

KENT STATE UNIVERSITY

CERTIFICATION OF CURRICULUM PROPOSAL

Preparation Date _____ Curriculum Bulletin _____
Effective Date **Fall 2020** Approved by EPC _____

Department **Computer Science**
College **AS - Arts and Sciences**
Degree **BS - Bachelor of Science**
Program Name **Computer Science (no concentration)** Program Banner Code **~~AS-BS-CS~~ CS**
Concentration(s) _____ Concentration(s) Banner Code(s) _____
Proposal **Offer program at another campus or off site**

Description of proposal:

I am proposing to offer the Bachelor of Science in Computer Science at the Stark campus. Thank you for reviewing this proposal.

Currently the Stark campus offers only the minor in Computer Science (CS). Over the years, due to the students' request, the number of CS courses offered at the Stark campus that are part of the BS in Computer Science program has grown tremendously, up to the point that the Stark campus is ready to offer the complete Bachelor of Science in Computer Science.

Does proposed revision change program's total credit hours? Yes No

Current total credit hours: **120** Proposed total credit hours **120**

Describe impact on other programs, policies or procedures (e.g., duplication issues; enrollment and staffing considerations; need; audience; prerequisites; teacher education licensure):

According to the Bureau of Labor and Statistics the Computer Science industry is projected to grow much faster than other industries over the next decade, with some occupations growing faster than others. "Employment of Software Developers is expected to grow 24% in the year 2016-2026 [<https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm>], much faster than the average for all occupations". This program offering is a response to the increasing demand in the field.

The institution of the BS in Computer Science at the Stark campus will not only benefit the Stark campus and help serve the local community, but at the same time will help the Kent campus feed both the CS grad program with our best students, as well as the CS undergrad program with students who, along their educational path want to change or add another concentration to their degree or take courses from the large selection of electives that are offered at the Kent campus.

An environmental study has been performed to see the effect of the program on the local community area. The environmental study has been attached to this application for your perusal (see page 6 of BS-CS-Stark-Attachment File.pdf).

The number of students in Computer Science at the Stark campus has grown by 59.4% since Fall 2011 with 41 students in Fall 2011 versus 102 students in Fall 2018. Between Fall 2017 and Fall 2018 the number of Computer Science students remained steady, even with the decrease of overall enrollment at the campus, with 103 students in Fall 2017 versus 102 students in Fall 2018 (see graph on page 1 of the attachment file (BS-CS-Stark-Attachment File.pdf) for more details).

The course rotation currently in place is able to satisfy that requirements of the Bachelor of Science in Computer Science. The course rotation is on page 2 of the attachment file (of BS-CS-Stark-Attachment File.pdf). All the remaining non-CS courses required for the completion of the degree are currently already offered at Stark. This course rotation will permit the students

entering the degree either in Fall or in Spring to complete the BS degree in 4 years. A semester-by-semester plan of study to ensure a timely graduation for KSU-Stark students entering the BS in CS in Fall or Spring that reflects the roadmap of the BS in CS from the catalog (from <http://catalog.kent.edu/colleges/as/cs/computer-science-bs/#roadmapstext>) is available on page 3 of the attachment file (of BS-CS-Stark-Attachment File.pdf).

The entire current course rotation has been achieved with 2 CS tenure track Stark faculty, one full time adjunct instructor and 3-4 rotating GA Ph.D. students from the Department of Computer Science at the Kent campus. No additional staffing is required at this time.


I will be glad to provide any additional file or information regarding the implementation of the CS Bachelor of Science in Computer Science at Stark on request.

Units consulted (other departments, programs or campuses affected by this proposal):

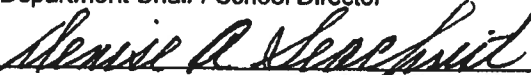
The curriculum committee and the entire faculty of the Department of Computer Science has been consulted. Both committees have approved the proposal. The Dean of the Stark campus and the faculty of the Department of Mathematics at the Stark campus, through the person of Dr. Kasturiarachi, has been consulted and they strongly supported the proposal.

No other programs or campuses are expected to be affected by this proposal.

REQUIRED ENDORSEMENTS



Department Chair / School Director 11/27/19



Campus Dean (for Regional Campuses proposals) 11/12/19



College Dean (or designee) 12/20/19

Dean of Graduate Studies (for graduate proposals) _/_/19

Executive Vice President for Academic Affairs and Provost (or designee) _/_/19

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Department **Computer Science**
College **AS - Arts and Sciences**
Degree **BS - Bachelor of Science**
Program Name **Computer Science** Program Banner Code **AS-BS-CS**
Concentration(s) **Information Security** Concentration(s) Banner Code(s) **INSE**
Proposal **Offer program at another campus or off site**

Description of proposal:

I am proposing to offer the Bachelor of Science in Computer Science with the concentration in Information Security at the Stark campus. Thank you for reviewing this proposal.

Currently the Stark campus offers only the minor in Computer Science (CS). Over the years, due to the students' request, the number of courses offered that are part of the BS in Computer Science has grown immensely on our campus up to the point that Stark is ready to offer a complete Bachelor in Computer Science. Since the hiring of Dr. Y. Chae, whose research expertise is in security, many of the newly offered elective courses in CS at Stark are in the security area. Consequently a Bachelor of Science in Computer Science with the Concentration in Information Security is the appropriate choice.

Does proposed revision change program's total credit hours? Yes No
Current total credit hours: **120** Proposed total credit hours **120**

Describe impact on other programs, policies or procedures (e.g., duplication issues; enrollment and staffing considerations; need; audience; prerequisites; teacher education licensure):

Currently "security" is one of the most attractive topics both in research as well as in industry. With the complete conversion of data into digital format, there is an extreme need to protect data from attacks and guarantee privacy. Consequently, Information Security is becoming a necessity in almost every kind of business. The Bureau Labor of Statistics <https://www.bls.gov/ooh/computer-and-information-technology/information-security-analysts.htm> indicates that job market for Information Security Analysts is expected to grow by 28% in the next decade - much faster than the average job growth. This fast growing field will soon require businesses to actively seek professionals with such expertise. This program offering is a response to increasing demand in the field.

The institution of the BS in Computer Science with the concentration in Information Security at the Stark campus will not only benefit the Stark campus and help serve the local community, but at the same time will help the Kent campus feed both the CS grad program with our best students, as well as the CS undergrad program with students who, along their educational path, want to change or add another concentration to their degree or take courses from the large selection of electives that are offered at the Kent campus.

An environmental study has been performed to see the effect of the program on the local community area. The environmental study has been attached to this application for your perusal (see page 7 of BS-CS-INSE-Stark-Attachment File.pdf).

The number of students in Computer Science at the Stark campus has grown by 59.4% since Fall 2011 with 41 students in Fall 2011 versus 102 students in Fall 2018. Between Fall 2017 and Fall 2018 the number of Computer Science students remained steady, even with the decrease of overall enrollment at the campus, with 103 students in Fall 2017 versus 102 students in Fall 2018

(see graph on page 1 of the attachment file (BS-CS-INSE-Stark-Attachment File.pdf) for more details).

