KENT STATE UNIVERSITY
CERTIFICATION OF CURRICULUM PROPOSAL

Preparation Date **2-Nov-17** Curriculum Bulletin _____

Effective Date **Fall 2018** Approved by EPC _____

Department	**Applied Engineering**
College	**AR - Aeronautics and Engineering**
Degree	**BS - Bachelor of Science**
Program Name	**Computer Engineering Technology** Program Banner Code
Concentration(s)	Concentration(s) Banner Code(s)
Proposal	**Establish program**

Description of proposal:

The college of Aeronautics and Engineering is seeking approval to establish a Bachelor of Science Degree in Computer Engineering Technology. This new program is based on the existing Computer Engineering Technology concentration under the Bachelor of Science in Applied Engineering program. The purpose of this change is to create a program that is relevant and responsive to industry needs. The computer engineering technology curriculum has developed to the point where it no longer shares 50% of its major courses with the other Applied Engineering concentrations and is out of compliance in regards to concentration content within a major.

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):

There will be no impact, because the program already exists as a concentration.

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

CS, MIS, CompT

REQUIRED ENDORSEMENTS

Jackie Bueller 12/4/17

Department Chair / School Director

_____ ___/___/___

Campus Dean (for Regional Campuses proposals)

Robert G Smolj 12/7/17

College Dean (or designee)

_____ ___/___/___

Dean of Graduate Studies (for graduate proposals)

_____ ___/___/___

Senior Vice President for Academic Affairs and Provost (or designee)

HIGHER LEARNING COMMISSION

FORM

New Programs

Substantive Change Application

Institution: Kent State University City, State: Kent, Ohio

Name of person completing this application: Therese E. Tillett

Title: Executive Director, Curriculum Services Phone: 330-672-8558 Email: ttillet1@kent.edu

Date Submitted:

The questions are designed to elicit brief, succinct, detailed information, rather than a narrative or references to extensive supporting documents. Do not attach other documents unless they are specifically requested in the questions and are germane to the request. The total submission should be no more than 10–12 pages on a single classification of change. (The page limit excludes attachments. However, the overall length, including attachments, should not exceed 200 pages.)

If the person completing this application is not the CEO, CAO or the ALO of the institution, it is understood that the person completing and submitting this application has consulted with and informed those individuals.

Submit the completed application as a single PDF file on the following webpage: http://www.hlcommission.org/document_upload/.

Part 1: General Questions

1. **Requested Change(s).** Concisely describe the change for which the institution is seeking approval.

   The College of Aeronautics and Engineering is seeking approval to move the Computer engineering technology concentration under the Bachelor of Science in Applied Engineering to a major.

   Computer Engineering Technology, currently, is one of four concentrations in the ATMAE-accredited Applied Engineering major.

   Due to the gradual development of the concentrations in the Applied Engineering major to meet their respective market needs, the percentage of major courses for each of the concentrations has reduced to be 10 percent of the entire curriculum. Since the Ohio Department of Higher Education requires concentrations to comprise a minimum 50 percent of the major curriculum, this program is not in compliance.

The noncompliance primarily is due to the program's incremental development to keep up with the perpetually developing nature of technology. For this field of study to remain relevant to students and employers, it must continue to develop and diverge from its fellow concentrations of study. The program is currently ATMAE-Accredited and the college will design this curriculum such that students will graduate with industry recognized certifications to ensure the highest quality of instruction and value to students and employers. Thus, the concentration must evolve to become its own major to remain an asset to the state and its population and to meet the market needs.

2. **Is this application being submitted in conjunction with another application?**

☐ Yes

☒ No

3. **Classification of Change Request.**
Note: not every institutional change requires prior review and approval. Review the "Overview of HLC Policies and Procedures for Institutional Changes Requiring HLC Notification or Approval" to make certain that current HLC policy requires the institution to seek approval.

New academic program(s):

☐ Certificate ☒ Bachelor's ☐ Diploma ☐ Master's/specialist

☐ Associate's ☐ Doctorate ☐ *Check if program is at a new degree level*

An institution submitting more than one change request should complete multiple applications, one for each type of change. The types of change requests include:

- Change in mission
- Change in student body
- Competency-based education (credit-based; direct assessment; hybrid) programs
- Consortial arrangement
- Contractual arrangement
- Substantially changing the clock or credit hours required for a program
- Change in academic calendar (e.g., quarters to semester) or change in credit allocation
- Teach-out plan if closing location provides total degree programs
- Distance or correspondence education
- New programs
- Certificate programs
- Branch campuses and additional locations

4. **Special conditions.** Indicate whether any of the conditions identified below fit the institution (Yes or No). If Yes, explain the situation in the space provided.

a) Is the institution, in its relations with other regional, specialized, or national accrediting agencies, currently under or recommended for a negative status or action (e.g., withdrawal, probation, sanction, warning, show-cause, etc.)?

No.

b) Is the institution now undergoing or facing substantial monitoring, special review, or financial restrictions from the U.S. Deptartment of Education or other federal or state government agencies?

No.

c) Has the institution's senior leadership or board membership experienced substantial resignations or removals in the past year?

No.

d) Is the institution experiencing financial difficulty through such conditions as a currently declared state of exigency, a deficit of 10% or more, a default or failure to make payroll during the past year, or consecutive deficits in the two most recent years?

No.

e) Is the institution experiencing other pressures that might affect its ability to carry out the proposal (e.g., a collective bargaining dispute or a significant lawsuit)?

No.

5. **Approvals.** Mark whether each type of approval is required prior to implementing the proposed change. If "Yes," attach documentation of the approval to the request. If "No," attach evidence that approval is not needed.

Internal (faculty, board) approvals	☒ Yes	☐ No	
System approvals	☐ Yes	☐ No	☒ Not Applicable
State approval	☒ Yes	☐ No	
Foreign country(ies) approvals	☐ Yes	☐ No	☒ Not Applicable

For Distance or Correspondence Education only:

Process in place to ascertain and secure state approval(s) as required	☐ Yes	☐ No

6. **Specialized Accreditation.** Complete this section only if specialized accreditation is required for licensure or practice in program(s) covered by this change application.

☐ The institution has already obtained the appropriate specialized accreditation. Attach a copy of the letter from the agency granting accreditation.

☐ The institution has begun the process of seeking or plans to seek specialized accreditation. Specify the name of the agency and the timeline for completing the process in the space below. (If approval is a multi-stage process, the institution should contact the HLC staff liaison to discuss the timeline before submitting this change application form.)

☐ The institution does not plan to seek specialized accreditation. Provide a rationale for not seeking this accreditation in the space below.

7. **Changes Requiring Visits.** This section is not for HLC-mandated visits such as additional location confirmation visits or campus evaluation visits.

