KANSAS BOARD OF REGENTS
COUNCIL OF CHIEF ACADEMIC OFFICERS

VIRTUAL MEETING AGENDA
Wednesday, January 19, 2022
9:00 a.m. – 10:00 a.m.
or upon adjournment of SCOCAO

The Council of Chief Academic Officers (COCAO) will meet virtually via Zoom. Meeting information will be sent to participants via email, or you may contact arobinson@ksbor.org.

I.	**Call to Order**	Jill Arensdorf, Chair	
	A. Roll Call		
	B. Approve Minutes from December 15, 2021		p. 3
II.	**First Readings**		
	A. MS in Health Data Science – KUMC	Robert Klein	p. 6
III.	**Second Readings**		
	A. MS in Computer Science – FHSU	Jill Arensdorf	p. 18
	B. BS in Computer Science – PSU	Howard Smith	p. 24
IV.	**Council of Faculty Senate Presidents Update**	Janet Stramel, FHSU	
V.	**Other Matters**		
	A. Update on Program Review	Daniel Archer	
	B. Discuss Opportunities (new degree programs, partnerships, strategic initiatives, etc.) that Universities are Considering or Planning to Pursue in the Future	COCAO Members	
VI.	**Next COCAO Meeting – February 16, 2022**		
	A. New Program Approvals		
	B. Off-Campus Academic Specialty Program Request (KUMC)		
VII.	**Adjournment**		

Date Reminder:
- Feb. 16th, 10am-1pm, 19th Annual Capitol Graduate Research Summit, Capitol Rotunda, Topeka, KS

COUNCIL OF CHIEF ACADEMIC OFFICERS

The Council of Chief Academic Officers (COCAO), established in 1969, is composed of the academic vice presidents of the state universities. The Board's Vice President for Academic Affairs serves as an ex officio member, and the member from the same institution as the chairperson of the Council of Presidents serves as chairperson of the Council of Chief Academic Officers. The chief academic officers of the University of Kansas Medical Center and Washburn University are authorized to participate as non-voting members when agenda items affecting those institutions are to be considered. The Council of Chief Academic Officers meets monthly and reports to the Council of Presidents. The Council of Chief Academic Officers works with the Board Academic Affairs Committee through the Vice President for Academic Affairs. Membership includes:

Jill Arensdorf, Chair	FHSU	Howard Smith	PSU
George Arasimowicz	ESU	JuliAnn Mazachek	Washburn
Charles Taber	K-State	Shirley Lefever	WSU
Barbara Bichelmeyer	KU	Daniel Archer	KBOR
Robert Klein	KUMC		

Council of Chief Academic Officers

AY 2022 Meeting Schedule

COCAO Academic Year 2021- 2022 Meeting Dates				
Meeting Dates	**Location (virtual or in-person)**	**Lunch Rotation**	**Institution Materials Due**	**New Program Requests due**
September 15, 2021	Virtual		August 25, 2021	July 21, 2021
	*No October Meeting			
November 17, 2021	Virtual		October 27, 2021	September 22, 2021
December 15, 2021	Virtual		November 24, 2021	October 21, 2021
January 19, 2022	Virtual		December 29, 2021	November 24, 2021
February 16, 2022	Virtual		January 26, 2022	December 22, 2021
March 16, 2022	Virtual		February 23, 2022	January 19, 2022
April 20, 2022	Virtual		March 30, 2022	February 23, 2022
May 18, 2022	TBD		April 27, 2022	March 23, 2022
June 15, 2022	TBD		May 25, 2022	April 20, 2022

*COCAO meets at 9:00 a.m. or upon adjournment of SCOCAO unless otherwise noted.

Wednesday, December 15, 2021

The December 15, 2021, meeting of the Council of Chief Academic Officers was called to order by Chair Jill Arensdorf at 8:59 a.m. The meeting was held through Zoom.

In Attendance:

Members:	Jill Arensdorf, FHSU	Barbara Bichelmeyer, KU	Robert Klein, KUMC
	Chuck Taber, K-State	George Arasimowicz, ESU	JuliAnn Mazachek, Washburn
	Linnea GlenMaye, WSU	Howard Smith, PSU	Daniel Archer, KBOR
Staff:	Karla Wiscombe	Sam Christy-Dangermond	Amy Robinson
	Tara Lebar	Judd McCormack	April Henry
	Marti Leisinger	Lisa Beck	Hector Martinez
Others:	Alysia Johnson, Fort Scott CC	Cindy Hoss, Hutchinson CC	Amber Knoettgen, Cloud County CC
	Bobby Winters, PSU	Elaine Simmons, Barton CC	Grady Dixon, FHSU
	Janet Stramel, FHSU	Jason Sharp, Labette CC	Jane Holwerda, Dodge City CC
	Jean Redeker, KU	Jennifer Ball, Washburn	Jennifer Roberts, KU
	Keith Dreiling, FHSU	Kim Morse, Washburn	Kim Zant, Cloud County CC
	Laura Loyacono, KSCAC	Luke Dowell, SCCC	Mickey McCloud, JCCC
	Lisa Blair, NWKTC	Laurel Littrell, K-State	Meaghan Higgins, KSCAC
	Monette DePew, Pratt CC	Mary Carol Pomatto, PSU	Marlon Thornburg, Coffeyville CC
	Remy Lequesne, KU	Robert Klein, KUMC	Robin Henry, WSU
	Shirley Lefever, WSU	Tanya Gonzalez, KSU	Tom Nevill, Butler CC
	Steve Loewen, FHTC	Aron Potter, Coffeyville CC	Tiffany Bohm, KCKCC
	Michelle Schoon, Cowley CC	Andrew Hippisley, WSU	

Jill Arensdorf welcomed everyone. Roll call was taken for members and presenters.

Approval of Minutes
George Arasimowicz moved to approve the November 17, 2021 meeting minutes, and Chuck Taber seconded the motion. With no corrections, the motion passed.

1st Readings
Jill Arensdorf, Grady Dixon, and Keith Dreiling presented the first reading for an MS in Computer Science at FHSU. The focus of the program is the high-demand area of data science. FHSU recognizes that other computer science programs in Kansas exist and has provided information on how their program differs. They currently offer an online undergraduate program that has grown to over 500 students. Due to undergraduate growth, student requests, and surveys, FHSU created a master's program intending to offer it in Fall 2022.

Howard Smith, Mary Carol Pomatto, and Bobby Winters presented the first reading for a BS in Computer Science at PSU. The program came about due to local employer demand and is one of the most requested programs from students. They currently do not have the staffing to teach upper-division courses but will when the program matures.

Both programs will be up for a second reading and vote at the next COCAO meeting.

2nd Readings

Barbara Bichelmeyer presented second readings for the following KU programs:
- BS/BAS in Project Management
- M.Eng. in Electrical Engineering & Computer Science

Barbara Bichelmeyer moved to approve the KU request for a BS/BAS in Project Management, and George Arasimowicz seconded the motion. With no further discussion, the motion passed unanimously through a roll call vote.

Barbara Bichelmeyer moved to approve the KU request for an M.Eng. in Electrical Engineering & Computer Science, and Howard Smith seconded the motion. With no further discussion, the motion passed unanimously through a roll call vote.

Both programs will move forward to COPS later in the day for approval.

Other Requests

- Chuck Taber presented the K-State request for an Off-Campus Academic Specialty Program for its Adult Learning and Leadership program. KBOR policy requires academic specialty programs offered at multiple locations across the state be renewed at least every ten years. The K-State Adult Learning and Leadership is a graduate program housed in the College of Education and focuses on lifelong learning and how one effectively conducts lifelong learning. This program is delivered online and on-site at Fort Leavenworth, Wichita, Gardner, and Kansas City. A full description of the program can be found on page 47 of the agenda.

  George Arasimowicz moved to approve K-State's request for an Off-Campus Academic Specialty Program for the Adult Learning and Leadership program for the next 10-years, and Howard Smith seconded the motion. It was clarified this is a vote to authorize the institution to offer an existing program outside their campus and not to approve the program itself. The motion passed unanimously through a roll call vote.