The course rotation currently in place is able to satisfy the requirements of the Bachelor of Science in Computer Science with the concentration in Information Security. The course rotation is on page 2 of the attachment file (BS-CS-INSE-Stark-Attachment File.pdf). All the remaining non-CS courses required for the completion of the degree are currently offered at Stark. This course rotation will permit the students entering the degree either in Fall or in Spring to complete the BS degree in CS with the concentration in Information Security in 4 years. A semester-by-semester plan of study to ensure a timely graduation for KSU-Stark students entering the BS in CS with the concentration in Information Security in Fall or Spring that reflects the roadmap of the BS in CS with the concentration in Information Security from the catalog (from <http://catalog.kent.edu/colleges/as/cs/computer-science-bs/#roadmapstext>) is available on page 3 of the attachment file (BS-CS-INSE-Stark-Attachment File.pdf).

To avoid or minimize duplications with CS security electives offered at the Kent campus, the CS courses on security at Stark have been offered either in a semester when they were not offered at the Kent campus or in a face-to-face format, when an online version was available, to provide an alternative format.

The entire current course rotation has been performed with 2 CS tenure track Stark faculty, one full time adjunct instructor and 3-4 rotating GA Ph.D. students from the Department of Computer Science at the Kent campus. No additional staffing is required at this time.

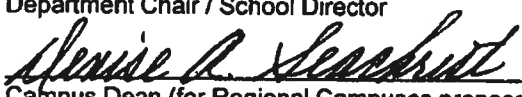
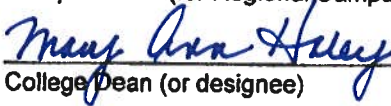
I will be glad to provide any additional file or information regarding the implementation of the CS Bachelor of Science in Computer Science with the concentration in Information Security at Stark on request.

Units consulted (other departments, programs or campuses affected by this proposal):

The curriculum committee, the coordinator of the concentration in Information security Dr. Ghazinour, and the entire faculty of the Department of Computer Science has been consulted. All of them have supported and approved the proposal. The Dean of the Stark campus and the faculty of the Department of Mathematics at the Stark campus, through the person of Dr. Kasturiarachi, has been consulted and they strongly supported the proposal.

No other programs or campuses are expected to be affected by this proposal.

REQUIRED ENDORSEMENTS

	
Department Chair / School Director	<u>11-21-19</u>
	
Campus Dean (for Regional Campuses proposals)	<u>11-12-19</u>
	
College Dean (or designee)	<u>12-20-19</u>
_____	<u> / / </u>
Dean of Graduate Studies (for graduate proposals)	
_____	<u> / / </u>
Executive Vice President for Academic Affairs and Provost (or designee)	



Change Request: Offering Existing Program at Regional Campus

Date of submission: 11/01/2019

Name of institution: Kent State University

Name of campus: Stark Campus

Program to be delivered at the site: Computer Science within the Bachelor of Science degree
(No concentration and Information Security concentration only)

Proposed start date: Fall 2020

Primary institutional contact for this request:

Name: Therese E. Tillett
 Title: Director of Curriculum Services, Office of Provost
 Phone number: 330-672-8558
 E-mail: tillet1@kent.edu

Date that the request received final approval from the appropriate institutional committee:

Final approval by the Educational Policies Council, a sub-committee of the
 Faculty Senate, on *date pending*

Educator Preparation Programs:

Program leads to licensure: No
 Program leads to endorsement: No

Briefly describe the rationale for offering the program at this site. In your response, indicate whether the program to be offered at the site will be time limited or ongoing.

Computer Science is the fastest growing major on the Stark campus and has garnered steady student interest throughout. Between fall 2013-fall 2018 the enrollment on campus has increased – specifically, 79, 76, 82, 83, 103, and 101 respectively. The environmental scan points to a strong workforce demand through the year 2026. The scan also highlights the affordability of our program compared to other universities in Stark County. Additionally, Computer Science, is one of the STEMM disciplines covered by the Choose Ohio First (COF) grant for student merit scholarships, with guaranteed funding from the Ohio Department of Higher Education (ODHE) through AYs 2016-2021, and the possibility of future renewal.

With two dedicated faculty members, Dr. Angela Guercio (Coordinator) and Dr. Younghun Chae, all coursework for the Bachelor of Science in Computer Science can be delivered at Kent State University at Stark. A faculty member in applied mathematics teaches the sections of Discrete Structures and there are other fulltime members in applied mathematics who could teach other select courses. Currently there is a request for a new TT hire in Computer Science for AY 2020-2021.

The proposed Computer Science major at the Stark Campus has some unique features:

1. The program will be primarily anchored at the Stark Campus for students who consider the campus as their entry point to Kent State University. These students will complete the degree at the Stark Campus.
2. By having the full Bachelor of Science degree in Computer Science, the STEMM fields will be strengthened. As a true interdisciplinary subject, lower division computer science courses will provide attractive elective choices for students in several STEMM disciplines.
3. The strong collaborative partnership between the two campuses will allow students who start at the Stark Campus and desire to pick a different concentration in CS, to seamlessly transfer to the Kent Campus after several semesters.

SECTION 1: CHANGES NEEDED TO ACCOMMODATE THE NEW PROGRAM(S)

Academic and Administrative Leadership and Services

1.1 Describe the changes (if any) that will be needed in academic and administrative leadership at the site to accommodate the new program.

There are no anticipated changes needed. As this is an established regional campus of Kent State University, there is a dean/chief administrator officer, who reports to the university provost and senior vice president for academic affairs, and a full range of support personnel who are supervised by an assistant dean for academic affairs and a director of student affairs and enrollment management.

These positions supervise staff in offices that include, but are not exclusive to, the library, computer technology, learning center, disability services, admissions, registration, financial aid, advisement, registrar, bursar and tutoring.

The chair of the Computer Science Department, Dr. Javed Khan, oversees all curricular and academic aspects of the Bachelor of Science in Computer Science.

1.2 Describe the changes (if any) that will be needed in the site's existing administrative services (e.g., admissions, financial aid, registrar, etc.) to accommodate the new program. If such services are not available at the site, describe how students in the new program(s) will access such services.

There are no additional resources required to implement this degree program. As this is an established regional campus of Kent State University, there is a full range of administrative and support services available, including admissions, financial aid, advising, registrar, tutoring, learning resources center, disability services and library.

1.3 Describe the changes (if any) that will be needed in the site's existing academic student services (e.g., advising, tutoring, psycho-social counseling, placement services, etc.) to accommodate the new program. If such services are not available at the site, describe how students in the new program(s) will access such services.

There are no changes needed to accommodate this program.

Resources and Facilities

1.4. Describe the changes in resources and facilities (e.g., classrooms, computer labs, laboratories, study areas, social areas, technology, and other learning environments) that will be needed to accommodate the new program and provide a timeline for implementing the changes.

