
- Award NSA GenCyber Grant – 2017
- Award NSA/DHS CAE Regional Resourse Center Grant.

PROGRAMMER   1999 – 2002, 2004 - 2009
Dyntel /CSC   *Pensacola, Florida*

- Project Lead for two dynamic web application using a variety of technologies including, J2EE, Oracle, MS SQL Server, Perl, and Linux.
- Performed multiple programming task in several languages including Visual Basic Script, ASP languages, **C++**, **Java** and Java Script in support of the U.S. Navy effort to allow world-wide web integration and collaboration.
- Developing integrated web and application based database system to store, present, and report data used by various departments of the federal government.
- Team leader of project which included building an **Oracle** Database and providing a complex **dynamic** web interface using Cold Fusion and Java Script.
- Designed and developed interactive web site using JSP, JavaSerlets and SQL Server DB. Project pulled data from multiple internet sources and develop chart, graph etc.
- Exetensive use of Perl scripting to extract complex data for storage in an Oracle database.
- Developed an Application in BMC Remedy Administrative Request System.
- Led a team to develop a Software engineering project process for a government

organization.

- Designed, implemented and integrated in C and Unix Script, an Email address conversion program handling 30,000 addresses from 20 different sources.
- Built and maintain a web accessible site that houses all 10000+ U.S Navy training courses including schedules and dynamic quotas using extracted data from the Navy's Master **Oracle** database.
- Converted Marine Corps Awards program into version used by Chief of Naval Education and Training including over 400 hours of modification and additions.
- Managed network security.

NETWORK ADMINISTRATOR   1994 -1999
Naval Air Technical Training CenterMillington, Tennessee and Pensacola, Florida

- Performed hardware and software configuration of Windows 3.11/95 computers for use on Windows NT system..
- Managed network security by controlling user access through password, user groups and profiles.
- Diagnose/repaired software, network access and hardware problems.
- Trained users on software/system operation to include file back-up procedures.
- Developed Lotus Approach Data Base program to track student administrative data.

ATC RADAR MAINTENANCE INSTRUCTOR/SUPERVISOR   1992 - 1999
Naval Air Technical Training CenterMillington, Tennessee and Pensacola, Florida

- Supervised 6 instructors in a complex $2.5 million computer controlled Radar system course consisting 568 classroom/laboratory hours.
- Proven innovator by decreasing student attrition rate from 17% to 3% by implementing curriculum changes and refocusing instructor's schedules.
- Hand-picked by Training Officer due to unquestioned credibility, persistence and organizational skills to research, supervise and electronically **develop curriculum** for a maintenance management course consisting of over 2000 pages of material. **Received Navy and Marine Corps Commendation Medal**.
- Managed quarterly training schedule for 150 instructors by developing **Lotus Approach Data Base** program to report and schedule training.

1983-1992 Provided varying degrees of management and technical skills in relation to computer controlled Radar system.

ADDITIONAL INFORMATION
Security clearance precludes discussion. Excellent health.

Dr. rer. nat. (Ph.D.) Bernd Owsnicki-Klewe

Email:
bowsnickiklewe@uwf.edu

RECENT ACTIVITIES AT UWF (LECTURE DETAILS UNDER POINT F)

2010 through today:	Assessment coordination for the CS department
2014 through 2016	ABET collaborator
Since 2008	Member of various departmental/university committees
	Currently CASL

Spring 2017

CGS 3183:	Basic Web Applications
CIS 4592:	Capstone 2
COP 4027:	Advanced Computer Programming
COT 4420:	Theory of Computation (F2F/online)

Fall 2016

COP 2253:	Java Programming
CEN 4400:	Introduction to Operations Research
CTS 4817:	Web Server Administration
COP 4856:	Distributed Software Architectures 1 (F2F/online)

Support of the ACM ICPC South-East Regional

Summer 2016
CGS 3853: Web Page Design

Spring 2016

COT 3100:	Discrete Structures
CGS 3183:	Web Design for E-Commerce
CIS 4592:	Capstone 1
COT 4420:	Theory of Computation (F2F/online)

Fall 2015

COP 2253:	Java Programming
CEN 4400:	Introduction to Operations Research
CTS 4817:	Web Server Administration
COP 4856:	Distributed Software Architectures 1 (F2F/online)

Organization of the ACM ICPC South-East Regional

Summer 2015
        CGS 3853: Web Page Design

  Spring 2015

        COT 3100:   Discrete Structures (F2F/online)
        CGS 3183:   Web Design for E-Commerce
        CIS 4592:   Capstone Research Experience
        COT 4420:   Theory of Computation (F2F/online)

  Fall 2014
        COP 2253:   Java Programming
        CIS 4595C: Capstone Project
        CTS 4817:   Web Server Administration
        COP 4856:   Distributed Software Architectures 1 (F2F/online)
        Organization of the ACM ICPC South-East Regional

Summer 2014
        CIS 4905: Directed Study "Web Application Security"
        CGS 3853: Web Page Design

Spring 2013
        COT 3100C: Discrete Structures
         CGS 3183:   Web Design for E-Commerce
         CIS 4592:   Capstone Research Experience
         COT 4420:   Theory of Computation (F2F/online)
        COP 4857: Distributed Software Architectures 2 (online)

Fall 2013
         COP 2253:   Java Programming
         CIS 4595C: Capstone Project
         CTS 4817:   Web Server Administration
         COP 4856:   Distributed Software Architectures 1 (F2F/online)
        Organization of the ACM ICPC South-East Regional

Summer 2013
        CGS 3853: Web Page Design

Spring 2013
        COT 3100/L: Discrete Structures with Lab
         CGS 3183:   Web Design for E-Commerce
         CIS 4592:   Capstone Research Experience
         COT 4420:   Theory of Computation (F2F/online)

Fall 2012
         COP 2253:   Java Programming
         CIS 4595C: Capstone Project
         CTS 4817:   Web Server Administration
         COP 4865:   Distributed Software Architectures 1 (F2F/online)

Organization of the ACM ICPC South-East Regional

Summer 2012
     CGS 3853: Web Page Design

Spring 2012
     COT 3100/L: Discrete Structures with Lab
     COP 4814:   Net-Centric Applications
     CIS 4592:   Capstone Research Experience
     COT 4420:   Theory of Computation (F2F/online)
     COP 4534L: Data Structures and Algorithms 2 Lab

Fall 2011
     CGS 2060L: Excursions in Computing Lab
     COP 2253:   Java Programming
     CTS 4817:   Web Server Administration
     COP 4865:   Distributed Software Architectures 1 (F2F/online)
     Organization of the ACM ICPC South-East Regional

Spring 2011
     COT 3100/L: Discrete Structures with Lab (Pensacola)
     COP 4814:   Net-Centric Applications (Pensacola)
     CIS 4592:   Capstone Research Experience
     COT 4420:   Theory of Computation (DL, Online, Pensacola)

Fall 2010
     COP 2253:   Java Programming (3 sections, Pensacola/online)
     CTS 4817:   Web Server Administration
     Organization of the ACM ICPC South-East Regional

Summer 2010
     COP 2253:   Java Programming
     CGS 3853:   Web Page Design

Spring 2010
     COP 2253:   Java Programming (Online)
     COT 3100/L: Discrete Structures with Lab (Pensacola)
     CIS 4592:   Capstone Research Experience
     COT 4420:   Theory of Computation (Pensacola)