Note: Complete this section only if the institution is already aware that the proposed change will need to be reviewed through a visit. (If the institution is unsure whether a visit is required, HLC will advise the institution based on the information provided in both Part 1 and Part 2 of the change application.)

☐ Request to schedule a Change Visit.

☐ Request to add a proposed change to an already scheduled visit. Specify type of visit and date scheduled:

Whether the change will be reviewed through a separate Change Visit or embedded in an already scheduled visit, the following schedule will apply.

- Part 1 of this change form must be submitted at least four months before the visit. If the visit has not already been scheduled, this filing will initiate the process of scheduling the visit.
- The institution files Part 2 of this change form at least two months before the scheduled visit. If the change will be embedded in an already scheduled visit, the form should be filed as an attachment to the report prepared for that visit. Provide URLs to the Faculty/Staff Handbook and Catalog below. If the URLs are not available, please do not submit the full handbook or catalog as attachments. HLC will provide directions on how to submit electronic versions of these documents prior to the visit.

  Faculty/Staff Handbook URL:

  Catalog URL:

Please note: HLC plans to update the change forms annually, on or about September 1 of each year. However, if a Change Application form was accessed more than 90 days prior to filing, it is recommended that the institution visit http://www.hlcommission.org/change to ensure that there have been no changes in the application form in the intervening time.

Part 2: Topic-Specific Questions

An institution should submit a separate application for each requested program (unless the programs represent closely related disciplines). If more than one program is being requested in this application, please be sure to sufficiently address each program when answering the following questions, particularly in Sections A, D, E and F. Each proposed new program should be identified by using the *Classification of Instructional Programs* terminology (CIP codes). CIP codes are established by the U.S. Department of Education's National Center for Education Statistics as a taxonomic scheme that supports the accurate tracking and reporting of fields of study and program completions activity. More information is available at http://nces.ed.gov/ipeds/cipcode/.

Attach the "Substantive Change Application, Part 1: General Questions" as page one of your application. That completed form and your answers to the questions below will constitute your request for approval of a substantive change. This form will be the basis for review of this application.

Section A. Characteristics of the Change Requested

1. Identify the basic characteristics of the proposed educational program as indicated below:

   a) The full name of the proposed program, the specific degree (if applicable) or the instructional level (if not a degree program), and the six-digit CIP code XX.XXXX of the program (CIP codes, program name, and additional description [optional])

      Bachelor of Science in Computer Engineering Technology *Contact Therese Tillett for CIP code.*

   b) Total credit hours (indicate whether semester or quarter) for completion of the program

      There are 120 total credit hours in the program. This program is based on semesters.

   c) Normal or typical length of time for students to complete the program

      The program is designed to be completed in eight semesters.

   d) Proposed initial date for implementation of the program

      The proposed date of implementation of the program is fall 2018.

   e) Primary target audience for the program (e.g., full-time, part-time, traditional college age, working adults, transfer students, military personnel, or particular ethnic group)

      The primary target audience is full-time, traditional college age, transfer and part-time students.

   f) Projected life of the program (single cohort or ongoing)

      This will be an ongoing program.

   g) Whether the program will be part of contractual or consortial arrangement

Not applicable.

2. Identify if the institution is requesting new stipulations for the proposed program and provide a rationale for this request.

   Not applicable.

3. If the institution is planning any involvement by external organizations (other than accredited higher education institutions) in key operations as identified below, provide the information requested below and complete the Contractual Screening Form for each planned involvement. (Note that such involvement by a parent company or by one of its subsidiaries external to the institution in any of these operations should be reported.) If the screening form indicates contractual approval is required, complete the full contractual application and submit it in conjunction with the program application. If the screening form indicates no further action is required, attach the confirmation email from HLC.

Type of Involvement	Name(s) of External Organization(s)	Percent of Involvement
A. Recruitment and admission of students	Not applicable	
B. Course placement and advising of students	Not applicable	
C. Design and oversight of curriculum	Not applicable	
D. Direct instruction and oversight	Not applicable	
E. Other support for delivery of instruction	Not applicable	

Section B. Institution's History With Programs

4. Does the institution currently offer a program at the same instructional level and with the same 4-digit CIP code (XX.XX) as the proposed program? If so, identify the program currently offered and whether it is a degree program. Will the proposed program replace the program currently offered?

   Contact Therese Tillett for the information.

5. Does the institution currently offer two or more programs at the same instructional level with the same 2-digit CIP code (XX.) as the proposed program? If so, identify the two such programs with the highest numbers of graduates during the past year, along with their numbers of graduates.

   Contact Therese Tillett for the information.

Section C. Institutional Planning for Program Change

6. What impact might the proposed program have on challenges identified as part of or subsequent to the last HLC review and how has the institution addressed the challenges?

   No identified challenges. Kent State University has adequate faculty and other resources for existing programs and the proposed program.

7. Briefly describe the planning process for determining the need for this new program, including the role of faculty in the planning and approval process.

   The College of Aeronautics and Engineering offers the Computer Engineering Technology concentration under the Bachelor of Science in Applied Engineering (BSAE). The enrollment has steadily increased. Currently, the BSAE has four concentrations: Computer Engineering Technology, Applied Engineering and Technology Management, Mechatronics and Computer Engineering Technology. The lead faculty member for each concentration, periodically reviews the curriculum to ensure its relevancy. Due to the gradual modifications in the curriculum of the concentrations in the BSAE program to meet their respective market needs, the percentage of common courses of in the four concentrations has gradually reduced to be 10% of the entire curriculum. Since the state requires that the common courses of different concentrations of the same major be at least 50% of the entire curriculum and it is impossible to meet this requirement due to different market needs of each concentration, it is necessary to change the CET concentration to a Major of Bachelor of Science in Computer Engineering Technology. In addition, while the program is currently ATMAE accredited, the curriculum has been updated by the faculty to include material necessary for students to sit for industry certifications. Any changes made are discussed and voted on by the other Applied Engineering faculty. If approved, the college curriculum committee discusses and votes on changes.

8. What are the physical facilities and equipment needed to support the program? Indicate the impact that the proposed change will have on the physical resources and laboratories that currently accommodate existing programs and services, or identify new laboratory and preceptor needs.

   Since the program already exists, there will be no impact on the physical resources and laboratories currently supporting the program.

9. What is the evidence that a market for the new program(s) exists? How has estimated program demand been factored into realistic enrollment projections? How has this evidence been used in planning and budgeting processes to develop a quality program that can be sustained?

This area of study continues to remain relevant to the economic future of Ohio. Industry relies heavily on information technology systems to deliver better service and cost savings to operational bottom lines. The Bureau of Labor Statistics analysis for the decade between 2014 and 2024 proves this by indicating a continued growth of between eight percent (as fast as average) and 27 percent (much faster than

average) for various labor markets in IT employment, including those for web developers[1], computer systems analysts[2], computer network architects[3], information security analysts[4] and network and computer systems administrators[5]. This range of growth, at its minimum, is on par or with that of other healthy labor markets and, at its maximum, far exceeds the average growth for the labor market in general.