There are no changes in resources and facilities. This is an established regional campus which already provides the resources and the facilities to host the courses required for the establishment of the program. We have two large computer labs, open computer pods in each building, and two designated technology enhanced classroom where computer science courses are scheduled. All campus computers have the dedicated software for student access. A specialized lab for computer science research is currently under development.

1.5 Describe any additional library resources (e.g., personnel, space, technology, etc.) that will be needed to accommodate the new program at the site and provide a timeline for implementing the changes.

There are no additional library resources required to implement this degree program. The Stark campus houses a full academic library with access to computers, information literacy instruction, interlibrary loan, KentLINK and OhioLINK. The library has 3-D printers, a high-end poster printer, and iPads and professional cameras for student use.

1.6. If a full-service library is not available onsite, please indicate how students, faculty, staff in the program will access the resources and services of the main campus library.

Not applicable.

SECTION 2: PROGRAM INFORMATION

2.1 Using the chart below, please list the degree program/general education program that is being added for delivery at the site.

Degree/Major (Concentration)	Available on Campus		Comments for Chancellor's Staff
	Full	Partial	
BS degree in Computer Science (No concentration)	✓		All required courses for the degree together with a set of elective courses will be offered on-ground at the Stark Campus. The number of electives will be sufficient to complete the degree. Students are welcome to take additional electives at the Kent Campus.
BS degree in Computer Science (Information Security concentration)	✓		The only specific concentration that will be offered at the Stark Campus is in Information Security. All required courses in the concentration together

			with a set of elective courses will be offered on-ground at the Stark Campus. The number of electives will be sufficient to complete the degree within the concentration. Students are welcome to take additional electives at the Kent Campus.
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2.2 Indicate whether accelerated, hybrid/blended and/or online delivery options are available for the program at the proposed campus and indicate whether this is different from the delivery option used for the approved program at other campuses:

All courses offered at the Stark Campus for the degree programs in consideration are face-to-face.

SECTION 3: FACULTY

3.1 Complete a faculty matrix for the proposed program at this offsite location. A faculty member must be identified for each course to be taught at the site during the first two years of program delivery. If a faculty member has not yet been identified for a course, indicate that as an “open position” and describe the necessary qualifications in the matrix.

Please note that the courses listed below in the matrix are the major courses in the degree program. All other courses to satisfy graduate requirements comprise general education requirements (Kent Core), first-year orientation (US 10097 Destination Kent State: First Year Experience) and general electives, which are offered on all Kent State University campuses.

The 2019-2020 University Catalog for the program requirements are provided in the link below:
BS in CS program requirements:

<http://catalog.kent.edu/colleges/as/cs/computer-science-bs/#programrequirements> (no concentration)

<http://catalog.kent.edu/colleges/as/cs/computer-science-bs/#ISC> (concentration in Information Security)

A copy of each full-time faculty member’s CV must be included as Appendix A.

*Number of courses instructor will teach per year at all campus locations.

Instructor name and rank	Full/part time	Degree title, institution, year	Years teaching/experience	Course(s) instructor will teach in proposed program	Courses taught*
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Proposal to offer existing B.S. in Computer Science at the Stark Campus | Kent State University | 5

Instructor name and rank	Full/part time	Degree title, institution, year	Years teaching/experience	Course(s) instructor will teach in proposed program	Courses taught*
Angela Guercio, Associate Professor	FT	Ph.D. Computer Science, Kent State University 2004	33	CS 13001 CS I CS 33101 Struct. of Progr. Languages CS 35201 Comp Comm. Networks CS 33901 Software Engineering CS 44105 Web Programming I CS 44106 Web Programming II CS 49901 Capstone Project CS 46901 Design and Analysis of Algorithms CS 33192 Human Interface Computing CS 49998 Research (No load) CS 33192 Internship in CS (No load)	8
Younghun Chae, Assistant Professor	FT	Ph.D. Computer Science, University of Rhode Island, 2016	4	CS 23001 CS II CS 33211 Operating Systems CS 35101 Computer Architecture CS 33007 Intro to Database Design CS 47205 Information Security CS 45203 Computer Network Security CS 47221 Intro to Cryptology CS 47207 Digital Forensic CS 43203 System Programming CS 49998 Research (No load) CS 33192 Internship in CS (No load)	8
Aloysius Bathi Kasturiarachi, Associate Professor	FT	Ph.D. Mathematics, University of North Carolina at Chapel Hill, 1993	32	CS 23022 Discrete Structures for CS MATH 20011 Decision-Making under Uncertainty	2
Open Position	PT/FT	Part-Time Instructor Currently there is a request for a new TT CS hire for AY 2020-2021.		CS 33007 Intro to Database Design CS 44001 CS III	1
FT Faculties of the Department of Mathematics in rotation. All of them who teach the courses in consideration have extended years of teaching experience. For example, faculty who will teach them in Spring 2020 are Dr. Cynthia Barb Ph.D., Dr. Oliver Ruff Ph.D., Dr. Janice Kover Ph.D., Dr. Relja Vulanovic Ph.D., Dr. J. Alexopoulos Ph.D.	FT	Ph.D.	7-35	MATH 12002 Analytic Geometry and Calc I (KMCR) MATH 12013 Brief Cal II (or equivalent MATH 12003) MATH 21002 Applied Linear Algebra	1-2

3.2 Describe future faculty staffing plans for the program at this location. In your response, include a description of the institution’s plans, if any, for adding courses and faculty after the initial two years of operation and a description of the plans to add faculty in response to increases in student enrollment.

Currently there is a request for a new TT CS hire for AY 2020-2021. The new hire will cover the courses that have been currently offered by part-time instructors. We will seek a TT hire with research expertise in areas of high interest, such as Big Data, Data Science, and AI, thus increasing the number of electives offered at the campus and continue to offer attract options for students. The Stark Campus has approximately 100 students in the CS major currently and has a steady enrollment projection for future years. Helping this trend is the Choose Ohio First scholarships through ODHE that are available for Stark Campus students.

SECTION 4: MARKET / WORKFORCE NEED

4.1 Indicate whether the institution performed a needs assessment/market analysis to determine a need for the program at the proposed site. If so, briefly describe the results of those findings.

Please refer to the Environmental Scan in Appendix B.

4.2 Indicate the projected enrollments for the program at this site over the next three years.

	2020-2021	2021-2022	2022-2023
First-year students	28	30	32
Second-year students		24	26
Third-year students			22

4.3. Indicate whether the institution consulted with advisory groups, business and industry, or other experts when considering moving the program to the proposed site. If so, briefly describe the involvement of these groups in the development of this request.

The decision to propose this program was reached after extensive consultations with appropriate curricular and administrative bodies on Campus and in the College of Arts and Sciences (e.g., campus Academic Planning Committee, campus dean, college dean; the Undergraduate Curriculum Committee and the Department of Computer Sciences).