- Chuck Taber presented the K-State request to merge the Departments of American Ethnic Studies and Gender, Women, & Sexuality Studies. These programs have been identified as low enrolled programs, and merging creates an opportunity to increase the impact and visibility on campus and create administrative efficiencies. The newly merged program would be named Social Transformation Studies. K-State anticipates this will lead to mergers of the academic programs within the departments.

  Linnea GlenMaye moved to approve the K-State request to merge the departments as presented, and Barbara Bichelmeyer seconded the motion. With no further discussion, the motion passed unanimously through a roll call vote. This request will go to Blake Flanders, President and CEO, for final approval.

- Linnea GlenMaye and Andrew Hippisley presented the WSU request to change the name of the Department of Women's Studies to the Department of Women's, Ethnicity, & Intersectional Studies. WSU believes this will lead to increased enrollment and is a realignment based on market research of students. It also aligns the department with existing faculty expertise.

  Howard Smith moved to approve the WSU name change request as presented, and Chuck Taber seconded the motion. With no further discussion, the motion passed unanimously through a roll call vote. This request will go to Blake Flanders, President and CEO, for final approval.

Council of Faculty Senate Presidents (COFSP) Update
Janet Stramel, FHSU Faculty Senate President, provided the update. Later in the day, the council plans to discuss the request granting tenure clock extensions. They will also begin their 5-year Advanced Placement (AP) cut score for college credit review. Policy states they will distribute the default systemwide cut scores in draft form to department heads who have faculty members responsible for each equivalent course at applicable universities.

Other Matters
KUMC will soon present for approval an MS in Health Data Science. This program deals with large databases and national databases and will be housed entirely at the medical center.

PSU's Kelce College of Business is working on a general business degree to be presented soon after the new year. They will also have department mergers and reorganize structures to their system, both aimed at cost-efficiency.

Adjournment
The next COCAO meeting is scheduled for January 19, 2022, and will be held virtually.

Barbara Bichelmeyer moved to adjourn the meeting, and Chuck Taber seconded the motion. With no further discussion, the meeting adjourned at 9:38 a.m.

Program Approval

Summary

Universities may apply for approval of new academic programs following the guidelines in the Kansas Board of Regents Policy Manual. The University of Kansas Medical Center has submitted an application for approval and the proposing academic unit has responded to all of the requirements of the program approval process.

January 19, 2022

I. General Information

A. Institution   University of Kansas Medical Center

B. Program Identification

Degree Level:	Masters
Program Title:	Health Data Science
Degree to be Offered:	Master's in Health Data Science
Responsible Department or Unit:	University of Kansas/School of Medicine/Department of Biostatistics & Data Science
CIP Code:	30.7001
Modality:	Hybrid
Proposed Implementation Date:	Fall 2022

Total Number of Semester Credit Hours for the Degree: 36

II. Clinical Sites: Does this program require the use of Clinical Sites? No

III. Justification

The Master's Degree in Health Data Science is proposed by the Department of Biostatistics & Data Science at the University of Kansas Medical Center with full support of the leadership of the University of Kansas Medical Center. This online and in-person program will be on the cutting edge for several reasons. It is the first in the region focused on producing graduate-trained health data scientists with the high level of biostatistics and computing skills demanded by a rapidly emerging healthcare analytics workforce. In addition, online access to all required coursework provides flexibility to accommodate working professionals seeking advanced health data science training.

Due to the advent of new technologies, a large amount of data is being generated in healthcare industries. For example, new sensor technologies have dramatically increased the frequency and reliability of the data being generated by individual patients. Therefore, there is a high demand for expertise in tracking, managing, analyzing, and interpreting the high volume of data being generated. In addition, interdisciplinary research is a point of emphasis in academia, government, and industry. To support effective interdisciplinary collaborations, data scientists need to possess statistical, computing, and domain-level expertise. The application of data science has already had a tremendous impact on the diagnosis and treatment of many medical conditions. However, clinicians/researchers usually do not have formal training in data science in their degree programs. The proposed MS in Health Data Science will fill this significant gap.

Besides clinicians and researchers already working in their field, the proposed program will be an attractive career choice for beginners. Integrating clinical data with other diverse data sources, like sleep cycles, sedentary vs active life, diet, and nutrition, etc., allows a greater level of understanding of the association and casual factors. Moreover, each of us carries diverse genetic variants and lifestyle factors that can be combined with phenotypic and demographic data to inform our understanding of physiology, which will eventually help in advancing personalized medicine. Analyzing the vast amount of available data to generate actionable information for clinicians, requires advanced training in health data science.

Highly personalized data comes with a unique management challenge due to the Health Insurance Portability and Accountability Act (HIPPA). Both law and ethics require that the patients' personal information must be kept secure. On the other hand, utilization of as much clinical research data as possible is vital for the development of personalized medicine. The complexity of securing such information and using it effectively demands highly skilled health data scientists immersed in the healthcare world.

The curriculum has been developed by the largest group of PhD statisticians and data scientists in the KU system, whose track record of successful online curriculum development and instruction is evidenced by the rapid growth of their existing programs. The proposed degree will deliver high-quality accessible graduate programs in STEM fields and produce a much-needed health data science workforce for the local and regional communities of Kansas City and the State of Kansas.

IV. Program Demand:

A. Survey of Student Interest

Number of surveys administered: ………………	N/A
Number of completed surveys returned: ……….	137
Percentage of students interested in program: …	39.4%

An electronic RedCAP survey was distributed through the KUMC Office of Graduate Medical Education, the Office of Postdoctoral Affairs and Graduate Studies, the University of Kansas Cancer Center, and Frontiers. In addition, the survey was distributed to select regional academic institutions. The survey first asked participants to indicate whether a Master of Science in Health Data Science degree was a career goal, and for those who answered in the positive, a series of questions about the types of degrees desired were presented. Of the 137 respondents, 29 (21.2%) were undergraduate students, two (1.5%) were medical students, 50 (36.5%) were graduate students, 30 (21.9%) were medical residents, nine (6.6%) were medical doctor, 16 (11.7%) were post-doctoral fellows, three (2.2%) were staff, and five (3.6%) were faculty. In total, 54 (39.4%) indicated health data science was a career goal. All 54 (100%) replied "Yes" to the question "Would you be interested in a Master of Science degree in Health Data Science at the University of Kansas Medical Center?"

B. Market Analysis

The Master of Health Data Science is designed to prepare students for immediate entry into the workforce. "Data Scientist" has been ranked as one of the top jobs in the U.S. over the last several years. The Harvard Business Review named it as "the sexiest job of the 21st century" back in 2012 and pointed out that the shortage of data scientists is becoming a serious impediment in some sectors (Davenport & Patil, 2012). The recruiting website, Glassdoor, annually releases the best jobs in U.S. based on three criteria: earning potential (median annual base salary), overall job satisfaction, and the number of job openings on Glassdoor. Glassdoor ranks "Data Scientist" as the second best job in U.S. in 2021 with median salary of $113,736. Further, "Data Scientist" has been consistently ranked as top three best job in last five years (third in 2020, first in 2019, 2018, 2017, and 2016) (Glassdoor, 2020). Bureau of Labor Statistics determined that data science is one of the fastest growing occupations and has a projected 31% growth over the next 10 years (2019-2029) (Bureau of Labor Statistics,

2020). However, the supply of data scientists has not been able to keep pace with their demand. In August 2018, LinkedIn reported that there was a shortage of 151,717 people with data science skills in the United States (LinkedIn, 2018). A January 2019 report from Indeed showed a 29% increase in demand for data scientists every year and a 344% increase since 2013. The same report also showed that searches for data science jobs increased 14% in 2018, which suggests a big gap between the demand and supply (Flowers, 2019).

In the Kansas City Metro area, the demand for workers with statistics and analytics skills will increase by 22.2% over the next decade, according to a Labor Market report by the Regional Workforce Intelligence Network of Greater Kansas City (MARC, 2020). According to the Bureau of Labor, the projected demand for Statisticians and Data Scientists will be 34.6% and 31% respectively. The proposed program will be a combination of both statistics and data science with a focus on health outcome data. Therefore, the program will be in high demand.