Fall 2009
     COP 2253:   Java Programming (Pensacola/online)
     CTS 4817:   Web Server Administration
     COP 4865:Distributed Software Architectures 1 (Pensacola)Spring 2009
     COP 2253:   Java Programming (Pensacola)
     COT 3100/L: Discrete Structures with Lab (Pensacola)

COP 3022/L: Intermediate Programming with Lab (Pensacola)
COT 4420:   Theory of Computation (Pensacola)
Argoforge: Training group for Programming Competitionsi

Fall 2008
COP 2253:   Java Programming (Pensacola/online)
COT 3100/L: Discrete Structures with Lab (Pensacola)
COP 4865:   Distributed Software Architectures 1 (Pensacola)ii
Coach for the 2008 ACM International Collegiate Programming Contest

Spring 2008

COP 2253:   Java Programming (Pensacola/online) [3 sections]
COT 3100:   Applications of Discrete Structures

Fall 2007
COP 2253:   Java Programming (Pensacola) [2 sections]
CGS 3823:   Web Page Design (Pensacola)
COT 4420:   Theory of Computation (Pensacola)
Organization of the UWF Second Life presenceiii
Contact faculty for Bits & Bytes – UWF/CS Student's Group

Spring 2007
COP 3022:   Intermediate Programming (Pensacola) [2 sections]
COT 4420:   Theory of Computation (Pensacola)
COT 3100:   Applications of Discrete Structures
CEN 5915:   Graduate CS research: Embedded Systems
UWF Honors Seminar "Great Works of Science": Frontiers of Computing
Participation in Curriculum Reform Working Group
Participation in the setup of the new CS department web server
Final development, launch and maintenance of the CS web site

Fall 2006
CIS 3020:   Science of Computing (Pensacola) [2 sections]
CGS 3604:   Applications of Information Technology (Pensacola)
CGS 3823:   Web Page Design (Pensacola)
CEN 4905:   Directed Study (Client/Server Architectures)
Participation in Curriculum Reform Working Group
Development of a concept for the CS web site
Participation in ITS training "Certified Web Developer"
Member of the Association for Computing Machinery (ACM)
Spring 2006
CIS 3020:   Science of Computing (FWB, Pensacola) [2 sections]
COP 3022:   Intermediate Programming (FWB)
COT 4420:   Theory of Computation (FWB)
Co-organization of "Seastars 06"

Fall 2005

CEN 3031:   Software Engineering (FWB)
COP 3530:   Algorithms and Data Structures (FWB)
COP 3022:   Intermediate Programming (FWB)
CIS 3020:   Science of Computing (FWB)

A.   EDUCATION

1984   Doctorate (Ph.D, Dr. rer. nat.) in Computer Science from the University of Hamburgiv (Grade A, "Magna cum laude"). Thesis supervisors: Prof. Dr. F. Schwenkel (Univ. of Hamburg), Prof. Dr. W. Brauer (Technical Univ. of Munich), Prof. Dr. H.-J. Schneider (Technical Univ. of Berlin)

1980 Diploma in Computer Science from the University of Hamburg (Grade A) on subject of "Knowledge Based Systems"

B.   PROFESSIONAL HISTORY

- current   Lecturer at the Department of Computer Sciencev at the University of West Floridavi.

2004 - 2005 Settling over to the USA, received work permit and SSN. Work on a CS textbook, improving photography and Photoshop/Flash skills.

1990 – 2004 Full Professor for Foundations of Computer Science and Applications of Computer Science in Economy at University of Applied Sciences Hamburgvii, Department of Electrical Engineering and Computer Scienceviii.

1984 – 1990 Researcher with PHILIPSix Research Laboratory, Hamburg. Research topics: Theoretical considerations, design and nucleus
implementation of a taxonomic knowledge representation system (based on description logics a la KL-ONE) at PHILIPS Research Laboratory, Hamburg. Several publications, invited talks and lectures within and outside of PHILIPS.

Since December 1987: Project leader (leading 4 scientists) supervising system extensions like connecting to a DBMS and integration of nonmonotonic and vague reasoning. Work on example applications: Computer configuration and text understanding.

1980 – 1984 Freelance employee with REDA GmbH, Hamburg/Grossensee, a consulting firm with focus on accounting and cost control for medium-sized manufacturing companies. Leading designer and implementation supervisor of BABSSY, a software system for integrated accounting, cost controlling and production control.

Responsibilities: Management of two pilot installations (in jewelry and mechanical engineering companies), technical and organizational support, consultant to customer management and general maintenance of customer relations. Reported directly to CEO. Later awarded procuration for REDA until leave in 1984.

1973 – 1980 Freelance employee with SCHIFFKO GmbHx, Hamburg. Design and implementation of software (FORTRAN) for Computer Aided Manufacturing (CAM) in shipbuilding. Esp. S16-BS, an interactive graphical program for interactive arrangement of pieces on steel plates for oxygen or laser cutting. Participation in several workshops and exhibitions on CAM and cutting technology.

C.   Professional Services

2002 – 2004 Designer and webmaster of the Computer Science website at UAS Hamburgxi.

1998 – 2004 Member of the Study Reform Committee of the Department of Electrical Engineering and Computer Science. Member of the work group on the definition of the revised CS study system, including introduction of Bachelor's and Master's degrees in CS. Participation in several auditions for accrediting Bachelor and Master courses in Computer Science and Information Engineering.

1997 – 1999 Member of the department's working group on cooperation with local high schools on issues of CS education in high schools.

1997 – 1999 Participation in the University work group on the agreement upon "Ergonomic guidelines for computer workplaces". Definition of ergonomic rules and their implementation within the around 800 staff computer workplaces at the University.

1995 – 2004 Reviewer of several books on AI and C++ programming (details available upon request)

1994 – 1995 Expert referee for several Federal Research Funding Applications procedures (by the German Secretary for Research and Technology)

1992 - 1994 Head of the "Laboratory for Software Technology" at the Dept. of EE and CS at FH Hamburg, overseeing five laboratory assistants/technicians. The laboratory is responsible for carrying out teaching support for more than 400 students of "Software Technology" and "Technical Computer Science".

1992 – 1994 Member of the "Computer Council Berliner Tor". Council objectives: Planning and overseeing the future technical and staff development of computer equipment for four major departments of the university.

1990   Referee for the German Workshop on AI, GWAI-90
1990 – 1999 Member of several committees for the appointment of professors in Hamburg, Leipzig and Elmshorn (Northern Academy)

1989   Referee for the workshop on "Modeling" at the Austrian AI Conference, ÖGAI-89

1988   Program Chairman, organization and management of the 6th Spring School on AI, KIFS-88, Günne

1988   Member of the program committee of the German Workshop on AI, GWAI88

1987   Expert referee for "Informatik in Forschung und Entwicklung" (Computer Science in Research and Development)

1987   Referee for the German Workshop on AI, GWAI-87

1979 – 1980 Participation in the "CAD Working Group" at the "German Research Center for Shipbuilding". Emphasis on discussion and recommendation of "Guidelines for Future CAD Applications in Shipbuilding and Maintenance Technology" (recommendation to the German Secretary for Research and Technology). Evaluation of several Computer Graphics kernel systems, esp. GKS

D.   Publications (In chronological order)

Graphische Datenverarbeitung – Eine marktnahe Neuentwicklung zur Steigerung der Effektivität in der Fertigungsvorbereitung (Graphical Data Processing – A close-tomarket development to increase efficiency in production planning). HANSA – Schiffahrt – Schiffbau – Hafen, 114, No. 18, pp. 1599-1601, 1977 (with B. Pruin).