In addition, several business groups and government agencies have networked with our students. The office of Career Services and Internships at the Stark Campus will oversee the placement of computer science majors in internships throughout local companies, including Timken, DieBold-Nixdorf, Progressive Insurance, and Patriot Software.

4.4. Indicate whether any other institution within a 30-mile radius of your campus currently offers the program(s). If so, list the institutions that offer the program(s) within this radius.

There are three private universities that offer degrees in computer science. There are no public institutions that offer computer science degrees in Stark County.

- Malone University
- University of Mount Union
- Walsh University

APPENDICES

Appendix Description

- A Faculty curricula vitae
- B Environmental Scan

Commitment to Program Delivery at Site

Kent State University is committed to supporting the Computer Science program at its Stark Campus. If the university decides in the future to either eliminate the degree program or close the campus, Kent State University will provide the necessary resources and means for matriculated students to complete their degree.

Kent State University verifies that the information in the application is truthful and accurate.

[will be signed after EPC]

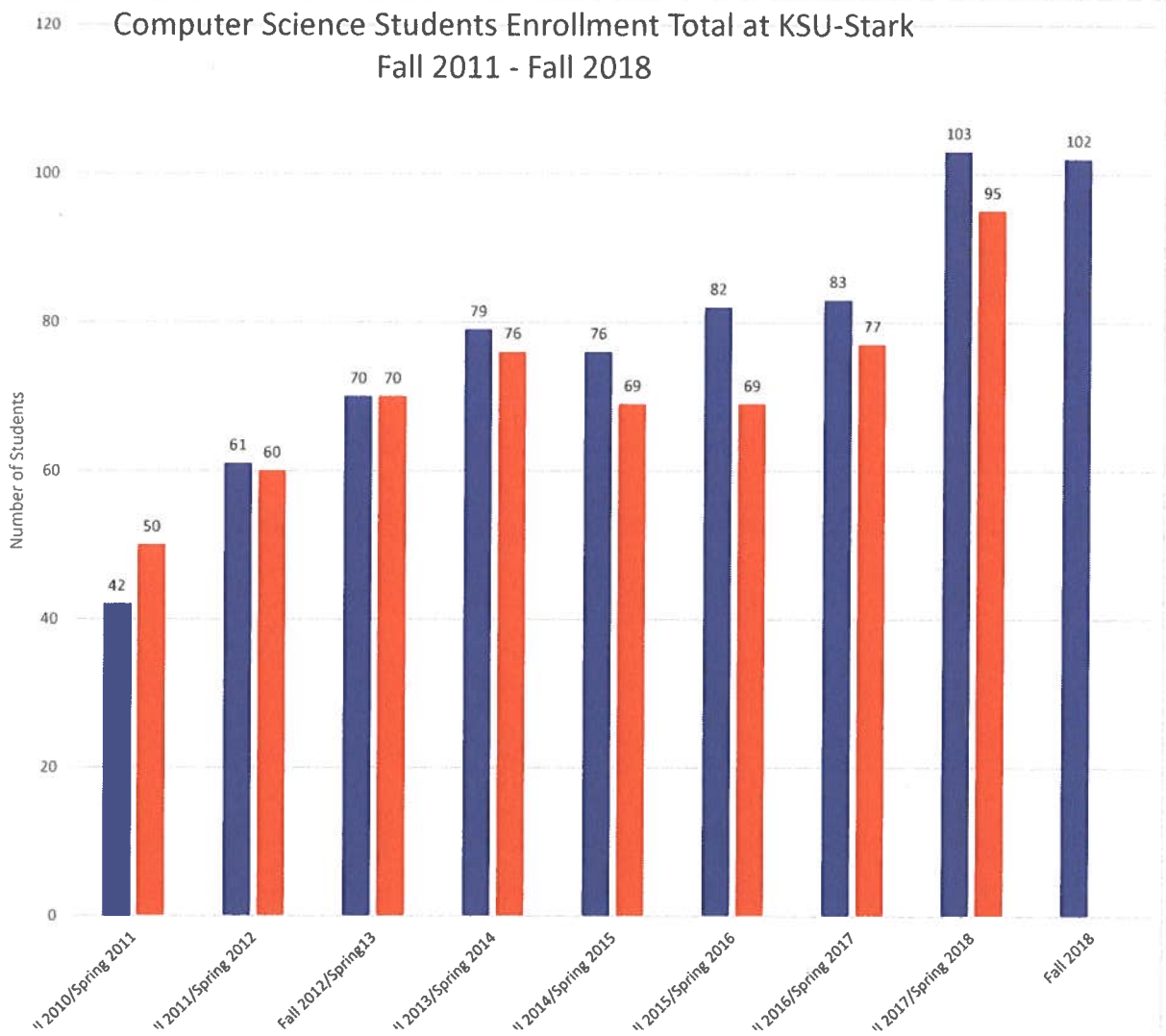
Todd A. Diacon
 Provost and Senior Vice President for Academic Affairs
 Kent State University

BS in CS (no concentration) at Stark
[AS-BS-CS]
Attachment Material

This file contains:

- 1) The [trend of CS students enrollment](#) total at KSU-Stark between Fall 2011 and Fall 2018;
- 2) The Computer Science [\(CS\) Course Rotation at Stark](#);
- 3) The [roadmap of BS in Computer Science](#) no concentration [AS-BS-CS].

Use the links for easy access to the attachments.



CS Course Rotation at KSU-Stark

Current CS rotation, future CS course rotation, and staffing

LEGEND - Staffing

Dr. A. GUERCIO, FTT
Dr. A. KASTURIARACH, FTT
Dr. Y. CHAE, FTT
PT INSTRUCTOR
GUERCIO/CHAE FTT (NO LOAD)

FA17	SP18	FA18	SP19	FA19	SP20	FA20	SP21	FA21	SP22	FA22	SP23	FA23	SP24	FA24	SP25
CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI
CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2
DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS
CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA
	OS		OS		OS		OS		OS		OS		OS		OS
	CS3		CS3						CS3				CS3		
PL		PL		PL		PL		PL		PL		PL		PL	
NET		NET		NET		NET		NET		NET		NET		NET	
	ALG		ALG				ALG			ALG		ALG			ALG
	SE		SE		SE		SE		SE		SE		SE		SE
DB		DB		DB		DB		DB		DB		DB		DB	
			CAPS		CAPS		CAPS		CAPS		CAPS		CAPS		CAPS
							HIC					HIC			
WPI	WP11	WPI	WP11	WP1	WP11	WP1	WP11	ALG	HIC	WP1	WP11	ALG	HIC	WPI	WP11
INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP
RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES
							NETSEC					NETSEC			
ICRYP	INSEC	DFOR	SYSP	ICRYP	INSEC	DFOR	SYSP	ICRYP	INSEC	DFOR	SYSP	ICRYP	INSEC	DFOR	SYSP