There are several factors that influence the trend in healthcare analytics market size and growth. The transition from paper charts to real-time monitoring systems and use of electronic health records to gather patient health data is expected to increase the healthcare analytics market size. Industry players invest huge amounts of money in research and development processes to create unique platforms and solutions with enhanced features that allow them to gain a competitive advantage in the market for health care analytics. This increase in investment is expected to fuel the growth of the healthcare analytics market size. In addition, the outbreak of COVID-19 pandemic has brought the importance of data analytics sharply into focus. The need to extract and analyze the healthcare data quickly has only increased with pandemic (Sheng, 2020). Integrating the developments in computing technology and increasing the implementation of predictive and prescriptive analytics in most hospitals is driving healthcare analytics market growth.

V. Projected Enrollment for the Initial Three Years of the Program

Based on the demand and the current recruitment in other MS in Applied Statistics programs, we anticipate the following estimates of the enrollment in the proposed program.

Year	Total Headcount Per Year		Total Sem Credit Hrs Per Year	
	Full- Time	Part- Time	Full- Time	Part- Time
Implementation	5	5	95	45
Year 2	10	10	180	90
Year 3	10	10	180	90

VI. Employment

Implementation of the program will create several employment opportunities for both administrative staff and faculty, as well as graduates. There will be a Director, an Assistant Director, and an Administrative Assistant for the program. The directors will have dedicated percentage effort time overseeing and ensuring the proper functioning of the program. The full-time Administrative Assistant will work on administrative processes and facilitate instructor and trainee communication, starting from student recruitment to graduation. Many other KUMC faculty will be employed with percentage effort for their involvement in various educational activities including both didactic and non-didactic course works.

There will be a wide spectrum of employment opportunities for the graduates of the proposed program. Given the applied nature of coursework/training, we anticipate that our graduates will be able to join the workforce immediately after the graduation. The program will bring statistics and data science together with a focus on health data. This combination of skill sets is highly sought after and required in many healthcare institutions and industries. We anticipate that our graduates will be targeted for recruitment by academic health research institutions and a variety of different health care provider industries. A few examples of potential employment

venues include academia, government, hospital, biotechnology, insurance company, pharmaceutical company, and consulting. Many of the healthcare analytics providers are increasingly focused on providing scalable solutions that can be made adaptable to technology advancement as well as human expertise and skills in healthcare organizations. Examples of a few companies include, Cerner Corporation, PRA Healthcare, Quintiles, McKesson Corporation, Optum, CitiusTech, Health Catalyst, SAS Institute Inc, and VitreosHealth, Inc. Therefore, successful completion of the proposed MS in Health Data Science program will enable our graduates achieve high level of competency to seek a career across a wide spectrum of healthcare data scientist positions.

VII. Admission and Curriculum

Admission to the MS program in Health Data Science is made by the Department's MS/PhD Admissions Committee which consists of four full-time faculty members and the Program Director who serves as Chair. All committee recommendations are presented directly to the Department Chair. ***Non-discrimination policy*** : Qualified students are admitted without regard to race, color, ethnicity, religion, sex, national origin, age, ancestry, disability, status as a veteran, sexual orientation, marital status, parental status, gender identity, gender expression, and genetic information.

A. Admission Criteria

Application for admission to the MS program in Health Data Science is through the Department of Biostatistics and Data Science at the University of Kansas Medical Center. The following materials are required to be considered for admission:
- A completed online application form.
- Evidence of a bachelor's degree from an accredited college or university.
- Official transcript(s) bearing the official seal from each college or university in which course work had been taken.
- Three (3) letters of recommendations.
- TOEFL or IELTS test results (if applicable).

For admission into the MS program in Health Data Science, the applicant must meet the general requirements for admission to Graduate Studies. The minimum requirements for admission into the MS program are:
- A cumulative undergraduate GPA of 3.0 or better is required for regular admission status. An applicant with an undergraduate GPA not meeting the minimum requirements may be admitted under provisional status, provided they meet the academic standards of the Department without excessive deficiencies in pre-requisites.
- B average (or higher) in Calculus I – II (i.e., single variable differentiation and integration or equivalent).
- Successful completion of a course in any computer programming language.

An applicant meeting the minimum requirements for admission is referred to the Admissions Committee for approval or disapproval. Approval for admission is good for up to 12 months from the approved date for admission. Failure to enroll during this time will require a new application if admission is desired.

B. Curriculum

The proposed educational program will utilize all but one existing statistical, computational and health data science foundation courses. One new course will be designed with special focus on observational health data analysis. The curriculum of the MS in Health Data Science is built upon three foundational courses: required statistics foundation course (12 credit hours), required computing foundation courses (six credit hours), required

health data science foundation courses (12 credit hours). In addition, the program requires six credit hours of elective courses of students' choice.

Required Statistics Foundation Courses (12 semester credit hours (SCH))
HDSC 805: Professionalism, Ethics and Leadership in the Statistical Sciences (3 SCH)
HDSC 835: Categorical Data Analysis (3 SCH)
HDSC 840: Linear Regression (3 SCH)
HDSC 845: Survival Analysis (3 SCH)

Required Computing Foundation Courses (6 semester credit hours (SCH))

HDSC 818: Introduction to R (1 SCH)
HDSC 819: Introduction to Python (1 SCH)
HDSC 822: Introduction to SQL (1 SCH)
HDSC 823: Introduction to Programming and Applied Statistics in R (3 SCH)

Required Health Data Science Foundation Courses (12 semester credit hours (SCH))

HDSC 824: Data Visualization and Acquisition (3 SCH)
HDSC 880: Data Mining and Analytics (3 SCH)
HDSC 881: Statistical Learning I (3 SCH)
HDSC 861: Observational Health Data Analysis (3 SCH)

Electives (6 semester credit hours (SCH))
HDSC 815: Introduction to Bioinformatics (3 SCH)
HDSC 820: SAS Programming I (3 SCH)
HDSC 830: Experimental Design (3 SCH)
HDSC 855: Statistical Methods in Genomic Research (3 SCH)
HDSC 882: Statistical Learning II (3 SCH)

Course Plan

The courses mentioned above will be taught in Fall, Spring and Summer semesters as shown on the plan of study below:

Year 1: Fall   **SCH = Semester Credit Hours**

Course #	Course Name	SCH
HDSC 835	Categorical Data Analysis	3
HDSC 840	Linear Regression	3
HDSC 824	Data Visualization and Acquisition	3

Year 1: Spring

Course #	Course Name	SCH
HDSC 880	Data Mining and Analytics	3
HDSC 845	Survival Analysis	3
HDSC 818	Introduction to R	1

Year 1: Summer

Course #	Course Name	SCH
HDSC 823	Introduction to Programming and Applied Statistics in R	3

Year 2: Fall

Course #	Course Name	SCH….
HDSC 881	Statistical Learning, I	3
HDSC 822	Introduction to SQL	1
HDSC 815 (1st Elective)	Introduction to Bioinformatics (or one other elective)	3

Year 2: Spring

Course #	Course Name	SCH….
HDSC 861	Observational Health Data Analysis	3
HDSC 882 (2nd Elective)	Statistical Learning II (or one other elective)	3

Year 2: Summer

Course #	Course Name	SCH….
HDSC 805	Professionalism, Ethics and Leadership in the Statistical Sciences	3
HDSC 819	Introduction to Python	1

Total Number of Semester Credit Hours …………………………………………………. 36

All the courses required for the MS in Health Data Science already exist as part of the MS in Applied Statistics and MS in Biostatistics programs with one exception. One new course (HDSC 861) will be created to align with the Health Data Science degree focus. The courses will be taught both in-person and online. The online courses will be delivered via internet and require the students to have access to an adequately equipped computer with internet connection. The Department of Biostatistics & Data Science currently offers online courses in two formats: synchronous (live) or asynchronous (recorded). In general, the Department of Biostatistics & Data Science has developed online courses to mimic the classroom as closely as possible using educational technology, such as, Panopto, Zoom, Blackboard, and Canvas.

Annual Evaluations

Students will be evaluated each May by their faculty advisor and Program Chair. These evaluations provide feedback to the student regarding the progress that they are making towards the degree. To proceed in the program, students must remain in good standing and maintain a 3.0 GPA with no more than two grades of C in the required courses.