Bauteile SMD, ein in die Praxis eingeführtes EDV-Paket für die blechverarbeitende Industrie (Parts SMD, a practical EDP package for the steel processing industry).
HANSA – Schiffahrt – Schiffbau – Hafen, 115, No. 18, pp. 1463-1672, 1978 (with H. Dittmann, U. Kipp, B. Pruin).

Repräsentation von strategischem Schachwissen (Representation of Strategic Chess Knowledge). KI-Rundbrief der GI Nr. 21, pp. 2-6, 1980 (with K. v. Luck)

Structures for Knowledge Based Chess Programs. In: J. Siekmann (ed.): GWAI-81, German Workshop on Artificial Intelligence, pp. 297-306, Springer Verlag, 1981 (with K. v. Luck) [refereed]

N.N. A View on Planning in Chess. In: W. Wahlster (ed.): GWAI-82, German Workshop on Artificial Intelligence, pp. 92-101, Springer Verlag, 1982 (with K. v. Luck) [refereed]
N.N. A Case Study in Chess Knowledge Representation. In: D. Beal (ed.): Advances in Computer Chess IV, pp. 127-146, Pergamon Press, 1984 (with K. v. Luck) [refereed]

Declarative Representation of Control Structures. In: J. Laubsch (ed.): GWAI-84, German Workshop on Artificial Intelligence, pp. 181-190, Springer Verlag, 1984 (with K. v. Luck) [refereed]

Repräsentation von postionellem Schachwissen mit Methoden der Künstlichen Intelligenz (Representation of Positional Chess Knowledge with Artificial Intelligence Methods), Ph.D. Thesis. Also: Report No. 111, Department of Computer Science, University of

Hamburg

Data Models in Knowledge Representation Systems. In: C.-R. Rollinger, W. Horn (eds.): GWAI-86, German Workshop on Artificial Intelligence, pp. 69-74, Springer Verlag, 1986 (with J. Edelmann) [refereed]

Neuere KI-Formalismen zur Repräsentation von Wissen. In: T. Christaller (ed.): Künstliche Intelligenz, KIFS-87, 5. Frühjahrsschule für Künstliche Intelligenz, Springer Verlag, 1989 (with K. v. Luck) [invited]. English version: New AI formalisms for Knowledge Representation, KIT Report, TU Berlin, 1987

Configuration as a Consistency Maintenance Task. In: W. Hoeppner (ed.): GWAI-88, German Workshop on Artificial Intelligence, Springer Verlag, 1988 [refereed]

Probabilistic Inheritance and Reasoning in a Hybrid Knowledge Representation System. In: W. Hoeppner (ed.): GWAI-88, German Workshop on Artificial Intelligence, Springer Verlag, 1988 (with J. Heinsohn) [refereed]

Ein integriertes System zur Repräsentation von Wissen (An Integrated System for the Representation of Knowledge). PHILIPS "Unsere Forschung in Deutschland" (Our Research in Germany), 1989

A General Characterization of Term Description Languages. In: K.H. Bläsius, U. Hedstück, C.-R. Rollinger (eds.): Sorts and Types in Artificial Intelligence, Springer Lecture Notes in Artificial Intelligence, pp. 183-189, Springer Verlag, 1989 [invited]

A Cardinality-Based Approach to Incomplete Knowledge. In: L.C. Aiello (ed.): Proceeding of the European Conference on Artificial Intelligence, ECAI-90, pp. 491-496, Pitman Publishing, London, 1990 [refereed]

Term Subsumption Languages in Knowledge Representation. AI Magazine, No. 2, pp.16-23, 1990 (with P. F. Patel-Schneider, A. Kobsa, N. Guarino, R. M. MacGregor, W. S. Mark, D. L. McGuiness, B. Nebel, A. Schmiedel, J. Yen)

KL-ONE – Eine Einführung (KL-ONE – An Introduction). In: P. Struß (ed.): Wissensrepräsentation (Knowledge Representation), Oldenbourg Verlag, 1991 (with K. v. Luck) [invited]
Integrating Cognitive Systems: First Intermediate Report - Project Outline, 1995 (with K. von Luck)

Smalltalk als Plattform zur Integration unterschiedlicher Softwarekonzepte (Smalltalk as a Platform for the Integration of Various Software Concepts). Proceedings of the STJA (Smalltalk and Java in Industry and Education) '97, pp. 209-214, 1997 (with M. Böhm, G. Pfeiffer, J. Raasch) [refereed]

Integration kognitiver Systeme - ein Zwischenbericht (Integration of Cognitive Systems – an Intermediate Report). KI (German magazine on Artificial Intelligence), No. 2/97, pp. 33-36, 1997 (with M. Böhm, G. Klemke, K. v. Luck, G. Pfeiffer)

Objektorientierung in der Informatikausbildung auf der Basis von Smalltalk (Object Orientation in Computer Science Education based on Smalltalk). Informatik Spektrum No. 20, pp. 335-343, 1997 (with M. Böhm, J. Freytag, G. Pfeiffer, J. Raasch) [invited]

Introducing a Reflective Activity into the Design Process in an Advanced Computer Programming Course, CCSC-MS: 2016 (with J. Coffey)

E.   Books

Algorithmen und Datenstrukturen (Algorithms and Data Structures), Verlag Wißner,

Augsburg, 1995, 2nd ed. 1997, 3rd ed. 1998, 4th ed. 2002, ISBN 3-89639-172-0

Wissensrepräsentation und Logik - Eine Einführung (Knowledge Representation and Logic – An Introduction). In: Görz, G. (ed.): Handbuch der Künstlichen Intelligenz

(Handbook of Artificial Intelligence), Addison-Wesley, 1993, 2nd ed. 1995, 3rd ed. 2000, ISBN 3-486-25049-3 (with K. v. Luck, B. Nebel). Responsible chapter editor of the chapter on "Knowledge Representation".

F. PRESENTATIONS (SELECTION, IN CHRONOLOGICAL ORDER)

Wissensrepräsentation mit Semantischen Netzen (Knowledge Representation with Semantic Networks). PHILIPS Research Laboratories, Hamburg, 1986

Semantic Networks. ISA Colloqium on Conceptual Modeling, Eindhoven, 1986

The MESON Knowledge Representation System. PHILAI-86, PHILIPS Workshop on Artificial Intelligence, 1986

Notes on the Role of Semantics in Knowledge Representation Systems. Tutorial at the German Workshop on Artificial Intelligence GWAI-86, 1986
On the Representation of Uncertainty in Semantic Networks. PHILAI-87, PHILIPS Workshop on Artificial Intelligence, 1987

Non-Concepts and Non-Roles. 1st German KL-ONE workshop, Saarbrücken, 1987

Advanced Course: New AI Formalisms for Knowledge Representation. 5th Spring School on AI (KIFS-87), Günne, (with K. v. Luck), 1987

Basic Course: Knowledge Representation. 6th Spring School on AI (KIFS-88), Günne, (with K. v. Luck), 1988

Configuration in the MESON Knowledge Representation System. PHILIPS TDS Appeldoorn, 1988

Verstehen und Referenz in der KI (Understanding and Reference in AI). Workshop on the Philosophy of Understanding, Dagstuhl, 1989

Knowledge Representation for Text Understanding. Institute for Perception Research, Eindhoven, 1989

Terminologische Repräsentationssysteme (Terminological Representation Systems). Univ. Bielefeld, 1989

The MESON Knowledge Representation System. AAAI Workshop on "Term Subsumption Languages in Knowledge Representation", Thorn Hill, NH, 1989

Wohin steuert die KI? (Where is AI heading to?). Spring School on Artificial Intelligence, Günne, 1991

Künstliche Intelligenz - Ein Thema für das Gymnasium? (Artificial Intelligence - A Topic in High-School Education?). Annual Conference of the MNU (Society for Education in Science and Mathematics), Stuttgart, 1992 (with Y. Klewe)

Semantic Networks and Term Description Languages for Knowledge Representation. Advanced Tutorial at the Conference on Artificial Intelligence in Medicine (AIME-93), Munich, 1993

Several presentations to high school representatives on "CS education in high school", 1997-1999

Programming Languages (position statement). Workshop on "Object Orientation in Education". GI-Tagung Informatik und Ausbildung (Conference of the German CS Society on Computer Science and Education), Stuttgart, 1998

oo-m-ai: Object-oriented Methods for Artificial Intelligence. Presentation at the Institute for Human and Machine Cognition, Pensacola, Florida, 2001.