LEGEND – Course Abbreviation

	lower level
	upper level
	electives
	concentration specific

Abbreviation	Full Course Name (credit)	Frequency
INTRO	CS 10051 - INTRO TO COMPUTER SCIENCE (KMCR) (4)	every semester
CS1	CS 13001 - COMPUTER SCIENCE I - PROGRAMMING AND PROBLEM SOLVING (4)	
CS2	CS 23001 - COMPUTER SCIENCE II - DATA STRUCTURES AND ABSTRACTION (4)	
DS4CS	CS 23022 - DISCRETE STRUCTURES FOR COMPUTER SCIENCE (3)	
CA	CS 35101 - COMPUTER ARCHITECTURE (3)	every other semester
HIC	CS 32301 - HUMAN INTERFACE COMPUTING (3)	
OS	CS 33211 - OPERATING SYSTEMS (3)	
ALG	CS 46101 - DESIGN AND ANALYSIS OF ALGORITHMS (3)	
PL	CS 33101 - STRUCTURE OF PROGRAMMING LANGUAGES (3)	
NET	CS 35201 - COMPUTER COMMUNICATION NETWORKS (3)	
SE	CS 33901 - SOFTWARE ENGINEERING (3)	
DB	CS 33007 - INTRO TO DATABASE SYSTEM (3)	
CS3	CS 44001 - COMPUTER SCIENCE III - PROGRAMMING PATTERNS (4)	
CAPS	CS 49901 - CAPSTONE PROJECT (ELR) (WIC) (3)	
INTSHP	CS 33192 - INTERNSHIP IN COMPUTER SCIENCE (ELR) (1-3)	every semester
RES	CS 49998 - RESEARCH (ELR) (1-15)	
NETSEC	CS 45203 - COMPUTER NETWORK SECURITY (3)	every 4 semesters
DFOR	CS 47207 - DIGITAL FORENSICS (3)	
ICRYP	CS 47221 - INTRODUCTION TO CRYPTOLOGY (3)	
INSEC	CS 47205 - INFORMATION SECURITY (3)	
SYSP	CS 43203 - SYSTEMS PROGRAMMING (3)	
WP1	CS 44105 - WEB PROGRAMMING I (3)	
WP2	CS 44106 - WEB PROGRAMMING II (3)	

ROADMAP OF BS IN COMPUTER SCIENCE (NO CONCENTRATION) [AS-BS-CS]

<http://catalog.kent.edu/colleges/as/cs/computer-science-bs/#roadmapstext>

This roadmap is a recommended semester-by-semester plan of study for this major. However, courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

Plan of Study Grid

Semester One

!CS 13011 COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING & CS 13012 and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING or CS 13001 or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING
 MATH 12002 ANALYTIC GEOMETRY AND CALCULUS I (KMCR)
 UC 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE
 Kent Core Requirement
 General Electives

Credit Hours

Semester Two

!CS 23001 COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION
 CS 23022 DISCRETE STRUCTURES FOR COMPUTER SCIENCE
 MATH 12013 BRIEF CALCULUS II
 MATH 20011 DECISION-MAKING UNDER UNCERTAINTY
 Kent Core Requirement

Credit Hours

Semester Three

!CS 33211 OPERATING SYSTEMS
 CS 35101 COMPUTER ARCHITECTURE
 MATH 21002 APPLIED LINEAR ALGEBRA
 Foreign Language

Credit Hours

Semester Four

CS 32301 HUMAN INTERFACE COMPUTING
 CS 33007 INTRODUCTION TO DATABASE SYSTEM DESIGN
 CS 35201 COMPUTER COMMUNICATION NETWORKS
 Foreign Language

Credit Hours

Semester Five

Suggested semester-by-semester plan of study of CS courses at KSU-Stark to ensure a timely graduation for students entering the BS in CS in Fall or Spring. All the remaining courses are those of the roadmap as printed in the catalog.

	Fall (even)	Fall (odd)
Credits		
4	CS 13001 COMPUTER SCIENCE I	CS 13001 COMPUTER SCIENCE I
5		
1		
3		
3		
16		
4	CS 23001 COMPUTER SCIENCE II	CS 23001 COMPUTER SCIENCE II
3	CS 23022 DISCRETE STRUCT. FOR CS	CS 23022 DISCRETE STRUCT. FOR CS
3		
3		
3		
16		
3	CS 33007 INTRO TO DATA BASE	CS 33007 INTRO TO DATA BASE
3	CS 35101 COMPUTER ARCHITECTURE	CS 35101 COMPUTER ARCHITECTURE
3		
4		
13		
3	CS 32301 HUMAN INTERFACE COMPUTING	CS 47207 DIGITAL FORENSIC
3	CS 33211 OPERATING SYSTEMS	CS 33211 OPERATING SYSTEMS
3	CS 44001 CS III	CS 33901 SOFTWARE ENGINEERING
4		
13		