Graduate Examination

To graduate with a MS in Health Data Science, students must pass the Masters Comprehensive Examination. That examination is administered after a student has successfully completed: (1) the required coursework including Categorical Data Analysis (HDSC 835), Linear Regression (HDSC 840), Statistical Learning I (HDSC 881), and Observational Health Data Analysis (HDSC 861); and (2) during the final semester of enrollment. The examination has two purposes: to assess the student's strengths and weaknesses and to determine whether the student should be awarded the MS degree. The examination is created and administered by a committee of at least three members of the Department Graduate Faculty. If this examination is failed, a second examination may be taken no sooner than three months later and is subject to committee approval. The committee can recommend that the student leave the program following the semester in which the examination is taken. After two failures, no further examination is permitted, and the student will not be awarded the MS degree.

VIII. Core Faculty

Note: * Next to Faculty Name Denotes Director of the Program, if applicable
FTE: 1.0 FTE = Full-Time Equivalency Devoted to Program

Faculty Name	Rank	Highest Degree	Tenure Track Y/N	Academic Area of Specialization	FTE to Proposed Program
Jonathan Mahnken	Professor	PhD	Y	Biostatistics	0.10
Jianghua He	Associate Professor	PhD	Y	Biostatistics	0.10
John Keighley	Associate Professor	PhD	N	Biostatistics, Data Science	0.20
Jo Wick	Associate Professor	PhD	Y	Biostatistics	0.15
Dong Pei	Research Instructor	PhD	N	Bioinformatics, Informatics, Data Science	0.10
Jinxiang Hu	Assistant Professor	PhD	Y	Biostatistics, Data Science	0.20
Devin Koestler	Associate Professor	PhD	Y	Biostatistics, Bioinformatics, Data Science	0.00
Jeffrey Thompson	Assistant Professor	PhD	Y	Biostatistics, Bioinformatics, Informatics, Data Science	0.00
Dinesh Pal Mudaranthakam	Teaching Associate	MS	N	Informatics, Data Science	0.10
Lynn Chollet Hinton	Assistant Professor	PhD	Y	Bioinformatics, Informatics, Data Science	0.15
Prabhakar Chalise	Associate Professor	PhD	Y	Biostatistics, Bioinformatics, Data Science	0.15
Yanming Li	Assistant Professor	PhD	Y	Biostatistics, Bioinformatics, Data Science	0.05
Mihaela Sardiu	Associate Professor	PhD	Y	Bioinformatics, Data Science	0.20
Milind Phadnis	Associate Professor	PhD	Y	Biostatistics	0.10

Number of graduate assistants assigned to this program ………………………………………… **0**

The Department faculty who are responsible for teaching courses in this program include:

Jonathan Mahnken, PhD. Professor with Tenure. Research focus: study design; power and sample size calculations; secondary data analysis; survival analysis; categorical data analysis; statistical consulting and expert testimony; analysis of health claims data. Dr. Mahnken has an extensive collaboration record that includes basic science and translational research in stroke, clinical trials, and health services research. He is the director of the Data Management and Statistics Core of the NIA-funded KU Alzheimer's Disease Center and was PI of an R03 from the National Institute of Dental and Craniofacial Research of the NIH.

Dr. Mahnken currently teaches BIOS/STAT 805: Professionalism, Ethics and Leadership in the Statistical Sciences.

Jianghua He, PhD. Associate Professor with Tenure. Research focus: survival analysis; time varying coefficient models; meta-analysis; missing data; Bayesian dynamic survival models. Dr. He has developed statistical methodology for problems in obesity and nursing research, specifically in the area of survival analysis. She currently teaches BIOS 872: Mathematical Statistics II, and BIOS 835: Categorical Data Analysis.

John Keighley, PhD. Education Associate Professor, Education Track. Research focus: Analysis and Reporting of Cancer Registry Data. Dr. Keighley has worked with the Kansas Cancer Registry and on various other cancer- related grants and studies. He has worked with researchers that specialize in engineering, smoking cessation, genitourinary disease and gastroenterology, and large data sets such as Kansas Medicaid, and the SEER-Medicare linked database. He currently teaches BIOS 820: SAS programming I, BIOS 850: Multivariate Statistics, and BIOS 880: Data Mining and Analytics.

Jo Wick, PhD. Associate Professor with Tenure/Director of Graduate Education. Research focus: Statistics education, Bayesian statistics and applications, clinical trial design. Dr. Wick has extensive experience in clinical trial design and has worked with researchers in cardiology, nursing, endocrinology, cancer, and early phase drug discovery. Her primary role within the department is to oversee the Graduate Programs in Biostatistics and Applied Statistics (MS/PhD) where she has received the Outstanding Graduate Teaching Award, voted on by students. Her research is focused on Bayesian statistics and data analysis and statistics education. She currently teaches BIOS/STAT 840: Linear regression and has developed the new course STAT 805: Professionalism, Leadership and Ethics for Data Scientists. She has previously taught BIOS 830: Experimental Design.

Dong Pei, PhD. Research Instructor and Bioinformatics Specialist. Research Focus: Development and application of bioinformatics tools/pipelines to analyze high-throughput 'Omic data, including: DNAseq, RNAseq, scRNAseq, and Infinium Methylation microarray. Dr. Pei currently teaches STAT/DATA 819: Introduction to Python, BIOS/STAT 823: Introduction to Programming and Applied Statistics in R.

Jinxiang Hu, PhD. Assistant Professor, Tenure track. Research Focus: Patient reported outcome, health disparity, structural equation modeling, item response theory, longitudinal modeling, mixture modeling, machine learning. Dr. Hu currently teaches BIOS/STAT 833: Measurement for Statisticians, STAT/DATA 881: Statistical Learning I, and STAT/DATA 882: Statistical Learning II.

Devin Koestler, PhD. Associate Professor with Tenure/Associate Director Biostatistics and Informatics Shared Resources. Research focus: high-dimensional genomic data, statistical genomics, mixture models, clustering and classification, molecular epidemiology, epigenetics, and DNA methylation. Dr. Koestler's research focus is the development and application of statistical methods for high-throughput 'omics' data; in particular, array-based DNA methylation data. Dr. Koestler has previously taught BIOS/STAT 830: Experimental Design.

Jeffrey Thompson, PhD. Assistant Professor, Tenure track. Research focus: Statistical/Machine learning methods, data integration, feature selection, quantitative 'omics, molecular epidemiology, survival analysis, and predictive models. Dr. Thompson developed and taught three courses STAT/DATA 824: Data Visualization and Acquisition, STAT/DATA 881: Statistical Learning I and STAT/DATA 882: Statistical Learning II.

Dinesh Pal Mudaranthakam, MS. Teaching Associate. Research focus and technical support: Design and implementation of Data warehouse such as Cancer Curated Clinical Outcomes Database, Research

Databases to collect clinical research information, Query Module to validate study design feasibility, Software module to identify early cancer patient, Clinical Integration (Epic and EResearch), Investigator Initiated trial study build, standard eCRF (electronic case report form), Data dissemination for analysis and administrative purpose, patient accrual tracking and Managing the Biospecimen Inventory Software (OpenSpecimen) for the University of Kansas Cancer Center (KUCC). Mr. Mudaranthakam currently teaches DATA 822: Introduction to SQL, and DATA 817: Introduction to Tableau.

Lynn Chollet Hinton, PhD. Assistant Professor, Tenure track. Research focus: Population health, epidemiology, biomarkers, electronic health records, administrative claims data, observational study design, missing data, categorical data analysis, survival analysis, longitudinal data, and data integration. Dr. Hinton is currently developing new course specifically designed for proposed degree MS in Health Data Science, DATA 861: Observational Health Data Analysis.

Prabhakar Chalise, PhD. Associate Professor with Tenure/Assistant Director of Graduate Education. Research focus: Statistical Genetics and Genomics, Computational Statistics, Survival Analysis, Methods in Biostatistics. Dr. Chalise's primary research interest is in the development and application of statistical methods to health sciences research. Dr. Chalise's educational leadership role includes overseeing the Masters and PhD education program in Biostatistics. Dr. Chalise currently teaches BIOS 871: mathematical Statistics I, and BIOS 855: Statistical Methods in Genomics Research.