In addition, Ohio is ranked fifth in the nation with the highest employment for computer systems analysts and ninth overall with the highest concentration of jobs in this occupation[6]

These trends and data have not been ignored by other college and universities in Ohio. Every major state institution in Ohio offers an array of computer science, computer engineering, computer information systems and similar programs of study. However, few of these institutions offer a program that merges the core concepts of engineering design and computer technology as defined by industry. Students also have noticed the relevance of this field of study. The appeal of the existing concentration has been reflected in a threefold increase in enrollment from fall 2012 to fall 2016.

Fall Semester Student Enrollment (15th Day Census)
Computer Engineering Technology Concentration

2012	2013	2014	2015	2016
28	43	61	57	65

10. If the program request is approved, what future growth do you anticipate (e.g., in the next six months, three years) and how do you plan to manage this growth?

    If the program request is approved, future growth is expected to be at about the same rate as shown above or slightly higher because the program will be more visible (as a major compared to a concentration). The resources are currently available to manage the program now, but if the program continues to grow as expected, it may eventually be necessary to hire additional faculty.

---

[1] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Web Developers. Retrieved from www.bls.gov/ooh/computer-and-information-technology/web-developers.htm.

[2] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Computer Systems Analysts. Retrieved from www.bls.gov/ooh/computer-and-information-technology/computer-systems-analysts.htm.

[3] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Computer Network Architects. Retrieved from www.bls.gov/ooh/computer-and-information-technology/computer-network-architects.htm.

[4] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Information Security Analysts. Retrieved from www.bls.gov/ooh/computer-and-information-technology/information-security-analysts.htm.

[5] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Network and Computer Systems Administrators. Retrieved from www.bls.gov/ooh/computer-and-information-technology/network-and-computer-systems-administrators.htm.

[6] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Employment Statistics, May 2016*, Computer Systems Analysts. Retrieved from www.bls.gov/oes/current/oes151121.htm#st.

11. How does this program fit into the current and expected financial picture of the institution? In particular, will the program be financially self-sufficient within three years? If not, when do you expect the program to be financially self-sufficient and how do you expect the program to operate until then?

    This proposal is to convert our existing technology concentration in Computer Engineering Technology to a Computer Engineering Technology major.

    The college is seeking approval to convert this and two other applied engineering concentrations to engineering technology majors. These three programs along with the proposed new Mechatronics Engineering program form a portfolio that share courses, faculty and physical resources. Computer engineering connects to the University's digital sciences program and is bridged to mechanical engineering technology by mechatronics engineering and mechatronics engineering technology.

    The fiscal impact sought through the Computer Engineering Technology major is an increase in enrollment as the program migrates from a concentration in the technology program to a major. At present the program is financially self-sufficient. This will enhance that position. The college has allocated a portion of the income growth to promote this area as part of an overall portfolio of related programs: Mechatronics Engineering, Mechatronics Engineering Technology, Mechanical Engineering Technology, and Computer Engineering Technology. This portfolio of closely related programs supports enhanced student recruitment and thus growth in all four areas. Computer engineering technology also shares resources with digital science, which provides an additional path for enrollment growth, and support of financial stability.

12. What controls are in place to ensure that the information presented to all constituencies in advertising, brochures, and other communications will be accurate?

    Any materials generated by the college will be reviewed by several, appropriate faculty and staff.

Section D. Curriculum and Instructional Design

13. Please list all the courses that comprise the program and identify if the program will include any new courses. Include course descriptions and number of credit hours for each.

    The new courses in the Computer engineering technology program are as follows:

    TECH 26200– Programming for Engineers I (PENG I)-3 credits. This course has been developed to serve as the introductory programming course for engineering students. This course applies traditional programming concepts towards the engineering discipline of applied problem solving.

    TECH 36200– Programming for Engineers II (PENG II)- 3 credits. This course was developed to build upon TECH 26200, Programming for Engineers I and furthers the instruction of computational problem solving and data manipulation for engineering problem solving.

    TECH 26301-Networking Hardware I -4 credits. This course currently exists but been changed from a three credit to a four credit hour course to allow for sufficient time to prepare students for the CCNA I exam.

    TECH 36336 - IT SECURITY -3 Credit Hours. This course provides the foundation for understanding the key issues associated with protecting information assets. This course was added to the curriculum because if further supports the mission of the program and prepares students to take the CompTIA's Security+SYO-501 certification exam.

TECH 46300-NETWORK SECURITY - 3 Credit Hours. This course is an introduction to network security with emphasis in identifying, analyzing and preventing various threats and attack patterns on computer networks. Students will gain practical knowledge on network security protocols, firewalls, VPN, intrusion detection and prevention systems. Prepares students for the CCNA Security industry certification.

TECH 46316 Server Administration and Configuration -3 credit hours. This course emphasizes on administering and configuring server operating systems to solve engineering problems. Students are expected to learn MS server management, Active Directory, OUs and server roles by utilizing a variety of on-based and cloud based solutions.

This course has replaced a 3-credit tech elective in the CET curriculum.

The proposed courses in this program were chosen based on the updated program mission, which is- To give students the knowledge of human-computer interaction and software-hardware interface so that they are capable of analyzing the problems in the computer and networking industry and producing subsequent computer engineering, networking, and software solutions. COMT 36320 (COMPUTER FORENSICS) is being replaced by IT Security, TECH 36336, which is a broader course that emphasizes hands-on network tools and topics covered by the COMPTiA Security+ certification such as access control, cryptography, physical security, perimeter defenses, host defenses and application defenses.

COMT 36330 (LOCAL AREA NETWORK SECURITY FUNDAMENTALS) is being replaced by the higher level TECH 46300-Network Security course which not only teaches LAN 1, but also teaches user security and preparation for the CCNA Security certification.

Computer Engineering Technology

COMM 15000 INTRODUCTION TO HUMAN COMMUNICATION (KADL) 3 Credit Hours

An inquiry into the nature and function of human communication in interpersonal, group and public contexts.

Prerequisite: None.

Schedule Type: Lecture

Contact Hours: 3 lecture

ECON 22060 PRINCIPLES OF MICROECONOMICS (KSS) 3 Credit Hours

Course covers principles and policies affecting prices, including factor incomes, under alternative market structures. Students develop tools to examine social problems, including poverty, crime, pollution and international relations.

Prerequisite: Minimum 45 ALEKS math score; or minimum 22 ACT math score; or minimum 530 SAT math score; or one course from MATH 00023 to 49999.

Schedule Type: Lecture

Contact Hours: 3 lecture

ENG 20002 INTRODUCTION TO TECHNICAL WRITING 3 Credit Hours

Introduction to communication practices within technical communities. Planning, drafting, revising and editing. Process descriptions, object descriptions, instructional texts, technical correspondence, problem reports, critical reflection.