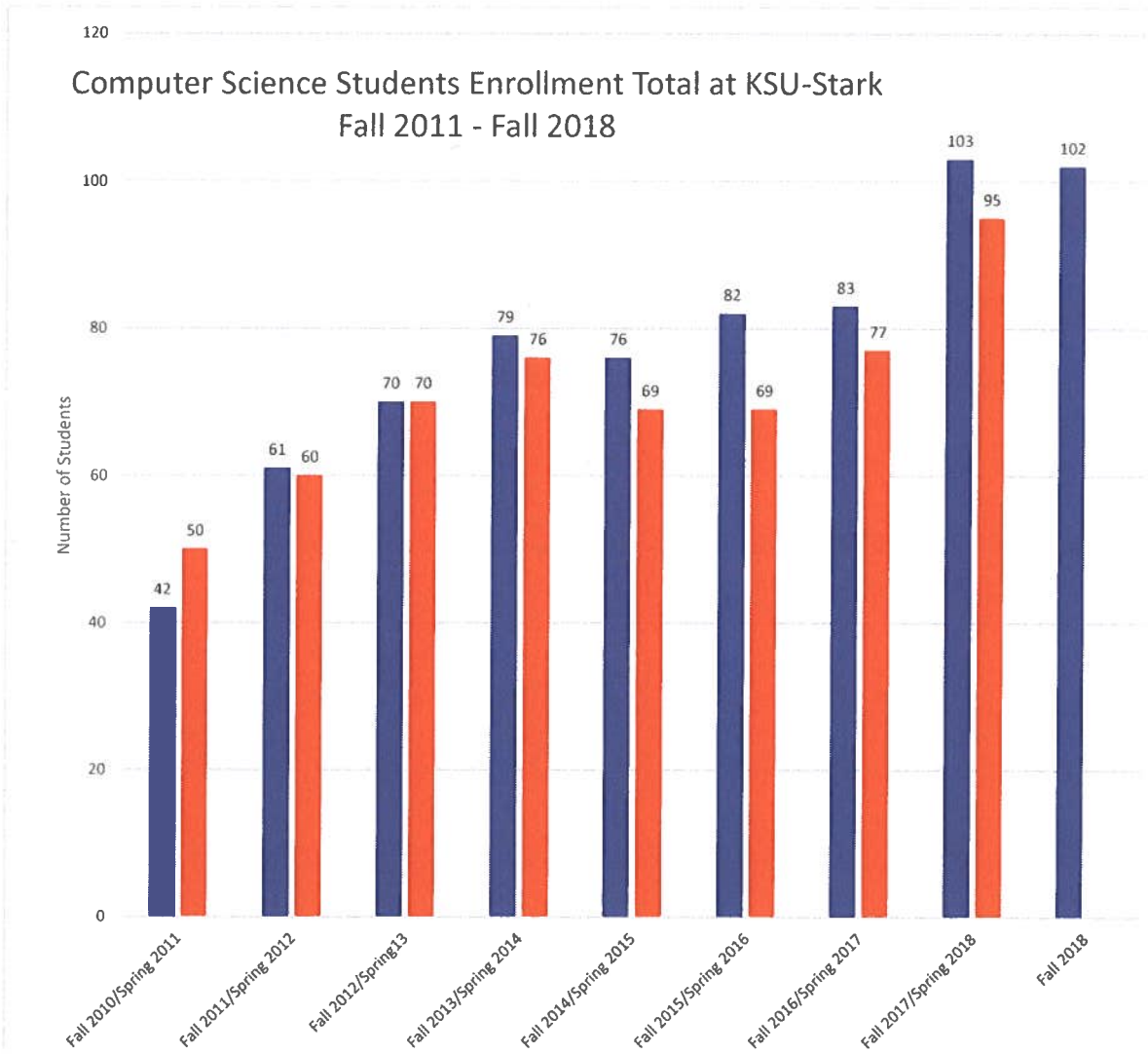
!CS 33901	SOFTWARE ENGINEERING	3	CS 35201 COMPUTER COMM. NETWORKS	CS 35201 COMPUTER COMM. NETWORKS
CS 44001	COMPUTER SCIENCE III-PROGRAMMING PATTERNS	4	CS 33101 STRUCT. OF PROGRAMMING LANGUAGES	CS 33101 STRUCT. OF PROGRAMMING LANGUAGES
!CS 46101	DESIGN AND ANALYSIS OF ALGORITHMS	3	CS44105 WEB PROGRAMMING I	CS 46101 DESIGN AND ANALYSIS OF ALG
Kent Core Requirement		3		
Kent Core Requirement		3		
Credit Hours		16		
Semester Six				
!CS 33101	STRUCTURE OF PROGRAMMING LANGUAGES	3	CS 33901 SOFTWARE ENGINEERING	CS 44001 CS III
Computer Science (CS) Upper-Division Electives (30000 or 40000 level)		3	CS44106 WEB PROGRAMMING II	CS 32301 HUMAN INTERFACE COMPUTING
Kent Core Requirement		3		
Kent Core Requirement		3		
Kent Core Requirement		3		
Credit Hours		15		
Semester Seven				
CS 49901	CAPSTONE PROJECT (ELR) (WIC)	4	CS 46101 DESIGN AND ANALYSIS OF ALG	CS44105 WEB PROGRAMMING I
Computer Science (CS) Upper-Division Electives (30000 or 40000 level)		3	CS 45203 COMPUTER NETW. SECURITY	CS 47221 INTRO TO CRYPT
Computer Science (CS) Upper-Division Electives (40000 level)		3	CS 43203 SYSTEM PROGRAMMING	KENT CORE REQUIREMENT
Kent Core Requirement		3		
Kent Core Requirement		3		
Credit Hours		16		
Semester Eight				
Computer Science (CS) Upper-Division Electives (40000 level)		6	CS 49998 CAPSTONE PROJECT	CS 49998 CAPSTONE PROJECT
Kent Core Requirement		3		CS44106 WEB PROGRAMMING II
Kent Core Requirement		3		
General Electives		3		
Credit Hours		15		
Minimum Total Credit Hours:		120		

BS in CS with Information Security concentration at Stark
[AS-BS-CS-INSE]
Attachment Material

This file contains:

- 1) The [trend of CS students enrollment](#) total at KSU-Stark between Fall 2011 and Fall 2018;
- 2) The Computer Science [\(CS\) Course Rotation at Stark](#);
- 3) The [roadmap of BS in Computer Science: Information Security](#) concentration [AS-BS-CS-INSE].

Use the links for easy access to the attachments.



CS Course Rotation at KSU-Stark

Current CS rotation, future CS course rotation, and staffing

LEGEND - Staffing

Dr. A. GUERCIO, FTT
Dr. A. KASTURIARACH, FTT
Dr. Y. CHAE, FTT
PT INSTRUCTOR
GUERCIO/CHAE FTT (NO LOAD)

FA17	SP18	FA18	SP19	FA19	SP20	FA20	SP21	FA21	SP22	FA22	SP23	FA23	SP24	FA24	SP25
CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI	CSI
CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2	CS2
DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS	DS4CS
CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA
	OS		OS		OS		OS		OS		OS		OS		OS
	CS3		CS3						CS3				CS3		
PL		PL		PL		PL		PL		PL		PL		PL	
NET		NET		NET		NET		NET		NET		NET		NET	
	ALG		ALG				ALG			ALG		ALG			ALG
	SE		SE		SE		SE		SE		SE		SE		SE
DB		DB		DB		DB		DB		DB		DB		DB	
			CAPS		CAPS		CAPS		CAPS		CAPS		CAPS		CAPS
							HIC					HIC			
WPI	WP1	WPI	WP1	WP1	WP1	WP1	WP1	ALG	HIC	WP1	WP1	ALG	HIC	WPI	WP1
INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP	INTSHP
RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES	RES
								NETSEC				NETSEC			
ICRYP	INSEC	DFOR	SYSP	ICRYP	INSEC	DFOR	SYSP	ICRYP	INSEC	DFOR	SYSP	ICRYP	INSEC	DFOR	SYSP