G. TEACHING EXPERIENCE

The following courses have been held at different Universities and academies in and around Hamburg.

Semantisch fundierte Wissensrepräsentationssysteme (Semantically Well-founded Knowledge Representation Systems). Seminar, Univ. of Hamburg, (with K. v. Luck), Fall 1988

Modellbildung in wissensbasierten Systemem (Modeling in Knowledge Based Systems). Seminar, Univ. of Hamburg, (with K. v. Luck), Spring 1989

Algorithms and Data Structures. Northern Academyxii, Elmshorn, 1996 – 2003. See below

Theoretical Foundations of Computer Science 3. Northern Academy, Elmshorn, 1999
Formal languages, grammars, Chomsky hierarchy of grammars and languages,

Pumping Lemma for regular languages, context-free languages, parsing problem, Compiler architecture, LL(1) parsing

Weekend seminar: Introduction to Java. Northern Academy, Elmshorn, 1999/2001/2002
See Programming 2 (Java) below

The following courses have been held at the University of Applied Science, Hamburg. Some have been held multiple times since 1990. Some lecture's material might overlap due to changes in the curriculum over the years.

Programming 1 (Pascal)
Simple data types, control structures, compound data types, procedural abstraction, data abstraction, top-down development, correctness (assertions, invariants)

Programming 2 (Pascal)
Basic algorithms, sorting and searching, information systems architectures, practical case studies

Programming 1 (Smalltalk)
Principles of object-orientation, CRC principle, message passing, classes, instances, methods, iterations, collections, streams, abstract classes and methods, design and redesign issues, GUI design, information systems architectures, simple design patterns ("Observer", "Factory", "Singleton", …)

Programming 2 (Java)
Distinctions between Smalltalk and Java, static vs. dynamic typing, type casts, design using abstract classes and interfaces, containers, exceptions, threads, events, AWT, applet programming, http services, reflective programming, advanced design patterns ("Strategy", "COR", …)

Programming for Students of Electrical Engineering (Pascal) Simple data types, control structures, compound data types, procedural abstraction, top-down development, numerical methods, basic algorithms (sorting and searching)

Algorithms and Data Structures (Pascal, C++ and Java)
Quality of algorithms, abstract data types, asymptotic analysis, sorting algorithms, divide-and-conquer algorithms, external sorting, binary search trees, B-Trees, tree and graph searching, optimization (greedy, Dynamic Programming), data compression

Functional and Logic Programming (Scheme/Prolog)
Functional programming paradigm, functions as first-class objects, lambda abstraction, higher-order functions, lexical and dynamic binding, encapsulation principle, delayed evaluation, streams, meta programming, logical programming paradigm, pattern matching and unification, WAM, Prolog programming styles, non-deterministic programming, information systems in Prolog, deductive databases, introduction to NLP and DCG parsing

Artificial Intelligence (Scheme/Common Lisp)

Introduction to Scheme/Lisp, list processing, list representation of complex data structures, objectives and methods of Artificial Intelligence, pattern matching, deduction algorithms, frame-based representation schemes, Micro-Flavors, Expert Systems

Applications of Artificial Intelligence (Prolog)

Advanced Prolog programming, backtracking control (cut, fail), non-deterministic parsing, Definite Clause Grammars, syntax, compositional semantics, world models and references, QA systems, semantic anomalies, issues of ambiguity

Applications of Artificial Intelligence (Smalltalk)

Objectives and methods of Artificial Intelligence, symbolic and sub-symbolic AI, symbols and denotation, logic, basic model theory, uninformed search methods, "Generate and Test", backtracking search, constraint solving, backward checking, forward checking, dependency-directed backtracking, informed search methods, gradient search, A* search, Means-End search, diagnostic problems, truth maintenance, uncertain knowledge, representation of temporal constraints, planning and configuration

Computer Science 1 (C++, in English for the international course on "Information Engineering")

Algorithms, data structures and abstract data types, Discrete Mathematics introduction (summations and products, asymptotic analysis), sorting algorithms, divide-and-conquer algorithms, binary search trees, B-Trees, data compression, tree and graph searching

The Semantic Web (Elective module)xiii

Current state of WWW services, Berners-Lee's "Semantic Web" vision, Search Engines, Annotations, SW activities by W3C and SemanticWeb.org, Semantics, Logic and Set Theory, Ontologies (Aristotle to modern), Languages (RDF, Description Logics, (DAML, OIL, …), Tools (Amaya, OilEd, …), Ontology construction and use

Introduction to Computer Science

Overview of CS, history of CS, coding schemes, the concept of information, redundancy, logic circuits and arithmetic, hardware abstraction layers, equivalence of hardware and software, programming languages and paradigms, automata and limits of computation.

Automata Theory

Alphabets, formal languages, grammars, Chomsky hierarchy of grammars, finite automata, acceptance conditions, regular languages, non-deterministic FAs, regular expressions, pumping lemma for regular languages, finite machines, applications in UI and protocol design, context-free languages and LL(1) parsing, push-down automata, normal forms, pumping lemma for CFLs, equivalence of CFLs and PDAs.

Compiler Construction

Compiler/Interpreter architecture, lexical analysis with finite machines, LL(1) parsing, elimination of left recursion, left factorization, manual conflict resolution, error

recovery strategies, issues of semantics, attributed grammars, syntaxdirected translation, type checking, intermediate code generation (Reverse Polish Notation), code design, limits of syntax-directed translation, bottom-up parsing, (S)LR parsing, lex and yacc

Theory of Computability

Objectives of Computability Theory, historical outline, Turing Machines, TMs as acceptors, recursively enumerable (Turing-acceptable) languages, computable functions, existence of non-computable functions, enumerable sets, decidable sets, construction of enumerators (dovetailing), Chomsky type 0 languages, equivalence of r.e./enumerable/type 0 languages, the Universal Turing Machine, non-deterministic TMs, undecidable problems, Halting Problem, equivalence of TMs, non-r.e. languages, undecidable languages, Rice's Theorem, Recursive functions, Introduction to Complexity Theory

Seminar on Applied Computer Science (Examples of tutored student presentations) Non-deterministic algorithms, probabilistic algorithms, encryption and compression algorithms, compression and transmission standards, computer viruses, XML, VPNs, Java 2 and JFC, Servlets, Web Services, distributed systems, electronic marketplaces

Seminar on Technical Computer Science (Examples of tutored student presentations) XML, DTDs and XMLS, URIs and XML namespaces, CSS and XSL/XSLT, XPath, XLink, XPointer, XQuery, XML development tools, XML extensions (RDF, DAML+OIL, etc.), XML applications

Introduction to CS

History of CS, areas of CS, number systems, elementary circuit design, effective procedures (algorithms), Turing machines, efficiency issues, asymptotic analysis, PL paradigms (imperative, functional, logical), syntax/semantics/translation of PLs, social implications of CS.