Yanming Li, PhD. Assistant Professor, Tenure track. Research focus: High-dimensional Data Analysis; Variable Selection; Survival Analysis with High-Dimensional Predictors; Weak Signal Detection, Estimation and Their Effects in Prediction; Probabilistic Graphical Models; Computational Statistics; Cancer Genomics; Neuroimaging-Genomics. Dr. Li is currently developing contents for course DATA 818: Data Summarization and Management.

Mihaela Sardiu, PhD. Associate Professor, Tenure track. Research focus: Dr. Sardiu's research interest is in the field of quantitative omics data, with a focus on the development of computational methods for processing and extracting biological information from large and complex datasets. Another research interest of Dr. Sardiu is to provide a holistic view of merged data and interpretation tools that harmonize biological information across heterogeneous platforms. Dr. Sardiu is currently teaching DATA 824: Data Visualization and Acquisition.

Milind Phadnis, PhD. Associate Professor with Tenure. Research focus: Dr. Phadnis's research interest is in the field of Survival Analysis and Design of Clinical Trial. He has collaborated extensively with researchers from nephrology, stroke, neurology, oncology, and many other areas. He is the co-director of the Biostatistics section of Investigator Initiated Trials supported by the KU Cancer Center. Dr. Phadnis is currently teaching BIOS 845: Survival Analysis.

Other faculty involved in curriculum, admissions, and future teaching include:

Matthew Mayo, PhD. Chair and Professor with Tenure. Research focus: robust regression; linear models; experimental design. Dr. Mayo currently teaches advanced courses within the MS/PhD programs in Biostatistics. His research focus is in clinical trial design and robust methods for regression.

Byron Gajewski, PhD. Professor with Tenure. Research focus: Bayesian data analysis; latent variable modeling. Dr. Gajewski currently teaches advanced courses within the MS/PhD programs in Biostatistics. His research focus is Bayesian data analysis with applications to nursing and health care evaluation data.

No new faculty is required for the proposed program. Department has recently recruited a couple of new faculty of which some effort will be allocated to this program. This program consists of all but one course already offered

through the Department of Biostatistics and Data Science and taught by Department faculty (listed above). There will be one new course unique to this program which will be developed by the subject area specific experts from the current faculty in the Department.

IX. Expenditure and Funding Sources *(List amounts in dollars. Provide explanations as necessary.)*

A. EXPENDITURES	First FY	Second FY	Third FY
Personnel – Reassigned or Existing Positions			
Faculty (*for one new course*)	$84,642	$87,181	$87,181
Administrators *(other than instruction time)*	$0	$0	$0
Graduate Assistants	$36,540	$37,636	$38,765
Support Staff for Administration (*e.g., secretarial*)	$0	$0	$0
Fringe Benefits *(total for all groups)*	$23,469	$23,938	$23,938
Other Personnel Costs	$0	$0	$0
***Total Existing Personnel Costs – Reassigned or Existing** (All the cost for faculty and GTA have been covered already with existing state funds and tuition dollars. Therefore, the cost shown here is not the new cost.*)	$144,651	$148,755	$149,884
Personnel – New Positions			
Faculty	$0	$0	$0
Administrators *(other than instruction time)*	$0	$0	$0
Graduate Assistants	$0	$0	$0
Support Staff for Administration (0.5 *FTE*)	$32,500	$33,475	$33,475
Fringe Benefits *(total for all groups)*	$13,893	$14,019	$14,019
Other Personnel Costs	$0	$0	$0
Total Existing Personnel Costs – New Positions	$46,393	$47,494	$47,494
Start-up Costs - One-Time Expenses			
Library/learning resources	$0	$0	$0
Equipment/Technology	$0	$0	$0
Physical Facilities: Construction or Renovation	$0	$0	$0
Other	$0	$0	$0
***Total Start-up Costs** (There will be no new cost. All the existing resources will be utilized.)*	$0	$0	$0
Operating Costs – Recurring Expenses			
Supplies/Expenses	$0	$0	$0
Library/learning resources	$0	$0	$0
Equipment/Technology	$2,000	$3,000	$3,000
Travel	$0	$0	$0
Other	$0	$0	$0
***Total Operating Costs** (All the existing resources will be utilized except one possible new software.)*	$2,000	$3,000	$3,000

	Current	First FY (New)	Second FY (New)	Third FY (New)
GRAND TOTAL COSTS		$48,393	$50,494	$50,494

B. FUNDING SOURCES *(projected as appropriate)*	Current	First FY (New)	Second FY (New)	Third FY (New)
Tuition / State Funds		$74,878	$149,756	$149,756
Student Fees		$16,940	$33,880	$33,880
Other Sources				
GRAND TOTAL FUNDING		$91,818	$183,636	$183,636
C. Projected Surplus/Deficit (+/-) (Grand Total Funding *minus* Grand Total Costs)		$43,425	$133,141	$133,141

X. Expenditures and Funding Sources Explanations

A. Expenditures
Personnel – Reassigned or Existing Positions

All but one of the program courses already exist, requiring no additional faculty effort for instruction. Any faculty effort indicated in Section IX is already accounted for and supported by existing graduate programs in Biostatistics. This is all paid for by the existing state funds and tuition dollars that are allocated to the Department through the SOM funding model.

Personnel – New Positions

One new Academic Program Specialist will be hired and devote 0.5 FTE towards the day-to-day management of the program and students.

Start-up Costs – One-Time Expenses

None

Operating Costs – Recurring Expenses

Software purchase for the proposed new course.

B. Revenue: Funding Sources

The funding sources will be tuition and fees as shown in section IX above. It was assumed that there will be 80% in-state and 20% out-of-state students. The average tuition per student will be $421.15 \times 0.8 + $989.6 \times 0.2 = 534.84. For the first year, average credit hours for each student will be 14 (19 Credits for full-time and 9 Credits for part-time). Therefore, total tuition revenue from 10 students in first year will be $534.84 \times 14 \times 10 = $74,878$.

Course fee for 14 average credit hours for 10 students at the rate of $121 will be $16,940. Therefore, the total revenue including tuition and student fees will be $74,878 + $16,940 = $91,818. In second year, we will have 10 new students (5 full time, and 5 part time) resulting in 20 students (10 full time and 10 part time). This will double the revenue to $183,636. After second year, at least 10 students will be admitted and around 10 students will graduate per year resulting in 20 (10 full time and 10 part time) students at any given year. Therefore, the tuition and fee revenue after second year will be at least $183,636.

C. Projected Surplus/Deficit

In the first year, there will be an expected surplus of $43,425. After first year, we expect a surplus of at least $133,141 per year.

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Program Approval

Summary

Universities may apply for approval of new academic programs following the guidelines in the Kansas Board of Regents Policy Manual. Fort Hays State University has submitted an application for approval and the proposing academic unit has responded to all of the requirements of the program approval process.

January 19, 2022

I. General Information

A. Institution   <u>Fort Hays State University</u>

B. Program Identification

Degree Level:	Master's
Program Title:	Computer Science
Degree to be Offered:	Master of Science in Computer Science
Responsible Department or Unit:	Department of Computer Science and Information Science Engineering
CIP Code:	11.0201
Modality:	Online
Proposed Implementation Date:	Fall 2022

Total Number of Semester Credit Hours for the Degree: 33 credit hours

II. Clinical Sites: Does this program require the use of Clinical Sites?   No

III. Justification

A master's degree provides a career boost by enabling professionals to expand their expertise in the areas of data science, network security, software development, or artificial intelligence. Earning a Master's Degree in Computer Science provides a competitive edge over other candidates when searching for new employment. More than 850 full-time job listings at Google currently mention a master's degree as a preferred qualification. Employers typically expect computer and information research scientists to hold master's degrees at minimum. Our Master's Degree in Computer Science will focus on data science which is currently an area of high demand. (Google Careers, n.d.)