LEGEND – Course Abbreviation

	lower level
	upper level
	electives
	concentration specific

Abbreviation	Full Course Name (credit)	Frequency
INTRO	CS 10051 - INTRO TO COMPUTER SCIENCE (KMCR) (4)	every semester
CS1	CS 13001 - COMPUTER SCIENCE I - PROGRAMMING AND PROBLEM SOLVING (4)	
CS2	CS 23001 - COMPUTER SCIENCE II - DATA STRUCTURES AND ABSTRACTION (4)	
DS4CS	CS 23022 - DISCRETE STRUCTURES FOR COMPUTER SCIENCE (3)	
CA	CS 35101 - COMPUTER ARCHITECTURE (3)	every other semester
HIC	CS 32301 - HUMAN INTERFACE COMPUTING (3)	
OS	CS 33211 - OPERATING SYSTEMS (3)	
ALG	CS 46101 - DESIGN AND ANALYSIS OF ALGORITHMS (3)	
PL	CS 33101 - STRUCTURE OF PROGRAMMING LANGUAGES (3)	
NET	CS 35201 - COMPUTER COMMUNICATION NETWORKS (3)	
SE	CS 33901 - SOFTWARE ENGINEERING (3)	
DB	CS 33007 - INTRO TO DATABASE SYSTEM (3)	
CS3	CS 44001 - COMPUTER SCIENCE III - PROGRAMMING PATTERNS (4)	
CAPS	CS 49901 - CAPSTONE PROJECT (ELR) (WIC) (3)	
INTSHP	CS 33192 - INTERNSHIP IN COMPUTER SCIENCE (ELR) (1-3)	every semester
RES	CS 49998 - RESEARCH (ELR) (1-15)	
NETSEC	CS 45203 - COMPUTER NETWORK SECURITY (3)	every 4 semesters
DFOR	CS 47207 - DIGITAL FORENSICS (3)	
ICRYP	CS 47221 - INTRODUCTION TO CRYPTOLOGY (3)	
INSEC	CS 47205 - INFORMATION SECURITY (3)	
SYSP	CS 43203 - SYSTEMS PROGRAMMING (3)	
WP1	CS 44105 - WEB PROGRAMMING I (3)	
WP2	CS 44106 - WEB PROGRAMMING II (3)	

ROADMAP OF BS in COMPUTER SCIENCE: INFORMATION SECURITY CONCENTRATION [AS-BS-CS-INSE]

<http://catalog.kent.edu/colleges/as/cs/computer-science-bs/#ISC>

This roadmap is a recommended semester-by-semester plan of study for this major. However, courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

Plan of Study Grid

	Semester One	Credits
! CS 13011 & CS 13012 or CS 13001	COMPUTER SCIENCE IA: PROCEDURAL PROGRAMMING and COMPUTER SCIENCE IB: OBJECT ORIENTED PROGRAMMING or COMPUTER SCIENCE I: PROGRAMMING AND PROBLEM SOLVING	4
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
UC 10097	DESTINATION KENT STATE: FIRST YEAR EXPERIENCE	1
Kent Core Requirement		3
General Electives		2
	Credit Hours	15
	Semester Two	
! CS 23001	COMPUTER SCIENCE II: DATA STRUCTURES AND ABSTRACTION	4
! CS 23022	DISCRETE STRUCTURES FOR COMPUTER SCIENCE	3
CS 32301	HUMAN INTERFACE COMPUTING	3
MATH 12013	BRIEF CALCULUS II	3
MATH 20011	DECISION-MAKING UNDER UNCERTAINTY	3
	Credit Hours	16
	Semester Three	
! CS 33211	OPERATING SYSTEMS	3
! CS 35101	COMPUTER ARCHITECTURE	3
CS 47221	INTRODUCTION TO CRYPTOLOGY	3
MATH 21002	APPLIED LINEAR ALGEBRA	3
Foreign Language		4
	Credit Hours	16
	Semester Four	

Suggested semester-by-semester plan of study of CS courses at KSU-Stark to ensure a timely graduation for students entering the BS in CS with the concentration in Information Security, in Fall. All the remaining courses are those of the roadmap, as printed in the catalog.			
	Fall (even)		Fall (odd)
	CS 13001 COMPUTER SCIENCE I		CS 13001 COMPUTER SCIENCE I
	CS 23001 COMPUTER SCIENCE II		CS 23001 COMPUTER SCIENCE II
	CS 23022 DISCRETE STRUCT. FOR CS		CS 23022 DISCRETE STRUCT. FOR CS
	KENT CORE REQUIREMENT		CS 32301 HUMAN INTERFACE COMPUTING
	CS 33007 INTRO TO DATA BASE		CS 35201 COMPUTER COMM. NETWORKS
	CS 35101 COMPUTER ARCHITECTURE		CS 35101 COMPUTER ARCHITECTURE
	CS 47221 INTRO TO CRYPT		CS 47207 DIGITAL FORENSIC

! CS 33007	INTRODUCTION TO DATABASE SYSTEM DESIGN	3	CS 33211 OPERATING SYSTEMS	CS 33211 OPERATING SYSTEMS
! CS 35201	COMPUTER COMMUNICATION NETWORKS	3	CS 32301 HUMAN INTERFACE COMPUTING	CS 33901 SOFTWARE ENGINEERING
CS 43203	SYSTEMS PROGRAMMING	3	CS 47205 INFORMATION SECURITY	CS 43203 SYSTEM PROGRAMMING
Foreign Language		4		
Kent Core Requirement		3	CS 44001 CSIII	
Credit Hours		16		
Semester Five				
! CS 33901	SOFTWARE ENGINEERING	3	CS 35201 COMPUTER COMM. NETWORKS	CS 33007 INTRO TO DATA BASE
! CS 46101	DESIGN AND ANALYSIS OF ALGORITHMS	3	CS 33101 STRUCT. OF PROGRAMMING LANGUAGES	CS 46101 DESIGN AND ANALYSIS OF ALG
! CS 47205	INFORMATION SECURITY	3	CS 47207 DIGITAL FORENSIC	CS 47221 INTRO TO CRYPT
Kent Core Requirement		3		CS 45203 COMPUTER NETW. SECURITY
General Electives		2		
Credit Hours		14		
Semester Six				
! CS 33101	STRUCTURE OF PROGRAMMING LANGUAGES	3	KENT CORE REQUIREMENT	KENT CORE REQUIREMENT
! CS 44001	COMPUTER SCIENCE III- PROGRAMMING PATTERNS	4	CS 33901 SOFTWARE ENGINEERING	CS 44001 CSIII
CS 45203	COMPUTER NETWORK SECURITY	3	CS 43203 SYSTEM PROGRAMMING	CS 47205 INFORMATION SECURITY
Concentration Elective		3	KENT CORE REQUIREMENT	KENT CORE REQUIREMENT
Kent Core Requirement		3		
Credit Hours		16		
Semester Seven				
! CS 49901	CAPSTONE PROJECT (ELR) (WIC)	4	CS 46101 DESIGN AND ANALYSIS OF ALG	CS 33101 STRUCT. OF PROGRAMMING LANGUAGES
Kent Core Requirement		3	CS 45203 COMPUTER NETW. SECURITY	
Kent Core Requirement		3		
Kent Core Requirement		3		
Credit Hours		13		
Semester Eight				
Kent Core Requirement		3	CS 49998 CAPSTONE PROJECT	CS 49998 CAPSTONE PROJECT
Kent Core Requirement		3		
Kent Core Requirement		3		
Kent Core Requirement		3		
General Electives		2		
Credit Hours		14		
Minimum Total Credit Hours:		120		

Computer Science Environmental Scan Kent State University at Stark

In order to assess the need for a computer science degree at Kent State University at Stark, an environmental scan of computer science employment and education was conducted. Computer occupation employment is projected to grow in Ohio. The number of computer science bachelor's degrees awarded grew by approximately 13 percent from 2008 to 2016. Tuition at Kent State University at Stark is approximately 29 to 36 percent of other local programs.