Automata and Formal Languages

Alphabets, formal languages, grammars, Chomsky hierarchy of grammars, finite automata, acceptance conditions, regular languages, non-deterministic FAs, regular expressions, pumping lemma for regular languages, finite machines, applications in UI and protocol design, context-free languages and LL(1) parsing

The following courses have been held at the University of West Florida.

Science of Computing

Data storage, data manipulation, operating systems, networking, algorithms, programming, software engineering, data abstractions, database systems, artificial intelligence, theory of computation

Intermediate Programming in Java

Arrays, Arraylists, Interfaces, inheritance, graphics, events, GUIs, exceptions, files and streams

Introduction to Software Engineering

Software Life-Cycle models, Software process models, teams, requirements analysis, OO analysis, OO design, implementation, post-delivery maintenance

Data Structures and Algorithms

Analysis of algorithms, Stacks and Queues, Binary Trees, self-adjusting trees (AVL, B-Trees), Hashing, Sorting, Graph algorithms

Theory of Computation

Sets, alphabets, mappings, formal languages, grammars, finite automata, acceptance conditions, regular languages, non-deterministic FAs, regular expressions, pumping lemma for regular languages, context-free languages, derivations, derivation trees, Chomsky Normal Form, pumping lemma for CFLs, Turing Machines, acceptance, recursively enumerable languages, construction of TMs, TMs as enumerators, Church-Turing Thesis, Halting Problem, undecidable languages, reduction proofs, Post's Correspondence Problem

Applications of Information Technology

Computer terminology, computer components, hardware, software, HumanComputer interaction, GUIs, interface usage, networks, WAN/LAN, Internet, files and folders, HTML, tags, links, pictures, WWW search and information retrieval, information representation, bit, byte, codes, computer organization, CPU, peripherals, machine programs, operating systems, programming languages, algorithms, digital media, sound, images, sampling, compression, social implications of IT, computer hazards, legal issues, spreadsheets, Excel, databases, basic concepts, query composition, database design, privacy and security

Web Page Design

Introduction to the WWW, clients and servers, history, protocols, URLs, HTML/XHTML basics, tags, colors, fonts, advanced XHTML, lists, tables, Cascading Style Sheets (CSS), association via tags/classes, specific styles, elements, external style sheets, CSS positioning, images, formats, preparation and embedding, copyright issues, design basics, usability, accessibility, aesthetics, page navigation schemes, form and color, website planning and construction, browser differences, Javascript basics, Document Object Model (DOM), Javascript and DOM, Multimedia basics, Audio/Video preparation and publishing, codes and Codecs, compression, SMIL

Applications of Discrete Structures

Propositional logic, truth tables, equivalences, predicates, quantifiers, inferences rules, proofs (direct, indirect), sets, operations, Venn diagrams, functions, surjective/injective/bijective, inverse functions, sequences and summations, summation rules, algorithms, asymptotic analysis, function growth (O, W, Q), definitions, proofs, algorithm complexity, induction proofs (mathematical, strong, structural), recursive definition, recursive algorithms, recursion and recurrences, solving linear recurrences, divide-and-conquer algorithms, Master Theorem, Boolean functions, construction of Boolean functions (Disjunctive/Conjunctive Normal Forms)

Distributed Software Architectures 1

Classification of Distributed Architectures, Client/Server, P2P, Three-Tier Architecture, Databases, Relational Model, Keys, Integrity, Relational Algebra, DB Design, Transactions, Two-Phase Lock Protocol, SQL, MySQL, JDBC, XML, Web Tier, Web Servers, http, Application Servers, GlassFish, NetBeans, Servlets,

Java Server Pages, JavaBeans, MVC, Server/Client-Side Validation, Java Server Faces, Distributed Objects, Error Semantics, Sockets, RMI, JRMP, IIOP, CORBA, EJB, Dependency Injection, JNDI, JPA, JTA

Web Server Administration

Installation and administration of the Apache web server under unix, user management, backups, support software (ftp,ssh), server extensions (CGI, PHP, tomcat), web application deployment, server security, secure connections (SSL/TLS), MS Server 2008 and IIS, .NET applications, virtualization

Capstone Research Experience

Research topic selection, literature selection, research project planning, presentation techniques, research report structure, practical aspects (project documentation, three presentations, one research report)

Net-Centric Applications

XML, basics, well-formedness, validation, DTD and XML Schema, CSS, XSLT, client-side scripting, JavaScript, jQUERY, AJAX, server-side processing, PHP, MySql database, web application security (XSS, SQL injection, …), session management, web services, WSDL and SOAP, deployment strategies

Excursions in Computing Lab

Hands-on experience with Search Engines, Web Page Design, Cooperative Work, Media, Operating Systems, Databases, Programming, Research and Presentations

Data Structures and Algorithms 2 Lab

Design studies by course projects, coding and debugging, probabilistic algorithms, applications of asymptotic analysis (recurrences, Master Therorem), Counting and Combinatorics, Greedy Algorithms

Capstone Project

Development of a software system for a real-world client while working in small teams. Development and delivery of relevant artifacts such as a project proposal, design, test plan, code, user's manual, and project log with metrics as the software system evolves throughout the course. A final presentation and evaluation of the project experience is required.

Web Design for E-Commerce

Introduction to software components in e-commerce, Infrastructure for ecommerce, Security and legal issues in e-commerce, Creating a web site for an industry, Accessibility and Usability issues, expanding a web site to include catalogs and shopping carts, Future of e-commerce software; technology: HTML/CSS, Relational DBMS, PHP

Distributed Software Architecture 2

Advanced concepts in Java EE: Details of MVC, EJBs and Dependency Injection (DI), DI by Annotations or JNDI lookup, Bean life cycle and call-backs, Web Services: REST and SOAP-based. Object-Relational Mapping, JPA/JTA (Java Persistence/Transaction API), JMS (Java Message Service), Overview over distributed

Dbs (Cassandra, MongoDB).

Directed Study "Web Application Security"
TCP/IP, TLS/SSL (https), attack forms and defenses; analysis of GOTOFAIL and HEARTBLEED, DANE/DNSSEC, Server-side TLS/SSL (Apache), Applicationside TLS/SSL; Server Hardening, Server-side encryption, (hashes/salting), Injection attacks (sanitizing).

Introduction to Operations Research
Game Theory, zero-sum games, equilibria and probabilistic solutions; special optimization problems: Shortest path, transport and scheduling; Linear Optimization: Graphical and computational solutions. Predictions by probability distributions; Introduction to Data Analysis: Analysis of raw data, five number analysis, box plots, geographical data; Programming in R: vectors, matrices, data frames, APIs for optimization and statistical analysis.

Advanced Computer Programming
Asymptotics; basic data structures: Queues, Stacks, trees. Sorting algorithms, Advanced DS: Hash maps, heaps, graphs. OO Design and UML; Java Generics; Design Patterns; Multithreading; DB and Web programming

H.   PROJECTS

G1.   Research projects

2012 – 2014 Scavenger: Semantic Representations for location-based services and planning.

2011 – 2014 SARIDE: Semantic Representations for Media Objects

2001 – 2004 Initiation of the "oo-m-ai" (OO methods for AI) research project. Project objectives: Develop a coherent, reusable object oriented framework for AIbased problem solving methods. Expanded to dealing with issues of the "Semantic Web" in 2002

1995 – 1997 Initiation and outline of a research project "Integration of Cognitive Systems" at the University of Applied Sciences, Hamburg, Department of Electrical Engineering and Computer Science (with Kai von Luck)xiv. Project goals: Integration of symbolic and sub-symbolic methods for problem solving. Supervision of several student's theses emerging from this project, esp. in the area of symbolic planning and robot control.