Prerequisite: ENG 11011 or HONR 10197.

Schedule Type: Lecture

Contact Hours: 3 lecture

MATH 11022 TRIGONOMETRY (KMCR) 3 Credit Hours

Solution of triangles, trigonometric equations and identities.

Prerequisite: Minimum 67 ALEKS math score; or minimum C grade in MATH 10774 or MATH 10775 or MATH 11010.

Schedule Type: Lecture

Contact Hours: 3 lecture

MATH 11012 INTUITIVE CALCULUS (KMCR) 3 Credit Hours

Designed to give an overview of differential and integral calculus to business and life-science majors. Does not include trigonometric functions. No credit earned toward a degree for this course if the student already earned credit for MATH 12002.

Prerequisite: Minimum 67 ALEKS math score; or minimum C grade in MATH 10774 or MATH 10775 or MATH 11010.

Schedule Type: Lecture

Contact Hours: 3 lecture

MIS 24056 FUNDAMENTALS OF BUSINESS STATISTICS 3 Credit Hours

(Equivalent to BMRT 21004) Introduction to concepts in statistical methods and their applications to real world problems. Examines both the theoretical and practical side of the different methods.

Prerequisite: MATH 11010 or MATH 11012 or MATH 12002.

Schedule Type: Lecture

Contact Hours: 3 lecture

MIS 24163 PRINCIPLES OF MANAGEMENT 3 Credit Hours

(Equivalent to BMRT 11009) Introductory course in management and organizational design. The leading contributions in the area are reviewed and practical implications are developed. The course covers the principles that most management professors have come to expect in an introductory course: planning, organizing, leading, and controlling. In addition, the students need to be aware of critical issues managers must be aware of to succeed: diversity, globalization, ethics, technology, among them. The course serves as an introduction to many upper level business courses.

Prerequisite: minimum sophomore standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

PHY 13001 GENERAL COLLEGE PHYSICS I (KBS) 4 Credit Hours

Principles of mechanics, heat and sound.

Prerequisite: Minimum C grade in MATH 11022 or MATH 12001; or pre/corequisite MATH 12002 or MATH 12012 or MATH 12021.

Corequisite: PHY 13021.

Schedule Type: Lecture, Recitation

Contact Hours: 3 lecture, 1 other

PHY 13002 GENERAL COLLEGE PHYSICS II (KBS) 4 Credit Hours

Principles of electricity and magnetism, optics and modern physics. Three hours lecture and one hour recitation weekly.

Prerequisite: PHY 13001 or PHY 23101.

Corequisite: PHY 13022.

Schedule Type: Lecture, Recitation

Contact Hours: 3 lecture, 1 other

PHY 13021 GENERAL COLLEGE PHYSICS LABORATORY I (KBS) (KLAB) 1 Credit Hour

Introductory lab to accompany PHY 13001 or PHY 13011.

Corequisite: PHY 13001 or PHY 13011.

Schedule Type: Laboratory

Contact Hours: 2 lab

PHY 13022 GENERAL COLLEGE PHYSICS LABORATORY II (KBS) (KLAB) 1 Credit Hour

Introductory lab to accompany PHY 13002 or PHY 13012.

Corequisite: PHY 13002 or PHY 13012.

Schedule Type: Laboratory

Contact Hours: 2 lab

TECH 21021 SURVEY OF ELECTRICITY AND ELECTRONICS 4 Credit Hours

Survey of DC and AC circuits, semiconductors, and electronic devices, including diodes and transistors. Includes laboratory.

Prerequisite: PHY 13002.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 2 lab

TECH 23010 COMPUTER HARDWARE I 3 Credit Hours

Introduction to the hardware, architecture and operation of the personal computer and associated devices. Topics include personal computer architecture and operation fundamentals; basic hardware;

data buses and ports; hardware component packaging; auxiliary hardware components; computer assembly; basic hardware installation and configuration; and basic troubleshooting.

Prerequisite: DSCI 26010 or TECH 26010.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 26200 PROGRAMMING FOR ENGINEERING I 3 Credit Hours

Introduction to engineering problem solving and use of programming language to solve those problems is the base of this course. Students with engineering major (including mechatronics, mechanical engineering technology and CET) are expected to develop basic mathematical modeling and engineering problem solving skills using mathematical and conventional computational tools. Developing modeling and logical thinking are the core objective of this course.

Pre/corequisite: Sophomore Status

Schedule Type: LLB

Contact Hours: 2 lecture, 2 Lab

TECH 26301 NETWORKING HARDWARE I 3 Credit Hours

A hands-on, applied engineering-focused course emphasizing the operation, maintenance, and performance aspects of personal computer networking hardware. Topics include networking hardware operation, characteristics, configuration, and troubleshooting fundamentals. Course also includes network standards, protocols, configuration, topologies, and administrative fundamentals as related to networking hardware systems. Note: This course is part of the Networking Hardware course sequence required for students enrolled in the Computer Engineering Technology concentration.

Prerequisite: DSCI 26010 or TECH 21021 or TECH 26010.

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 31000 CULTURAL DYNAMICS OF TECHNOLOGY (DIVD) (WIC) 3 Credit Hours

Study of technology and the forces it exerts upon society.

Prerequisite: ENG 21011.

Schedule Type: Lecture

Contact Hours: 3 lecture

TECH 33222 DIGITAL DESIGN FOR COMPUTER ENGINEERING 3 Credit Hours

Introduction to digital design. The operation and use of digital devices and components as used in microprocessors and digital computers. Topics include binary arithmetic operations, Boolean algebra, logic gates, combinational and sequential logic, buffers, registers, memory devices, counters, latches, timers, comparators, encoders, decoders, multiplexers and demultiplexers.

Prerequisite: TECH 21021.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 33223 ELECTRONIC COMMUNICATION 3 Credit Hours

Principles of digital and analog telecommunications and data signals. Topics include electromagnetic signal time and frequency characteristics, signal propagation, signal modulation, transmission lines, wireless signals, antennas, digital signal characteristics and protocols, signal multiplexing, microwave devices and applications.

Prerequisite: TECH 21021.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 33320 Applied Embedded Systems I

This course builds upon the content of several other applied engineering courses to establish a foundation for students to utilize embedded systems for engineering problem solving. The course will expose the student to the history of the microcontroller that is at the heart of modern embedded systems. Student will learn about the different classes of embedded systems and will form a foundation from which the student can begin to develop solutions to simple real world problems using simple embedded microcontrollers, electronic devices and sensors. Basic coding principals are explained from an engineering problem solving perspective.