The FHSU Bachelor of Science in Computer Science has grown from 220 students in 2017 to 457 in 2020. Much of this growth has come from our online program, and with this growth has come requests for a master's program. Currently, the only Kansas university that offers a master's in Computer Science with the same CIP as our proposed program is Kansas State University (MSE in Software Engineering), although K-State, KU, and Wichita State offer MS in Computer Science with a different CIP, and K-State and WSU offer an MS in Electrical Engineering. Also, KU is in the process of KBOR approval for an M. Eng. Electrical Engineering & Computer Science. Since our program is online, it will be completely accessible to a large area of place-bound students with undergraduate credentials in computer science in our service region.

IV. Program Demand

A. Survey of Student Interest

Number of surveys administered: ……………… 386
Number of completed surveys returned: ………. 147
Percentage of students interested in program: … 68%

The survey was sent to 327 online students and 59 on-campus students in fall 2019. Eighty-eight online surveys were returned and 59 on-campus surveys were returned. Seventy-three percent of the online students replied that they are interested in a master's program in Computer Science, and 25% indicated that they are possibly interested. Sixty-one percent of on-campus students indicated that they are interested in the program. Overall, 68% of all respondents indicated interest in pursuing a Master's Degree in Computer Science. Another 16% replied that they might be interested in the program.

B. Market Analysis

According to the U.S. Department of Labor Bureau of Labor Statistics, the rate of growth in the computer and information technology field is expected to be 13 percent from 2016 – 2026, exceeding the growth rate of all other occupations. By that time, an additional 557,100 jobs will be added. On the supply side, there may be a shortage of 1.1 million workers globally in technology, media, and telecommunications industries, and this shortage could increase to 4.3 million by 2030 (National University, 2019).

The 2019 Hanover Research, Market Opportunity Scan identifies a Master's Degree in Computer Science as high growth in student demand, labor demand, and overall growth. Seventeen Computer Science Master's programs are available in the Plains states of which only one is offered online (Hanover, 2019).

Large companies rely on data analysis to make decisions. Algorithms used by companies such as Google, Amazon, and Facebook require large amounts of data to be analyzed efficiently. Data science provides the ability to collect, manage, and analyze data to create the algorithms. Because of the need for data scientists, the U.S. Bureau of Labor Statistics predicts an increase of about 28% in jobs in data science by 2026. (Zita, 2021)

LinkedIn named data scientist as the second fastest-growing job in 2017 (LinkedIn, 2017), and Glassdoor ranked data scientist as the best job in the United States in 2018 (Forbes, 2018). At the regional/state level, The Kansas Department of Labor identifies software developers and software quality assurance analysts and testers, computer system analysts, computer programmers, and other computer occupations as high demand, high wage occupations (Kansas Department of Labor, January 2021). Information specific to master's degrees was not provided.

V. Projected Enrollment for the Initial Three Years of the Program

Year	Total Headcount Per Year		Total Sem Credit Hrs Per Year	
	Full- Time	Part- Time	Full- Time	Part- Time
Implementation	15	0	270	0
Year 2	30	0	495	0
Year 3	30	0	495	0

Enrollment projections are based on the available capacity of our courses if one new position is created to aid in the implementation of this program. Although some students will be part-time students, enrollment projections are stated as the equivalent of 15 or 30 full-time students enrolled in 9 credit hours of courses for three semesters and 6 credit hours for one semester.

VI. Employment

This program will reinforce knowledge and skills in software, digital storage and retrieval, networks, human-computer interaction, information security, digital design, and electronic media. Students will develop a high degree of specialization in data science, an important area of computer science that holds great growth potential (see Market Analysis above).

A Master's degree in Computer Science provides a graduate with the opportunity to advance his/her career within an organization and lead to higher earnings. Individuals with a master's degree in Computer Science earn significantly higher annual salaries than people who have a bachelor's degree. According to PayScale.com, professionals who had completed their Master's of Computer Science earned an average salary of $103,179 as of March 2021, whereas those with a Bachelor's of Computer Science averaged $86,095 per year at the same time period. (PayScale, n.d.)).

VII. Admission and Curriculum

A. Admission Criteria

Students must have completed a bachelor's in Computer Science or a related field from a regionally accredited college or university and have earned a minimum GPA of 3.0 in the most recent 60 hours of undergraduate college credits. Students will complete the graduate school application for admission and provide a personal statement of interest, undergraduate transcripts, and a minimum of two recommendation letters. A student may enter the program in the spring or fall as required courses may be taken in either order.

B. Curriculum

Year 1: Fall   **SCH = Semester Credit Hours**

Course #	Course Name	SCH....
CSCI 601	Advanced Programming	3
CSCI 811	Advanced Database Management	3
CSCI 663	Introduction to Cryptography	3

Year 1: Spring

Course #	Course Name	SCH....
CSCI 831	Advanced Operating Systems	3
CSCI 841	Advanced Software Engineering	3
CSCI 612	Fundamentals of Research	3

Year 2: Fall

Course #	Course Name	SCH....
CSCI 896	Digital Image Processing	3
CSCI 866	Data Mining	3
CSCI 851	Advanced Data Structures	3

Year 2: Spring

Course #	Course Name	SCH....
CSCI 897	Project	6

Total Number of Semester Credit Hours ……………………………………………. [33]

VIII. Core Faculty

Note: * Next to Faculty Name Denotes Director of the Program, if applicable
FTE: 1.0 FTE = Full-Time Equivalency Devoted to Program

Faculty Name	Rank	Highest Degree	Tenure Track Y/N	Academic Area of Specialization	FTE to Proposed Program
Hong Zeng	Professor	PhD	Y	Algorithm Design	0.2
Anas Hourani	Asst. Professor	PhD	Y	Machine Learning	0.2
Hussam Ghunaim	Asst. Professor	PhD	Y	Data Mining	0.2
Dr. Hieu Vu*	Asst. Professor	PhD	N	Cloud Computing	0.0
Pending hire	Asst. Professor	PhD	Y		0.2
New hire	Asst. Professor	PhD	Y		0.2

* Dr. Vu will continue to support the undergraduate program.

Number of graduate assistants assigned to this program **……………………………………… [0]**

IX. Expenditure and Funding Sources *(List amounts in dollars. Provide explanations as necessary.)*

A. EXPENDITURES	First FY	Second FY	Third FY
Personnel – Reassigned or Existing Positions			
Faculty	$64,000	$64,640	$65,286
Administrators *(other than instruction time)*	$0	$0	$0
Graduate Assistants	$0	$0	$0
Support Staff for Administration *(e.g., secretarial)*	$0	$0	$0
Fringe Benefits *(total for all groups)*	$14,080	$14,220	$14,363
Other Personnel Costs	$0	$0	$0
Total Existing Personnel Costs – Reassigned or Existing	$78,080	$78,860	$79,649
Personnel – New Positions			
Faculty	$16,000	$16,160	$16,322
Administrators *(other than instruction time)*	$0	$0	$0
Graduate Assistants	$0	$0	$0
Support Staff for Administration *(e.g., secretarial)*	$0	$0	$0
Fringe Benefits *(total for all groups)*	$3,520	$3,555	$3,591
Other Personnel Costs	$0	$0	$0
Total Existing Personnel Costs – New Positions	$19,520	$19,715	$19,913
Start-up Costs - One-Time Expenses			
Library/learning resources	$0	$0	$0
Equipment/Technology	$3,000	$1,000	$1000
Physical Facilities: Construction or Renovation	$0	$0	$0

		First FY	Second FY	Third FY
Other	$0	$0	$0
Total Start-up Costs	$3,000	$1,000	$1000
Operating Costs – Recurring Expenses			
Supplies/Expenses	$1,000	$1,000	$1,000
Library/learning resources	$0	$0	$0
Equipment/Technology	$0	$0	$0
Travel			
Other	$0	$0	$0
Total Operating Costs	$2,500	$2,500	$2,500
GRAND TOTAL COSTS	$103,100	$102,075	$103,062

B. FUNDING SOURCES *(projected as appropriate)*	Current	First FY (New)	Second FY (New)	Third FY (New)
Tuition / State Funds		$80,609	$147,782	$147,782
Student Fees		$0	$0	$0
Other Sources		$0	$0	$0
GRAND TOTAL FUNDING		$80,609	$147,782	$147,782
C. Projected Surplus/Deficit (+/-) (Grand Total Funding *minus* Grand Total Costs)		-$22,491	$45,707	$44,720

X. Expenditures and Funding Sources Explanations

A. Expenditures

Personnel – Reassigned or Existing Positions

Personnel expenditures are based on 1.0 FTE among five faculty members. Five graduate courses will be taught by these faculty members each semester.