1981 – 1984 Design and prototypical implementation of N.N., a Chess knowledge base for strategic middle game positions at the Department of Computer Science at the University of Hamburg as the Ph.D. project (with Kai von Luck).

G2.   Student's (educational) projects

  • Logic Programming and Planning (Prolog)

- Visualization for Software Engineering
- Visualization of Finite Automata (Pascal)
- Chess Programmingxv
- Java Evaluation
- Java Applications

I. THESES SUPERVISED (SOME IN COOPERATION WITH LOCAL COMPANIES - SELECTION)

- An Expert System for Human Resource Scheduling
- A Compiler for the Simulation of Robot Motion
- Core Production Planning System
- Mobile Robot Design for Serving Multiple Goals
- A Knowledge Representation Framework for Simulation
- Planning with Blackboard Abstractions
- An Object Oriented Robot Simulation System
- Design of a Cooperative Internet Agent
- An Open Logic-Programming Environment for Smalltalk
- The Use of Annotations in the "Semantic Web"
- Ontologies and Web Search Engines

J. Online Resources (Lectures & Downloads)

- Online slides for the "Semantic Web" course (Spring 2003) http://www.informatik.haw-hamburg.de/~semweb/online/
- Course material for "Computer Science 1" http://www.informatik.haw-hamburg.de/~owsnicki/cs1.html
- Handout "Theory of Computablity" (ps, zip, in German) http://www.informatik.haw-hamburg.de/~owsnicki/public/theo.zip □ Slides "Compiler Construction" (rtf, zip, in German) http://www.informatik.haw-hamburg.de/~owsnicki/public/folrtf.zip
- Slides "Applications of AI" (ps, zip, in German) http://www.informatik.haw-hamburg.de/~owsnicki/public/kips.zip
- Slides "Functional and Logical Programming" (ps, zip, in German) http://www.informatik.haw-hamburg.de/~owsnicki/public/flfolien.zip

K. COMPUTER-RELATED SKILLS

FORTRAN IV/80, Common Lisp, Scheme, Prolog, Java, C/C++, Smalltalk, XML/HTML, JSON, OWL, CSS, JavaScript, Flash, Photoshop, MySQL, MongoDB, Apache, LaTeX, Linux, R, PHP

L. MISCELLANEOUS SKILLS/HOBBIES

- Audio production and hard disk recording

- Composition and Songwriting
- Guitar, bass, flute playing
- Digital/analog photography and web design
- Chess
- English language (fluent)
- German language (native)

Appendix F

University of West Florida Undergraduate Admissions and Graduation Requirements

<u>Freshmen Admissions</u>

The following outlines the general processing of all First Time in College students to the University of West Florida (UWF Regulation 3.001).

General Provisions

- Admission decisions to the University of West Florida ("UWF" or "University") are made by the University subject to the regulations of the Florida Board of Governors ("BOG").
- For the purposes of this regulation, "First Time In College" ("FTIC") students are defined as students who have earned a standard high school diploma from a regionally accredited high school or its equivalent and who have earned fewer than 12 semester hours of transferable college credit, as defined in UWF/REG 3.001(1), since graduating from high school, as evaluated by UWF.
- Undergraduate admission decisions for FTIC students are determined on a selective basis within curricular, space, enrollment and fiscal limitations. Satisfaction of minimum admission requirements does not guarantee acceptance. The selection process may include, but is not limited to, such factors as grades, test scores, pattern of courses completed, class rank, educational objectives, past conduct, academic recommendations, personal recommendations and achievements. Preference for admission in any term will be given to those applicants whose credentials indicate the greatest promise of academic success while enrolled at UWF. Admission to UWF as a FTIC student affords an applicant the ability to enroll as a degree-seeking candidate in pursuit of a baccalaureate degree.
- UWF does not discriminate in the admission process based upon age, color, disability, gender (sex or gender identity), marital status, national origin, race, religion, sexual orientation, or veteran status.

First Time In College Student Admission

The minimum admission requirements expected of FTIC students are established by the Florida Board of Governors and are set forth in BOG Regulation 6.002. Satisfaction of the BOG minimum requirements does not automatically guarantee admission to the University of West Florida.

The BOG minimum admission standards require:

1. A standard diploma from a regionally accredited high school or its equivalent. Applicants with a General Educational Development ("GED") certificate must refer to sub-paragraph (5). Applicants that are participants in a Home Education or Other Non-Traditional High School Program must refer to sub-paragraph (6). (Students admitted under the Early Admission Program are exempted from this requirement.)

2. For students who entered high school on July 7, 2007, or later, completion of 18 academic units of college-preparatory, year-long courses or equivalents (normally offered in grades nine through 12) are required as follows:

    a. four (4) units of English–three of which must have included substantial writing requirements;

b. four (4) units of mathematics–at the algebra I level and above;

c. three (3) units of natural science–two of which must have included substantial laboratory requirements;

d. three (3) units of social science–history, civics, political science, economics, sociology, psychology or geography;

e. two (2) units of the same foreign language or American Sign Language demonstrating proficiency through the second level; and

f. two (2) additional academic elective units from among these five academic areas and other courses approved by the BOG.

g. For students who entered high school prior to July 7, 2007, completion of 18 academic units of college-preparatory, year-long courses or equivalents (normally offered in grades nine through 12) are required as follows:

   i.   four (4) units of English- three of which must have included substantial writing requirements;

   ii. three (3) units of mathematics- at the algebra I level and above;

   iii. three (3) units of natural science- two of which must have included substantial laboratory requirements;

   iv. three (3) units of social science–history, civics, political   science, economics, sociology, psychology or geography;

   v.   two (2) units of the same foreign language or American Sign Language demonstrating proficiency through the second level; and

   vi. three (3) additional academic elective units from among these five academic areas and other courses approved by the BOG.

3. An official SAT Reasoning Test (all three sections) or ACT Plus Writing Test; and

4. High school grades that meet either sub-paragraph a. or b.
    a. At least a "B" average (3.0 on a 4.0 scale) as computed by UWF in the required high school academic units in English, mathematics, natural science, social science, foreign language and electives; or

    b. At least a 2.5 grade point average (on a 4.0 scale) as computed by UWF in the required high school academic units in English, mathematics, natural science, social science and foreign language and electives and the following test scores:
        i.   SAT–Critical Reading $\geq$ 460; or ACT–Reading $\geq$ 19

        ii. SAT–Mathematics $\geq$ 460; or ACT–Mathematics $\geq$ 19

5. Applicants presenting a GED must present official GED results, official transcripts of any partial high school completion, and ACT Plus Writing and/or SAT Reasoning Test (critical reading, math and writing). In addition to the test score requirements list above in 3. (b), GED applicants must receive a minimum composite score of 21 on the ACT Plus Writing Test, or an overall combined test score of 1450 on the SAT Reasoning Test (critical reading, math and writing).

6. Applicants participating in a Home Education or Non-Traditional High School Program must present a transcript from the Home School Education Program (all units must be listed in Carnegie Units) and a document from their county stating that the applicant meets high school graduation requirements. In addition to the test score requirements list above in 4. (a) and (b), Home Education or Non-Traditional High School Program applicants must receive a minimum composite score of 21 on the ACT Plus Writing Test, or an overall combined test score of 1450 on the SAT Reasoning Test (critical reading, math and writing).