TECH 36200 PROGRAMMING FOR ENGINEERING II 3 Credit Hours

Emphasizes engineering problems and applications of programming language and mathematical tools to analyze and solve them. Students with engineering major (including mechatronics, mechanical engineering technology and computer engineering technology) are expected to learn problem solving techniques, modeling, simulation and presentation of engineering application oriented problems using conventional computation and mathematical tools. Advanced modeling, simulations and analysis are the core objectives of this course.

Prerequisite: Junior Status, TECH 26200

Schedule Type: LLB

Contact Hours: 2 Lecture, 2 Lab

TECH 36302 NETWORKING HARDWARE II 3 Credit Hours

Continuation of TECH 26301. In-depth coverage of personal computer-based enterprise networking systems hardware with a focus on network hardware and software configuration, fault analysis, diagnostics, and troubleshooting. Topics include router and switch operation, programming, configuration, and troubleshooting, along with overall enterprise network maintenance, troubleshooting, and repair. Course also includes WAN and VLAN fundamentals, intermediate TCP_IP, and network administration and maintenance as related to fielding and maintaining networking hardware components and systems.

Prerequisite: TECH 26301.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 36336 IT SECURITY 3 Credit Hours

This course provides the foundation for understanding the key issues associated with protecting information assets. It covers the essential principles for information security and risk management; making it an important stepping stone of an IT security career. This course is supported with case=based security problems in the industry and in-depth simulations to solve these problems. Additionally, it prepares students for CompTIA's Security+SYO-501 certification exam.

Prerequisite: NA

Schedule Type: Lecture

Contact Hours: 3 lecture

TECH 43222 COMPUTER HARDWARE ENGINEERING AND ARCHITECTURE 3 Credit Hours

Internal architecture and operation of digital computers. Topics include computer processor datapaths and control, computer memory datapaths and control, pipelining and parallel processing, memory architecture and management, IO control, system bus architecture and properties, and computer control timing and synchronization.

Prerequisite: DSCI 26010 or TECH 33222.

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 46000 COMPUTER ENGINEERING TECHNOLOGY CAPSTONE (ELR) 3 Credit Hours

The course provides students with an integrative experience, applying aspects of the student's required coursework in computer engineering technology. Students gain experience in developing requirements in engineering specifications for a practical problem in networking and or telecom-related projects. This course will address emerging issues, capabilities and challenges in the current field of study. A minimum C grade TECH 46330 or an approved object-oriented programming language is required for enrollment in the course.

Prerequisite: senior standing.

Corequisite: TECH 36620 and TECH 46350.

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 46300 NETWORK SECURITY 3 Credit Hours

This course is an introduction to network security with emphasis in identifying, analyzing and preventing various threats and attack patterns on computer networks. Students will gain practical knowledge on network security protocols, firewalls, VPN, intrusion detection and prevention systems. Prepares students for industry certification.

Prerequisite: TECH 26301 and TECH 36302

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 46316 SERVER ADMINISTRATION AND CONFIGURATION 3 Credit Hours

This course emphasizes on administering and configuring server operating systems to solve engineering problems. Students are expected to learn MS server management, Active Directory, OUs and server roles by utilizing a variety of on-based and cloud based solutions.

Prerequisite: TECH 26301

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

UC 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE 1 Credit Hour

(Equivalent to UC 10002 or UC 20007) Course assists students in making a successful academic transition to the university through experiential or intellectually engaging discipline-based content. Required of all first year students. Not required of transfer students with 25 or more credit hours.

Prerequisite: none.

Schedule Type: Colloquium

Contact Hours: 1 other

14. What are the requirements students must fulfill to complete the program successfully (including specific courses, course options, and any other requirements)?

Program Requirements: Computer Engineering Technology
Adjust the table to the proposed curriculum, including the Kent Core and general elective requirements.

Major Requirements (courses count in major GPA)			
Course	**Title**		**Credits**
TECH	26010	Introduction to Computer Engineering Technology	3
TECH	21021	Survey of Electricity and Electronics	4
TECH	23010	Computer Hardware I	3
TECH	26301	Networking Hardware I	4
TECH	26200	Programming for Engineers I	3
TECH	36200	Programming for Engineers II	3
TECH	31000	Cultural Dynamics of Technology	3

TECH	36302	Networking Hardware II	3
TECH	33222	Digital Design for Computer Engineering	3
TECH	33223	Electronic Communications	3
TECH	36620	Project Management in Engineering Technology	3
TECH	33320	Applied Embedded Systems I	3
TECH	36336	IT Security	3
TECH	43222	Computer Hardware Engineering and Architecture	3
TECH	46000	Computer Engineering Technology Capstone	3
TECH	46300	Network Security	3
TECH	46312	Wireless Networks and Telecommunications Systems	3
TECH	46316	Server Administration and Configuration	3
TECH	46350	Network Management and Design	3
TECH		CET Elective	3
TECH		TECH Elective-upper division	6
Additional Program Requirements			
US	10097	Destination Kent State: First Year Experience	1
COMM	15000	Introduction to Human Communication	3
MATH	11022	Trigonometry	3
MATH	11012	Intuitive Calculus	3
MIS	24056	Fundamentals of Business Statistics	3
MIS	24163	Principles of Management	3
PHY	13001	General College Physics I	4
PHY	13002	General college physics II	4
PHY	13021	General College Physics Laboratory	1
PHY	13022	General College Physics Laboratory II	1
ENG	20002	Introduction to Technical Writing	3
Kent Core Composition			6
Kent Core Humanities and Fine Arts (minimum one course from each)			9
Kent Core Social Sciences			6
General Electives (total credit hours depends on earning 120 credit hours, including 39 upper-division credit hours			3
			121

Graduation Requirements:
Minimum Major GPA: 2.25
Minimum Overall GPA: 2.00
Additional Graduation Requirements: A minimum C grade must be earned to fulfill the writing-intensive requirement.

Roadmap
Adjust the table to the proposed curriculum, including Kent Core and general electives.

Course Subject and Title	Credit Hours
Semester One: [16 Credit Hours]	
MATH 11022 Trigonometry	3
TECH 26010 Introduction to Computer Engineering Technology	3
US 10097 Destination Kent State: FYE	1
Kent Core Requirement	3
Kent Core Requirement	3
Kent Core Requirement	3
Semester Two: [17 Credit Hours]	
MATH 11012 Intuitive Calculus	3
COMM 15000 Introduction to Human Communication	3
PHY 13001 General College Physics I	4
PHY 13021 General College Physics Laboratory I	1
Kent Core Requirement	6
Semester Three: [14 Credit Hours]	
ENG 20002 Introduction to Technical writing	3
PHY 13002 General College Physics II	4
PHY 13022 General College Physics Laboratory II	1
TECH 23010 Computer Hardware I	3
TECH 26200 Programming for Engineers I	3
Semester Four: [16 Credit Hours]	
TECH 21021 Survey of Electricity and Electronics	4
MIS 24163 Principles of Management	3
TECH 36200 Programming for Engineers II	3
Kent Core Requirement	3
Kent Core Requirement	3
Semester Five: [15 Credit Hours]	
TECH 36620 Project Management in Engineering Technology	3
TECH 33222 Digital Design for Computer Engineering	3
TECH 33223 Electronic Communication	3
General Electives (lower or upper division)	2
TECH 26301 Networking Hardware I	4
Semester Six: [15 Credit Hours]	
TECH 33320 Applied Embedded Systems I	3