The research includes data from the following sources:

- Ohio Board of Regents
- U.S. Bureau of Labor Statistics
- Websites of Malone University, University of Mount Union and Walsh University

Computer Occupation Employment in Canton-Massillon Metropolitan Area

According to The U.S. Bureau of Labor and Statistics, the Canton-Massillon Metropolitan Area employees 2,360 in computer occupations. The location quotient for computer occupations in the metropolitan area indicates a lower employment rate than other areas.

Occupation (SOC code)	Employment	Location Quotient
Computer Occupations (15-1100)	2,360	0.47

Computer Occupations Employment Projections and Job Openings in Ohio

As shown in the table below, The U.S. Bureau of Labor and Statistics is projecting employment growth in computer occupations in Ohio.

Occupation (SOC code)	2016	2026	Number	Percent	Job Openings (2016-2026)
Computer Occupations (15-1100)	141,452	150,094	8,642	6.3%	10,311

Ohio Engineering Degrees

According to the Ohio Board of Regents, Ohio Universities have been awarding computer science degrees as shown in the table below. From 2008 to 2016, the growth of engineering bachelor's degrees awarded was 12.7 percent.

Discipline Area	2008	2009	2010	2011	2012	2013	2014	2015	2016	% Change 2008 to 2016
University Main and Regional Campuses - Bachelor's Degree										
Computer Science	1,168	1,182	1,127	1,171	1,353	1,288	1,310	1,299	1,316	12.7%

Cost of Other Stark County Universities offering Computer Science Degrees

According to data from their websites tuition rates are as follows:

- Malone University – \$831 per credit hour
- University of Mount Union – \$762 per credit hour
- Walsh University - \$791 per credit hour



DATE: October 31, 2019

TO: Chair Javed Khan and Feodor Dragan

FROM: Angela Guercio (Coordinator of CS) and Bathi Kasturiarachi (Chair APC Stark)

SUBJECT: New academic program evaluation – Computer Science

This report outlines the assessment and recommendations of the Academic Planning Committee (APC) on the proposal submitted by Dr. Angela Guercio for establishing the B.S. in Computer Science (Information Security), B.S. in Computer Science (no concentration), and the B.A. in Computer Science degrees at Kent State University at Stark.

Executive Summary

Kent State University at Stark has the faculty strength, required course rotation, computer resources, and the academic support services to offer the B.S. in Computer Science (Information Security concentration), B.S. in Computer Science (no concentration), and the B.A. in Computer Science degrees. The new programming is designed with a commitment to collaborate between departments. The proposal encapsulates benefits and opportunities through its objectives and follows through with a robust action plan. The Academic Planning Committee gives the proposal the highest rating for success.

S.W.O.T Analysis

Strengths

With two dedicated faculty members, Dr. Angela Guercio (Coordinator) and Dr. Younghun Chae, all coursework in the three concentrations can be delivered at Kent State University at Stark. There are other fulltime faculty members in applied mathematics who could teach sections of Discrete Structures and other select courses. Computer Science is the fastest growing major on campus and has garnered steady student interest throughout. Between fall 2013-fall 2018 the enrollment on campus has increased – specifically, 79, 76, 82, 83, 103, and 101 respectively. The environmental scan points to a strong workforce demand through the year 2026. The scan also highlights the affordability of our program compared to other universities in Stark County. Additionally, Computer Science, is one of the STEMM disciplines covered by the Choose Ohio First (COF) grant for student merit scholarships, with guaranteed funding from the Ohio Department of Higher Education (ODHE) through AYs 2016-2021, and the possibility of future renewal.

Weaknesses

There were no identifiable points of weakness in the proposal.

Opportunities

The Academic Planning Committee has identified several opportunities with Computer Science as a new major at Kent State University at Stark.

- The proposed program will help forge a stronger partnership with the Department of Computer Science by building pathways for our students to complete their degree in other concentration areas in CS
- At the Stark Campus the opportunity exists to seek funding to outfit the CS lab in Main Hall 302

- Opportunity to continue the collaboration with the existing Computer Design, Animation, and Game Design (CDAG) degree available on campus, by sharing the computer lab in Main Hall 313 and the adjoining Virtual Reality (VR) room.
- With a commitment and support from the Dean and the VP for Systems Integration during a conversation with the chair of Academic Planning Committee, we believe that the new degrees have the potential to make a good case for a future hire in CS. Currently there is a request for a new TT hire for AY 2020-2021.

Threats

There were no identifiable threats in the proposed program due to the highly supportive and collaborative nature of the partnership between the Computer Science departments at Kent State University and Kent State Stark.

Computer Science at Kent State Stark

The U.S. Bureau of Labor and Statistics is projecting employment growth in computer occupations in Ohio by 10,311 jobs during the ten-year period 2016-2026. At Kent State University, the number of Computer Science bachelor's degrees awarded grew by approximately 13% from 2008 to 2016, and the positive trend is expected to continue. We believe that the three concentrations of the Computer Science degree at the Stark Campus will create the following benefits:

1. Provide additional partnerships between the Stark Campus and area businesses in Stark and surrounding counties.
2. Strengthen the collaboration with the Department of Computer Science by providing additional opportunities for Stark Campus students.
3. Serve to distinguish Stark Campus graduates as having a signature experience that prepares them to become competitive in the computer technology industry

The enrollment in Computer Science at Kent State University has grown in recent years. The table below provides a breakdown of the numbers by campus. The CS faculty will continue to explore student interest and employer interest in Computer Science and Information Security. Recruitment efforts will be enhanced through the existing partnerships with area high schools via the College Credit Plus (CCP) program. Besides the Kent Campus, Walsh University is offering a B.S. in Cyber Security. Their program is a blend of CS and Information Computer Technology courses (ICT) with no permanent faculty specialized in Security. The next closest university with a B.S. in Computer Science is Case Western Reserve, which is outside our geographical reach.

Fall 2017	Fall 2018
B.A. (Kent) = 50	B.A. (Kent) = 45
B.S. (Kent) = 466	B.S. (Kent) = 482
Total Kent Campus = 516	Total Kent Campus = 527
Total all Campuses = 656	Total all campuses = 660
Total Regional Campuses = 140	Total Regional Campuses = 133
<i>Total Stark Campus = 103</i>	<i>Total Stark Campus = 101</i>

Kent State University at Stark has the required computer labs and the academic support services to retain students in the proposed program. The campus has an active Computer Club that supports a learning community. Dr. Guercio has networked with, Dr. Javed Khan - Chair of Computer Science, who has pledged strong support to establishing the CS degrees at the Stark Campus. The current (2016-2021) Choose Ohio First (COF) scholarships in STEM at the

Stark Campus helps recruit talented students into the CS major. Further strengthening the partnership between the two campuses is a new proposal spearheaded by Chair Khan, to obtain a large scholarship grant through the new COF initiative by the Ohio Department of Higher Education (ODHE). The Computer Science Department has always been very supportive of our program over the past several years when new courses were introduced in the curriculum. As the coordinator, Dr. Guercio will be responsible for administrative oversight with necessary support from academic advisors.