Transfer Admissions

The following outlines the general processing of all Transfer students to the University of West Florida. These procedures are encompassed in UWF Regulation 3.032, approved by the University of West Florida Board of Trustees in June 2012. Until this approval, transfer student admission practices had been contained within the FTIC admission protocol. In June 2012, these procedures were developed into their own regulation.

General Provisions

- Admission decisions to the University of West Florida ("UWF" or "University") are made by the University subject to the regulations of the Florida Board of Governors ("BOG").
- "Transfer" applicants are those applicants who, prior to admission to UWF, have earned 12 or more semester hours of transferable college credit, as defined in this regulation, since graduating from high school, as evaluated by the Office of Undergraduate Admissions.
    1. Transfer applicants with fewer than 60 semester hours of transferable college credit must meet the transfer admission requirements set forth below under Transfer Student Admission, and these applicants must also meet the First Time In College ("FTIC") student admission requirements located in UWF Regulation 3.001.
    2. Transfer applicants with 60 or more semester hours of transferable college credits must meet the transfer admission requirements set forth below under Transfer Student Admission.
- Undergraduate admission decisions for transfer students are determined on a selective basis within curricular, space, enrollment and fiscal limitations. Satisfaction of minimum admission requirements does not guarantee acceptance. The selection process may include, but is not limited to, such factors as grades, test scores, pattern of courses completed, class rank, educational objectives, past conduct, academic recommendations, personal recommendations and achievements. Preference for admission in any term will

be given to those applicants whose credentials indicate the greatest promise of academic success while enrolled at UWF.

- UWF does not discriminate in the admission process based upon age, color, disability, gender (sex or gender identity), marital status, national origin, race, religion, sexual orientation nor veteran status.

Transfer Student Admission

The minimum admission requirements expected of transfer students are established by and are set forth in BOG Regulation 6.004. Satisfaction of the BOG minimum requirements does not automatically guarantee admission to the University of West Florida. The BOG regulation requires the transfer applicant to:

- Be in good standing and eligible to return to the last post-secondary institution attended as a degree-seeking student;
- Have a cumulative 2.0 Grade Point Average ("GPA") on a 4.0 system. The GPA is calculated using all transferable post-secondary credits;
- Satisfy the minimum admission requirements for entering FTIC students (See UWF Regulation 3.001) if transferring with fewer than 60 semester hours; and
- Demonstrate proficiency to the second level of the same foreign language (or American Sign Language) taken either in high school or at the undergraduate institution(s) attended previously.
    1. Transfer students not meeting the foreign language requirement may be admitted; however, if admitted, such students are required to complete the foreign language requirement prior to UWF graduation.
    2. Transfer students who received an Associate of Arts ("AA") degree from a Florida public community college, college, or university prior to September 1, 1989 are exempt from this requirement.

International Undergraduate Admissions

Applicants to the University are considered international if they are not U.S. Citizens, hold dual citizenship between the U.S. and another country, or are permanent residents currently residing in the U.S. In addition to the policies and procedures stated for the different categories of admission, the following information pertains to international applicants. Domestic applicants should refer to the "Freshman Admissions" or "Transfer Admissions" sections.

The following outlines the general processing of all International students to the University of West Florida. These procedures are encompassed in UWF Regulation 3.042, approved by the University of West Florida Board of Trustees in March 2012.

International Student Office (ISO)

1. Admission of international students to the University of West Florida ("UWF" or "University") is governed by University of West Florida admission regulations 3.001, 3.002, 3.004, 3.032, 3.033 and 3.042 , Florida Board of Governors (BOG) Regulations 6.001, 6.002, 6.003, 6.004, and 6.009, and the requirements herein.
2. For purposes of this regulation applicants to the University of West Florida will be considered "International" students if they are not U.S. citizens and if they require a visa to remain in the United States. Applicants who are permanent residents of the United States are not considered international students.

3. The admission requirements stated in the Board of Governors and UWF regulations are minimum requirements. Satisfaction of minimum requirements does not guarantee admission into the University. Preference for admission in any term will be given to those applicants whose credentials indicate the greatest promise of academic success.
4. Applicants must meet the following criteria and submit the required documentation to receive consideration for admission to the University:
   - o   A degree seeking applicant (undergraduate and graduate) whose native language is not English must provide evidence of English language proficiency. Non-degree undergraduate students are not required to provide documentation of English proficiency unless they are attending UWF under an international exchange agreement which requires the student to document English proficiency. The English requirement (proficiency in written and spoken English) may be fulfilled by establishing one of the following:

1. That he or she is from a country where English is the official language; or

2. That his or her prior associate's, bachelor's, master's, or doctoral degree was earned from a regionally accredited college or university in the United States; or

3. That his or her prior bachelor's, master's, or doctoral degree was earned from a country where English is the official language, or from a university at which English is the official language of instruction; or

4. That he or she completed his or her junior and senior year in a U.S. high school with a SAT Verbal score of 550 or a ACT English score of 23; or

5. That he or she achieved a qualifying score on the Test of English as a Foreign Language (TOEFL), International English Language Testing System (IELTS) or Michigan English Language Assessment Battery (MELAB)/ Michigan English Language Institute College English Test (MELICET).

- Qualifying scores for undergraduate applicants are either a TOEFL computer-based score of 213, a TOEFL internet-based score of 78/80, a TOEFL paper-based score of 550, an IELTS score of 5.5/6, or a MELAB/MELICET score of 76/77. (Consult the Undergraduate Catalog for sub-score requirements and for specific program requirements, which may be higher.)

1. Undergraduate applicants must have a 2.5 GPA on a 4.0 scale as calculated by UWF Office of Undergraduate Admissions.

2. Applicants must submit transcripts evidencing all prior academic course work including post-secondary education. The University requires an official copy of all academic credentials. Transcripts that are not in English must be accompanied by a certified English translation. Transcripts from educational institutions outside the United States must be evaluated by a credential evaluation service, as specified on the international application. (All academic credentials become property of the University. They will not be returned or forwarded to a third party. Credentials of applicants who do not enroll within one year will be destroyed).

3. Applicants must submit a non-refundable application fee payable in U.S. dollars.

4. Applicants must complete and submit the following medical information:

    a. a Physician's Evaluation Form and a Medical History Form completed by a physician, indicating the applicant's fitness, mentally and physically to pursue a college level study program.

    b. Documentation of MMR (measles, mumps and rubella) immunization, and

    c. Proof of immunization for meningitis and hepatitis B, or a signed waiver indicating the applicant's informed decision not to be vaccinated.

5. Applicants must provide proof of medical insurance that complies with the requirement of University policy, AC-6.00- 08/08 "Medical Insurance Coverage for Enrolled International Students" for all applicants on F-1 or J-1 visas.

6. Applicants must provide a Certification of Finances before the Certificate of Eligibility (Form I-20 or a DS-2019) will be issued by the University. The Certificate of Finances will show specific sources of a satisfactory level of financial support and the amount expected from each source. Funding sources must be verified by the student's or sponsor's bank by submitting an original bank statement from the student's or sponsor's financial institution. The total funds available to the student for the first academic year must at least equal the total estimates of institutional costs and living expenses. For applicants living outside the U.S., the Declaration and Certification of Finances must be received by the University no later than the application deadline each semester.

7. For transfer students: A completed transfer clearance form is required for F-1 applicants to verify their eligibility to transfer in F-1 status.