TECH 36336 IT security	3
TECH 31000 Cultural Dynamics of Technology	3
TECH 36302 Networking Hardware II	3
MIS 24056 Fundamentals of Business Statistics	3
Semester Seven: [15 Credit Hours]	
TECH 46350 Network Management and Design Technology	3
TECH 46300 Network security	3
TECH 46316 Server Administration and Configuration	3
Technology upper division	3
Technology upper division	3
Semester Eight: [12 Credit Hours]	
TECH 46000 Computer Engineering Technology Capstone	3
TECH 43222 Computer Hardware Eng and Architecture	3
TECH 46312 Wireless Networks and Telecommunications Systems	3
TECH elective (CET course)	3
	120

CET TECH Elective Group (3 credits)-Choose one of the following:

TECH 26310 WEB DESIGN AND DEVELOPMENT
TECH 33020 COMPUTER HARDWARE II
TECH 33095 ADVANCED ANDROID APPS
TECH 43320 APPLIED EMBEDDED SYSTEMS II

15. For programs using prior learning credit, compressed time frames, online delivery, accelerated formats, or other approaches to learning, explain how the institution will ensure that student work and the levels of knowledge and competencies comparable to those required in traditional formats have been achieved.

    For Tech Prep -all programs are required to use the Career Field Technical Content Standards documents. Every Career Tech/Tech Prep program in the state follows the same curriculum which was developed by both HS and college faculty and business and industry representatives. Thus, the competencies are the same for all programs in a particular career field state-wide. All students are tested via the same state EOC (End of Course) exams which were developed by HS and college faculty.

Section E. Institutional Staffing, Faculty, and Student Support

16. How many and what types of faculty (full-time or part-time) will be employed in the program? Why is the number and type of faculty sufficient to support the program? How many, if any, new faculty will be hired for the program?

    There are 2 part-time and 7 full-time faculty that support the TECH courses in this program.

17. What will the impact of the new initiative be on faculty workload?

    The program is currently underway as a concentration so there will not be additional workload.

18. Provide a brief attachment that inventories each faculty member employed to teach in the program, including names of existing personnel, a description of each faculty member's academic qualifications, their prior instructional responsibility and other experiences relevant to the courses they will teach in the program in question, each faculty member's course load in the new program, and the course work each teaches in other programs currently offered. (Note: Do not attach full CVs for each faculty member; rather, the requested information should be summarized in one paragraph for each faculty member.)

    Shown below.

19. For graduate programs, document scholarship and research capability of each faculty member; for doctoral programs, document faculty experience in directing student research.

    Not applicable.

20. What library and information resources—general as well as specific to the program(s)—and staffing and services are in place to support the initiative? If the proposed new program is at the graduate level, document discipline-specific refereed journals and primary source materials.

    The Science Librarian, determined that the collection of print and electronic resources were adequate enough to support the program proposed. The Science Librarian works closely with the library representative from the college to determine the need for additional resources as needed, and fulfills direct requests from faculty in need of additional resources. There is an annual budget allocated by the library and administered by the Science Librarian to support the resource needs of the college. In addition, the Science Librarian teaches information literacy classes that focus on the usage of these materials.

Section F. Evaluation

21. Describe the process for monitoring, evaluating and improving the overall effectiveness and quality of the program, and articulate program-level learning outcomes and objectives.

    The goal for this program is to be able to offer students the opportunity to receive such industry credentials as juniper, cisco, dell, etc.

    The program outcomes are as follows:

    1) an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities; (skills, tools)

2) an ability to design a system, component, or process to meet desired needs within realistic constraints.

3) an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes; (cond. tests)

See attached Learning Outcomes pages for additional information

22. Describe the process for assessing and improving student learning, including student persistence and completion, in the new program.

While the traditional means to assess learning are employed with this program, such as quizzes, exams, papers and problem sets, the nature of an engineering technology program lends itself to a natural assessment process. So many of the courses in this program have a lecture and a lab component to them, which provides students the opportunity to learn the material during the lecture and then apply what they have learned during the lab. Labs provide an active way to learn which helps students stay engaged. This along with designing the course material so that students will understand how the material is relevant to them, how it applies to their everyday life and how it improves their chances of getting the job they may someday want, increases persistence.

Another way student learning is assessed is through internships. While this program does not require that every student participate in an internship, they are encouraged to do so. If the student chooses to receive credit for working an internship, he/she is required to journal about his/her experience weekly and write a paper at the end of the semester. This encourages the student to articulate what they have learned. This is a good assessment tool. The employer is also asked to evaluate the student and provide feedback about the student's knowledge and performance. Having a "real-world" experience provides the student with the opportunity to understand why they take the courses that they do, implement what they have learned and determine what they may like to do in the future, which increases persistence.

Md Amiruzzaman, Ph.D.

Assistant Professor

Dr. Amiruzzaman is an Assistant Professor at College of Aeronautics and Engineering. Before accepting the teaching position at Kent State University, he has worked as a computer programmer for almost 10 years for several companies (both nationally and internationally). Also, he has worked as a research assistant at Sejong University, and at Korea University. He completed his Bachelor's degree in Computer Science from National University. He completed his Master's degrees in following fields: computer engineering, computer science, and technology. He completed his Doctorate degree from Kent State University. Prior to Kent State University, he taught at the National University and Korea University.

Dr. Amiruzzaman teaches 15 credits in the applied engineering programs each semester. He will teach the Programming for Engineers I and II courses in the Computer Engineering Technology program.

COMPUTER HARDWARE ENGINEERING AND ARCHITECTURE
VISUAL BASIC PROGRAMMING IN ENGINEERING TECHNOLOGY
REQUIREMENTS ENGINEERING AND ANALYSIS
WEB DATABASE INTEGRATION
PROGRAMMING FOR ENGINEERS I & II
ADVANCED ANDROID APPS

Aminur Chowdhury, Ed.D.