This proposal is part of the undergraduate expansion proposal. The remaining .8 FTE for each faculty member will be dedicated to undergraduate offerings and development of master's courses. The undergraduate expansion proposal includes the addition of two faculty members to the existing four full-time faculty members, Dr. Zeng, Dr. Hourani, Dr. Ghunaim, and Dr. Vu.

Personnel – New Positions

One new position in addition to the pending hire will be added with 0.2 FTE dedicated to this program. The addition of one position with a 0.8 undergraduate/0.2 graduate split in responsibilities will allow for the other four faculty members to each dedicate 0.2 FTE to the master's program.

Start-up Costs – One-Time Expenses
The only anticipated start-up costs involve the purchase of licenses for software.

Operating Costs – Recurring Expenses
Money identified in recurring costs will contribute to the purchasing of office supplies and normal operating expenses. Administrative support is currently provided by the department's senior administrative assistant, and she will be assisted by the student secretary for the Department of Mathematics. Faculty development costs are included in Travel.

B. Revenue: Funding Sources
Revenue will be generated through online graduate tuition and fees at $298.55 per credit hour for 15 students taking eighteen hours per year for the first year, and 15 second-year students taking 15 hours and 15 first-year students taking 18 hours the second year and the third year. The projected increase in SCH is expected to provide funding needed to support the master's program after the first year as shown in Section IX.

C. Projected Surplus/Deficit
Assuming the program attracts the equivalent of 15 new full-time students each year, a deficit of $22, 491 is expected the first year, a surplus of $45,707 is expected the second year, and a surplus of $44,720 is expected the third year. The program would break even in Year 1 with 20 full-time (18 graduate credit hours per year) students.

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Program Approval

Summary

Universities may apply for approval of new academic programs following the guidelines in the Kansas Board of Regents Policy Manual. Pittsburg State University has submitted an application for approval and the proposing academic unit has responded to all of the requirements of the program approval process.

January 19, 2022

I. General Information

A. Institution Pittsburg State University

B. Program Identification

Degree Level: Bachelor
Program Title: Computer Science
Degree to be Offered: Bachelor of Science in Computer Science
Responsible Department or Unit: Department of Mathematics
CIP Code: 11.0701
Modality: Hybrid
Proposed Implementation Date: August 2022

Total Number of Semester Credit Hours for the Degree: 120

II. Clinical Sites: Does this program require the use of Clinical Sites? No

III. Justification

Across the nation, the demand for Computer Science programs is high. According to a recent article from the *New York Times*, demand is so high that some universities, such as the University of Maryland, must limit enrollment. In an example closer to PSU, the University of Central Missouri graduated 56 Computer Science majors in a recent year. Demand is growing in the field as jobs are going unfilled. The University has been approached by local entrepreneurs and employers who have strongly encouraged the creation of a degree in Computer Science to help fill local and regional needs for qualified people in this field. Ability to draw computer scientists educated elsewhere to the region has been challenging. This is echoed by the University's own IT staff. While it is recognized that universities cannot afford to have programs in every discipline, some disciplines are common to almost all universities due to the nature of the level of need, being more local or regional to national or international. Computer Science is one of those disciplines. A survey of universities similar to PSU in size and mission finds that Computer Science programs are ubiquitous. The five other Regents' universities offer a BS in Computer Science, but there is still a great need for more computer programmers nationwide and locally (as illustrated in part VI below). Demand is such that a new program at PSU is warranted. This is reflected by the fact that Computer Science is one of the top programs requested by students interested in attending PSU.

When mature, the Computer Science program will draw students who also have an interest in mathematics, physics, information systems, engineering technology, and other similar, technically oriented programs. These programs have been suffering from a Computer Science shaped hole in PSU's offerings. It will operate synergistically with them. Computer Science has been a missing piece of the STEM ecosystem.

IV. Program Demand

A. Survey of Student Interest

Number of surveys administered: ……………… 4,155
Number of completed surveys returned: ………. 407
Percentage of students interested in program: … 19%

Of the 407 students who responded to the survey, 348 thought that PSU should have a computer science major. Of those, 77 were interested in such a major themselves. Of those 407 who responded, almost a quarter of them left comments. The following are typical:

I think this is a field that will undoubtedly be a backbone of our society for a long time to come with the rate at which technology is making advancements every day with no foreseeable end in sight. I would imagine this program could be a great advantage for students seeking jobs after graduation.

I think a computer science major would fit well at PSU.

This would be a phenomenal program to add. I am in full support.

Computers are an essential part of today's world. The need for computers and people who fully understand them will never go away, the need will only grow.

YES. Adding this degree at PSU is vital.

With the massive increase for STEM related fields, this program would fit in great at PSU.

B. Market Analysis

The job market for majors graduating with computer science degrees is extremely compelling. According to the U.S. Bureau of Labor Statistics (BLS), the 2019 median salary of someone holding the role of "Software Developer" (someone who creates applications or systems that run on computers or other devices) is $107,510 per year. Typical entry-level education for this profession is a bachelor's degree in computer science or a related field. As of 2019, the job growth outlook for 2019-2029 is 22%, which is noted as "much faster than average."

In addition to extremely rapid growth, there are an exceptionally large number of jobs currently unfilled for software developers or similar jobs for computer science graduates due to lack of supply. This contributes to the high salaries of individuals in these positions. According to code.org, an educational computer science advocacy institution, there are 400,000 current job openings in the united states that could be filled by computer science majors. Given the trends noted by the BLS, it is safe to conclude that this number will continue to grow.

Another indicator of the current market status can be found when analyzing the generous signing bonuses that large companies are giving to new computer science graduates/employees. Google, for instance, often awards signing bonuses for new employees in the $15,000 to $35,000 range. Many other companies do the same, some opting to give these employees stock in their companies as well. The conclusion that can be drawn from this is that, given the extremely high number of job openings for computer science graduates, companies have no choice but to continue to increase compensation and incentives for new recruits.

To conclude, the combination of rapid job growth, many unfilled job openings, and high salaries and incentives shows that the current market for graduates with computer science degrees puts new graduates in a highly desirable position.

V. Projected Enrollment for the Initial Three Years of the Program

Year	Total Headcount Per Year		Total Sem Credit Hrs Per Year	
	Full- Time	Part- Time	Full- Time	Part- Time
Implementation	15		450	
Year 2	30		900	
Year 3	45		1,350	

VI. Employment

Students with computer science degrees enjoy a range of lucrative employment opportunities across a wide variety of industries. Indeed, one could say that today, every company is in some form a "tech company," from financial, to music, to sports, to manufacturing, even the companies we may not think of as traditional technology companies have been forced to engage that space. This means that students who are interested in almost any area can participate in that overall industry with a computer science degree.

Specific numbers for total current job openings and median salary can be found in the "Market Analysis" section.

A small sampling of large regional employers for graduates with computer science degrees in large numbers:
- Cerner
- Koch Industries
- Garmin
- Jack Henry
- Federal Reserve Bank of Kanas City

A small sampling of large national employers for graduates with computer science degrees in large numbers:
- Google
- Amazon
- Twitter
- Facebook
- Square
- Walmart
- IBM
- Microsoft

A small sampling of local employers for graduates with computer science degrees:
- Limelight (of Pittsburg, Kansas)
- WATCO
- Crossland
- Millers
- Midwestern Interactive
- CDL
- Jake's Fireworks
- Pittsburg State University

One important overall note about employment with a computer science degree is that there is increasing flexibility for and availability of remote work. This trend is becoming so prevalent that a recent study showed

that 86% of IT/development professionals work remotely to some degree, with 1/3 of those working from home full time. This flexibility is becoming highly desirable, and uniquely positions Pittsburg State University graduates to succeed. as they are not geographically restricted when finding employment before/after graduation. They may choose to live in their hometowns while working remotely for concerns in metro areas.