8. Undergraduate applicants who have provided all required materials and who meet all admission requirements except the English proficiency requirement may be considered for Conditional Admission to the University. Undergraduate students who receive a Conditional Admission letter who desire to attend UWF must enroll in the Intensive English Program at UWF. If such students seek to enroll in a degree program, they must meet the requirements set forth in paragraph (4) iv. above.

9. Undergraduate applicants who have provided all required materials and who meet all admission requirements except the English proficiency requirement may be considered for Conditional Admission to the University. Undergraduate students who receive a Conditional Admission letter who desire to attend UWF must enroll in the Intensive English Program at UWF. If such students seek to enroll in a degree program, they must meet the requirements set forth above.

10. Applicants will not be considered for admission until the University has received all required materials. Undergraduate international student applications, along with all other records required for admission must be received by the program deadline or university international application deadline, whichever is earlier, unless the deadline is waived by the University in writing.

Graduation and General Degree Requirements
(http://catalog.uwf.edu/undergraduate/academicpolicies/graduation/)

Pre-Graduation Audit

Students are required to meet with the assigned academic advisor to complete a Pre-Graduation Audit prior to completing 90 semester credit hours. This audit is intended to advise the student of all courses needed for graduation and to confirm that all remaining requirements are included in the degree plan.

Graduation Process

Students are responsible for meeting all graduation requirements. Having met all requirements for an undergraduate degree a student is expected to graduate and will not be permitted to take additional classes as an undergraduate student. Student responsibilities include:

1. Meeting with an academic advisor each semester to discuss degree progression;
2. Completing the Graduation Application online by the deadline listed in the Academic Dates and deadlines in the Catalog;
3. Meeting with the Department and completing a Graduation Action Plan when necessary; and
4. Meeting all requirements for the degree.

Bachelor's Degree Requirements

Requirements for a bachelor's degree from UWF are listed below. The colleges and departments may have requirements which exceed these minimums. Students should refer to their degree audits to review degree requirements. The degree audit must indicate all requirements have been completed. Please consult the individual departments for details. Minimum requirements are:

- 120 semester hours in an approved program
- UWF cumulative 2.00 GPA with a major GPA of 2.00 (departments may set a minimum grade requirement in each course and limited access programs may require higher minimum major GPAs)
- 48 semester hours in upper-level course work
- 25% of degree program credits must be earned at UWF
- The last 30 semester hours of credit for a degree must be earned at UWF
- 24 semester hours of upper-level work in the major field with a minimum of 18 upper-level semester hours in the major field at UWF
- Fulfillment of Gordon Rule
- Completion of all General Education requirements
- Completion of all program specific lower division common prerequisites
- Completion of admissions foreign language requirement
- Completion of multicultural requirement
- Nine hours of summer semester enrollment at an SUS institution (students who entered UWF with less than 60 semester hours)
- A degree will not be awarded for a student on academic probation or suspension
- Admitted and enrolled at UWF in a degree-seeking status for a minimum of one semester in the degree program for which a degree is awarded

- Admitted and enrolled at UWF in a degree-seeking status within the last five years of the date the degree is awarded. Students should contact their major department to determine the minimum of hours and courses in which to enroll. Students who need to be readmitted will be required to meet the degree requirements of the current catalog.

General Degree Requirements

In addition to the requirements for the major program of study, students must satisfy the following general University requirements:

General Education Requirements

All students (except for students holding an A.A. or certification of the completion of general studies requirements from a Florida public university or college) who enter UWF must complete the requirements specified as General Education. The General Education requirements are the basic studies that provide students with a broad educational foundation and are essential requirements for all A.A. and baccalaureate degree programs. Courses may not be taken on the pass/fail basis.

Gordon Rule (Writing and Mathematics) Requirements

To fulfill the writing and mathematics requirement for earning the first baccalaureate degree, students are required to satisfy the Gordon Rule, Florida Statutes by taking six semester hours of English coursework and six semester hours of additional coursework in which students are required to demonstrate college-level writing skills through multiple assignments. In addition, six semester hours of mathematics at the level of college algebra or higher are required. Students are required to take six semester hours of theoretical math or three semester hours of theoretical math and three semester hours of applied math. Students must have a grade of "C-" or better in the courses to successfully complete this requirement. Courses may not be taken on the pass/fail basis. Students must complete these requirements before advancing to upper-division status. Transfer students should refer to the Transfer Credit section of this catalog. Students should consult the Office of Undergraduate Admissions for evaluation of transfer mathematics courses for General Studies requirements, Gordon Rule, and credit for graduation.

Multicultural Requirement

An important component of a liberal education is the study of cultures other than one's own. As such, multiculturalism encompasses the appreciation of the values, expressions, and modes of organization of diverse cultural communities. To further such study, the University of West Florida requires all students pursuing a bachelor's degree to complete at least one course that explores one or more of the dimensions of another culture (language, religion, socio-economic structures, etc.). Students are exempt from this requirement if they have completed an A.A. degree, the general education program at a Florida public institution, or a baccalaureate degree.

The requirement is satisfied by the successful completion of a multicultural course designated on the following list. Several of the selections are General Education courses, and students may enroll in these to meet both the General Education and the multicultural requirements.

Foreign Language Requirement

Florida Statutes require that students admitted to a Florida public university meet the foreign language requirement for demonstrating competency in a foreign language. Students who have earned an A.A. from a Florida public community college may be admitted to the University, but must demonstrate competency prior to graduation with a baccalaureate degree. Students completing 8-10 semester hours of American Sign Language with passing grades will have satisfied the foreign language admission requirement. The foreign language requirement must be satisfied prior to progression to upper-division status. In addition, each academic department may determine specific language requirements for students and will recommend or require languages and proficiencies according to individual needs, career objectives, and academic programs.

Competency may be demonstrated in the following ways:

- Earning two credits of a single foreign language in high school or one credit in high school and the second semester (four semester hours) of the same foreign language at an accredited postsecondary institution demonstrating proficiency through the second level, OR
- Satisfactory completion of two semesters (8-10 semester hours) of a single foreign language at a postsecondary institution prior to admission to UWF demonstrating proficiency through the second level. Grades of P are acceptable for this requirement, OR
- Satisfactory completion of two semesters (8-10 semester hours) of a single foreign language at UWF demonstrating proficiency through the second level. Grades of P are acceptable for this requirement. Successful completion of the following tests with appropriate test scores: CLEP subject matter examinations, MAPS-Latin examination published by the College Entrance Examination Board, and proficiency examination at UWF.

Undergraduate transfer students are exempt if one of the following applies: (1) they received an A.A. from a Florida public college prior to September 1, 1989; or (2) they enrolled in a program of studies leading to an associate degree from a Florida public college prior to August 1, 1989, and complete at least one academic course each twelve month period beginning with the student's first enrollment in a Florida public college and continuing until the student enrolled at UWF.

Summer Hour Requirement

Undergraduate students entering one of the state universities of Florida with less than 60 semester hours of credit must earn at least nine semester hours prior to graduation by attendance during one or more summer sessions at one of the state universities.   Students may satisfy this requirement through online courses at UWF as well as any other UWF courses. Courses taken within the community college, state college system, or outside of the State University System of Florida cannot be used to satisfy summer hours.

Residency Requirement

Students must complete a minimum of 30 semester hours (25% of the degree program) in a planned program at UWF. In addition, the last 30 semester hours of course work for the undergraduate degree must be completed in residency at UWF. Courses taken while on University sponsored study abroad programs count as resident credit for purposes of meeting graduation requirements. Courses taken at another institution will not meet the UWF residency degree requirement.