Dr. A. R. Chowdhury is a Professor in Applied Science and Technology Division, in the area of Quality Control/Reliability Engineering and Manufacturing Systems. In his over 30 years of higher education professional career, he has served as the Academic/Faculty Dean at three major universities in USA (i.e. Kent State University, Minnesota State University and Texas Southern University), and as Department Head/Chair at North Carolina A&T State University and Bowling Green State University, Ohio, and coordinator of graduate studies of Industrial Education and Technology at Eastern Kentucky State University in USA. His teaching, scholarship and research interests include; Project Management, Quality Control, Reliability Engineering, Burn-in/Stress Testing for Component/System Reliability, and the Six-Sigma applications in Industrial Productivity/Measurement and Analysis. In addition to his Industrial Management and Manufacturing Systems background, his teaching and research also includes Technology Assessment, Technology Forecasting, Logistics, Value Engineering, Process/production Control, and, Production Planning and Decision Making. He has published and presented extensively in areas of his technical expertise, and technology based higher education curriculum. In recent years, he has integrated STEM (Science, Technology, Engineering and Mathematics) as fundamental concepts into the curriculum of Technology based education programs at Kent State University.

Dr. Chowdhury teaches 12 credit hours per semester in the applied engineering and master of technology programs. He will be teaching cultural dynamics of technology for the computer engineering technology program.

CULTURAL DYNAMICS OF TECHNOLOGY
AUTOMATED MANUFACTURING
APPLIED RELIABILITY ENGINEERING
SIX-SIGMA: TOOLS AND APPLICATIONS FOR TECHNOLOGY MANAGEMENT
QUALITY SYSTEMS AND INDUSTRIAL PRODUCTIVITY

Brian Gardner, Mtec

Professor Gardner has worked in the I.T. industry since 1998, During that time, he has focused on client network integration. With the rapid evolution and industry adoption of wireless systems, Professor Gardner has studied extensively on extending the functionality of wireless network systems beyond the typical client access model. These efforts involve detailed analysis of wireless systems requirements engineering based on environmental factors and client needs with an ultimate goal of enhanced performance over traditional guided media systems. He received his Master of Technology degree in 2013.

Brian Gardner is a full-time faculty member who teaches 15 credit per semester.

DIGITAL DESIGN FOR COMPUTER ENGINEERING
COMPUTER HARDWARE ENGINEERING AND ARCHITECTURE
WIRELESS NETWORK AND TELECOMMUNICATION SYSTEMS
ELECTRONIC COMMUNICATION
COMPUTER ENGINEERING TECHNOLOGY CAPSTONE
ADVANCED WIRELESS TELECOMMUNICATION SYSTEM AND NETWORK TECHNOLOGIES
APPLIED ENBEDDED SYSTEMS I&II

Evren Koptur, Ph.D.

Dr. Koptur is an Assistant Professor. His internship experience includes:

IT Support and Technical Service where he developed and tested new financial reporting system using Visual Basic, built local area networks, developed and tested the new inventory management system using SQL, provided object-oriented design, programming and implementation support to the customer billing system, written in C++, prepared test plans and data, and user documentation for customer billing system. Dr. Koptur earned an undergraduate degree in 2003 in Computer Engineering at the University of Bahcesehir, Istanbul, Turkey, Master's in 2005 in Technology at Kent State University, and Ph.D. in Instructional Technology at College of Education, Kent State

Dr. Koptur teaches 15 credits each semester and will teach introduction to computer engineering technology for the mechanical engineering technology program. The other courses he teaches supports the computer engineering technology program and the master of technology program.

INFORMATION TECHNOLOGY
INTRODUCTION TO COMPUTER ENGINEERING TECHNOLOGY
COMPUTER HARDWARE I
COMPUTER HARDWARE II
IT SECURITY
SERVER ADMINISTRATION AND CONFIGURATION
NETWORK MANAGEMENT AND DESIGN

Sarath Kunda, MS

Mr. Kunda Graduated from JNTU Hyderabad with Bachelors in Technology with Electronics and Communications Engineering as his major. He graduated from Kent State University with a Masters of Digital Science degree in Telecommunications and Computer Networks. He has been working with the College of Aeronautics and Engineering since 2016. His areas of expertise include Telecommunications, Computer Networking, Cisco Technologies, Juniper Networks, Embedded systems.

Certifications:

CCNA, CCNA security, JNCIA

Intro to Telecommunications, Networking Hardware I, Networking Hardware II, Network Management and Design Technologies, Advanced Networking, Advanced Wireless Technologies, Juniper Networks- JNCIA, and Network Security. "

Chuck Ivan, MBA

Mr. Ivan has his Bachelor of Science in Electrical Engineering from Youngstown State and his MBA from the University of Akron. He is a certified quality auditor by the American Society of Quality (ASQ) and a RAB certified in quality management. He is a member of the American Society of Quality. He has worked as a chief engineer for The Superior Technology Company, a manager of assembly with the Vistar/King Company, a technical support manager with Diebold, an electrical assembly manager for The Meta Fab Company and the Director of TQM/QA for the Will Burt Company. He also has extensive experience as an ISO 9000 Management Representative.

Mr. Ivan is a part-time faculty member and will be teaching Quality Techniques for the mechatronics engineering technology program.

QUALITY TECHNIQUES

PROJECT MANAGEMENT IN ENGINEERING AND TECHNOLOGY
INTRODUCTION TO LEAN SIX SIGMA

Nuttapong Phantkankum, ME

Master of Technology in Computer and Electronics technology: Kent State University - 2015, Master of Engineering in Mechanical Engineering: Chiang Mai University, Chiang Mai, Thailand - 2008; Bachelor of Engineering in Electronics Engineering: King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand - 2004; Mr. Nuttapong Phantkankum has been a part time instructor at Kent State University since 2016.

Mr. Phantkankum is a part-time faculty member and usually teaches 9 credit per semester. He will teach engineering graphics I and the lab portion of the survey of electricity and electronics course for the mechanical engineering technology program.

ENGINEERING GRAPHICS I
SURVEY OF ELECTRICITY AND ELECTRONICS

Jackie Ruller, MS

Jackie Ruller graduated from Alfred University with a Bachelor of Science degree in Ceramic Engineering and a Master of Science degree in Glass Science. Ms. Ruller has had a very diverse, technical career with experience in hands-on research, university interface and marketing, project management and intellectual property. She is a co-author on over 15 publications, including a patent. She is currently the interim Director of Applied Engineering at Kent State University in the College of Aeronautics and Engineering. During her time at Kent State, she has implemented an internship program for the college and developed a co-op course that allows students to leave for a semester to work full time in their field of study while maintaining full time student status. The course is now offered to all students at Kent State University. She has worked to secure grants from the state of Ohio for internship development and infrastructure as well as capital equipment for the engineering programs in the college. Providing quality programs to students and increasing industry partnerships are her top priorities. She teaches the first year experience course for all of the applied engineering students in the college so that she is familiar with the new students in the program.