VII. Admission and Curriculum

A. Admission Criteria
The program is open to all students who have been admitted to Pittsburg State University.

B. Curriculum

See the appendix for the list courses in the program and the requirements.

Year 1: Fall   **SCH = Semester Credit Hours**

Course #	Course Name	SCH 15
MATH 122	Plane Trigonometry	3
CIS 230	Introduction to Programming	3
	Pitt Pathway and electives	9

Year 1: Spring

Course #	Course Name	SCH 15
MATH 326	Mathematics for Programming	3
MATH 212	Matrix Algebra	2
EET 244	Logic Circuits	3
	Pitt Pathway and electives	7

Year 2: Fall

Course #	Course Name	SCH 15
CIS 380	Systems Analysis and Design	3
MATH 413	Introduction to Mathematical Thought	3
	Pitt Pathway and electives	9

Year 2: Spring

Course #	Course Name	SCH 15
MATH 513	Discrete Structures	3
CIS 240	Intermediate Programming	3
	Pitt Pathway and electives	9

Year 3: Fall

Course #	Course Name	SCH 15
CS 405	Principals of Software Architecture	3
CS 300	Web Application Development I	3
	Pitt Pathway and electives	9

Year 3: Spring

Course #	Course Name	SCH 15
CS 305	Web Application Development II	3
CIS 615	Database Management	3
	Pitt Pathway and electives	9

Year 4: Fall

Course #	Course Name	SCH 15
MATH 626	Data Structures and Algorithms	3
EET 344	Microcomputer Systems	3
	Pitt Pathway and electives	9

Year 4: Spring

Course #	Course Name	SCH 15
CS 410	Introduction to Frontend Frameworks	3
CS 500	Advanced Programming	3
	Pitt Pathway and electives	9

VIII. Core Faculty

Note: * Next to Faculty Name Denotes Director of the Program

FTE: 1.0 FTE = Full-Time Equivalency Devoted to Program

Faculty Name	Rank	Highest Degree	Tenure Track Y/N	Academic Area of Specialization	FTE to Proposed Program
Tim Flood*	Professor	PhD	Y	Number Theory	0.25
Scott Thuong	Associate Professor	PhD	Y	Topology	0.25
Retired Faculty line	Assistant Professor	PhD	Y	Computer Science	1
David Newcomb	Instructor	MS	N	Programming/Introductory Math	1
Terry Martin	Instructor	MS	N	Introductory Math	0.125
Bobby Winters	Professor	PhD	Y	Topology	0.125
Eric Mayer	Professor	PhD	Y	Embedded Systems	0.25

Number of graduate assistants assigned to this program **………………………………………… [0]**

IX. Expenditure and Funding Sources *(List amounts in dollars. Provide explanations as necessary.)*

A. EXPENDITURES	First FY	Second FY	Third FY
Personnel – Reassigned or Existing Positions			
Faculty	$34,111.11	$44,695.63	$155,086.00
Administrators *(other than instruction time)*			

Graduate Assistants			
Support Staff for Administration (*e.g., secretarial*)			
Fringe Benefits (*total for all groups*)	$11,001.34	$14,868.44	$20,289.04
Other Personnel Costs			
Total Existing Personnel Costs – Reassigned or Existing	$45,112.45	$59,564.07	$175,375.04
Personnel – New Positions			
Faculty	0	0	0
Administrators (*other than instruction time*)	0	0	0
Graduate Assistants	0	0	0
Support Staff for Administration (*e.g., secretarial*)	0	0	0
Fringe Benefits (*total for all groups*)	0	0	0
Other Personnel Costs	0	0	0
Total Existing Personnel Costs – New Positions			
Start-up Costs - One-Time Expenses			
Library/learning resources	0	0	0
Equipment/Technology	0	0	0
Physical Facilities: Construction or Renovation	0	0	0
Other	0	0	0
Total Start-up Costs	0	0	0
Operating Costs – Recurring Expenses			
Supplies/Expenses	0	0	0
Library/learning resources	0	0	0
Equipment/Technology	0	0	0
Travel	0	0	0
Other	0	0	0
Total Operating Costs	0	0	0
GRAND TOTAL COSTS	$45,112.45	$59,564.07	$175,375.04

B. FUNDING SOURCES (*projected as appropriate*)	Current	First FY (New)	Second FY (New)	Third FY (New)
Tuition / State Funds	In state	$172,880	$345,760	$518,640
Student Fees				
Other Sources				
GRAND TOTAL FUNDING		$172,880	$345,760	$518,640

C. Projected Surplus/Deficit (+/-) (Grand Total Funding *minus* Grand Total Costs)	■		$172,767	$286,196	$315,290

X. Expenditures and Funding Sources Explanations

A. Expenditures

Personnel – Reassigned or Existing Positions

Year 1 & Year 2
- This is based on the assumption that there will be only zero-hour freshmen enrolled at the beginning of the program, i.e. we will not be able to accept students who transfer into junior- and senior-level computer science courses during the first two years of the program. During that time, we will only need 0.75 of a faculty position during the first year and 1.25 faculty positions during the second. The salaries were calculated from particular faculty currently on staff.

Year 3
- This year we will convert the position of a professor who is on phased retirement. There is currently one member of the department of mathematics (with a salary of $72,000) who will be retired full before 2023. In addition, there will be another faculty member (with a salary of $50,000) in the department who will be going on half-time phased retirement at the end of AY2021. The plan is to use the salary savings to hire someone who is qualified to teach computer science.

Personnel – New Positions

None.

Start-up Costs – One-Time Expenses

None. Currently, there is a surplus of computers and computer labs on campus due to decreasing enrollment. Ultimately, given growth, we will probably have to invested in additional local computer resources, but at present the necessary infrastructure is in place.

Operating Costs – Recurring Expenses

Taken from current operating budgets.

B. Revenue: Funding Sources

Funding is from tuition only. It is based on 15 new students a year, with 10 in-state (tuition rate $7,744/year) and 5 out-of-state students (tuition rate $19,088/year).

C. Projected Surplus/Deficit

We project a minimum of $170,000 surplus during each year of the program.

XI. References

Bolden-Barrett, V. (2019, July 19). *Working remotely is now the norm for developers, new study shows*. HR Dive. https://www.hrdive.com/news/working-remotely-is-now-the-norm-for-developers-new-study-shows/559013/#:~:text=Eighty%2Dsix%20percent%20of%20IT,%2C%20a%20cloud%2Dbased%20platform.

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Tuttle, B. (2019, April 15). *The massive pay on offer to entry-level Google recruits*. Financial Careers. https://www.efinancialcareers.co.uk/news/2019/04/google-student-pay

U.S. Bureau of Labor Statistics. (2020, September). *Software developers, quality assurance analysts, and testers*. Occupational Outlook Handbook. https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm

Appendix

The Computer Science Major

Code		credit
	Core	35
MATH 122	Plane Trigonometry	3
MATH 212	Matrix Algebra	2
EET 244	Logic Circuits	3
MATH 326	Mathematics for Programming	3
MATH 413	Introduction to Mathematical Thought	3
MATH 513	Discrete Structures	3
CIS 380	Systems Analysis and Design	3
CIS 615	Database Management	3
CIS 230	Introduction to Programming	3
CIS 240	Intermediate Programming	3
MATH 626	Data Structures and Algorithms	3
CS 405	Principles of Software Architecture	3
	Choose 15 hours from the following	15
CS 300	Web Application Development I	3
CS 500	Advanced Programming	3
CS 305	Web Application Development II	3
CS 400	Mobile Application Development	3
CS 410	Introduction to Front End Frameworks	3
EET 344	Micro Computer Systems	3
EET 449	Programmable Logic Devices	3
EET 549	Micro Controllers	3
EET 647	Digital Signal Processing	3
		24
	Total hours in program	50
	Upper Division in program	36
	Upper Division electives	9
	Total Upper Division	45
	Balance to be filled with general education and electives	70
	Total Degree	120