UC - 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE

Mike Testa, MBA, MSM

Mr. Testa earned an M.B.A. from Youngstown State University (1994) in general business and an M.S.M. from The University of Akron (1997) in information systems. He has over 25 years of experience working in the technology field with experiences as a business professional and instructor. In the private sector and in higher education, Mike has held technical and management level positions, including leading IT departments as the Director of IT and Director

of Infrastructure. Mike has planned, designed, and implemented many complex projects using a wide variety of software and hardware technologies. Areas of expertise and experience include:

Networking
802.11a/b/g/n/ac wireless networking
server virtualization
data center design and renovation
project management
department and project based budgeting
management of personnel

Mr. Testa is active in educating students, customers, and peers in technical and business subjects. In the classroom, Mike has taught various subjects including computer networking, wireless networking, network security, virtualization, computer hardware, operating systems, office applications, accounting, payroll, and management.

Mr. Tesa is a Cisco Network Academy Instructor (CCAI) for CCNA Routing & Switching and CCNA Security. Industry certifications held are Cisco CCNA Routing and Switching; Juniper JNCIA-Junos; Cisco CCDA (past); and Microsoft MCSE (past).

Mr. Testa is a full-time professor who teaches 15 credits per semester. The courses he teaches support the computer engineering technology program and the masters of technology.

INTRODUCTION TO COMPUTER ENGINEERING TECHNOLOGY
NETWORK MANAGEMENT AND DESIGN
COMPUTER HARDWARE I, II
ADVANCED WIRELESS TELECOMMUNICATION SYSTEM AND NETWORK TECHNOLOGIES
ADVANCED NETWORKING
NETWORK SECURITY

Roberto Uribe, Ph.D.

Roberto Uribe, Ph.D., is a professor whose research interests are in the areas of radiation effects in materials as well as in radiation measurements and standards specifically in the development of techniques used to measure the energy absorbed by materials during electron beam irradiations. Work related to this area comprises experiments in the NEO Beam facility for several research institutions as well as private companies interested in studying the effects of radiation in semiconductor and solar cell materials for space applications as well as in food and polymeric materials.

Dr. Uribe is a full-time faculty member who will teach survey of electricity and electronics for the computer engineering technology program. The other courses he teaches support the master of technology program and the proposed mechatronics engineering program.

SURVEY OF ELECTRICITY AND ELECTRONICS

FUNDAMENTALS OF CIRCUIT ANALYSIS
ELECTONIC DEVICES
ELECTRIC MACHINERY
RADIATION DOSIMETRY AND SAFETY
DESIGN AND ANALYSIS OF EXPERIMENTS IN TECHNOLOGY

ADDENDUM TO HIGHER LEARNING COMMISSION SUBSTANTIVE CHANGE APPLICATION TO ESTABLISH A NEW UNDERGRADUATE DEGREE PROGRAM

Proposed Major: Computer Engineering Technology

Proposed Degree: Bachelor of Science

Administrating College: College of Aeronautics and Engineering

Administrating Department: Applied Engineering

Provide the title of the lead administrator for the proposed program and a brief description of the individual's duties and responsibilities.

Kent State's College of Aeronautics and Engineering, functions as one organizational unit with two separate and distinct program areas (aeronautics and engineering); each program area is led by a program director. The proposed Computer Engineering Technology degree program will reside in the engineering program area under the leadership of Jackie Ruller, interim Director. She is responsible for the administrative duties of the engineering programs such as course scheduling.

Indicate whether any institutions of higher education offer the proposed program within a 30-mile radius of the campus(es) at which the proposed program will be offered. If so, list the institutions that offer the proposed program and provide a rationale for offering an additional program at this campus.

There are no BS in Computer Engineering TECHNOLOGY programs within 30 miles.

CATALOG COPY

Description of Program:
Describe the program as you would to a prospective student.

The curriculum for the computer engineering technology major is designed to give graduates the human-computer interaction and software-hardware interface so that they are capable of analyzing the problems in the computer and networking industry and producing computer engineering, networking, and software solutions.

Fully Offered At:
List all campuses/locations and methods (e.g., online, accelerated) for which a student can fully complete the program.

A student may fully complete this program at the Kent State University, Kent campus.

Accreditation:
List specialized or professional accreditor for the program if applicable.

The computer engineering technology concentration is currently accredited by ATMAE.

Admission Requirements:
If program does <u>not</u> have additional admission criteria above and beyond the minimum to be admitted to a Kent State associate or bachelor's degree, write "standard admission criteria for the degree." If program has additional admission criteria (e.g., audition, 3.0 high school GPA, 2.75 overall GPA for transfer students), list those requirements.

Standard admission criteria for the degree.

Program Learning Outcomes:
List the specific knowledge and skills directly related to the program's discipline that you expect students to acquire as part of their educational experience in the program. The outcomes must be observable and measureable, rather than what students "know," "think," "understand, "appreciate," etc.

Student Learning Outcome 1: an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities; (skills, tools)

Student Learning Outcome 2: an ability to design a system, component, or process to meet desired needs within realistic constraints.

Student Learning Outcome 3: an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes; (cond. tests)

Program Requirements:
Adjust the table to the proposed curriculum, including the Kent Core and general elective requirements.

Major Requirements (courses count in major GPA)			
Course	**Title**		**Credits**
TECH	26010	Introduction to Computer Engineering Technology	3
TECH	21021	Survey of Electricity and Electronics	4
TECH	23010	Computer Hardware I	3
TECH	26301	Networking Hardware I	4
TECH	26200	Programming for Engineers I	3
TECH	36200	Programming for Engineers II	3
TECH	31000	Cultural Dynamics of Technology	3
TECH	36302	Networking Hardware II	3
TECH	33222	Digital Design for Computer Engineering	3
TECH	33223	Electronic Communications	3
TECH	36620	Project Management in Engineering Technology	3
TECH	33320	Applied Embedded Systems I	3
TECH	36336	IT Security	3
TECH	43222	Computer Hardware Engineering and Architecture	3
TECH	46000	Computer Engineering Technology Capstone	3
TECH	46300	Network Security	3
TECH	46312	Wireless Networks and Telecommunications Systems	3
TECH	46316	Server Administration and Configuration	3
TECH	46350	Network Management and Design	3
TECH		CET Elective	3
TECH		TECH Elective-upper division	6
Additional Program Requirements			
US	10097	Destination Kent State: First Year Experience	1
COMM	15000	Introduction to Human Communication	3
MATH	11022	Trigonometry	3

MATH	11012	Intuitive Calculus	3
MIS	24056	Fundamentals of Business Statistics	3
MIS	24163	Principles of Management	3
PHY	13001	General College Physics I	4
PHY	13002	General college physics II	4
PHY	13021	General College Physics Laboratory	1
PHY	13022	General College Physics Laboratory II	1
ENG	20002	Introduction to Technical Writing	3
Kent Core Composition			6
Kent Core Humanities and Fine Arts (minimum one course from each)			9
Kent Core Social Sciences			6
General Electives (total credit hours depends on earning 120 credit hours, including 39 upper-division credit hours			2
			120

Graduation Requirements:
Minimum Major GPA: 2.25
Minimum Overall GPA: 2.00
Additional Graduation Requirements: A minimum C grade must be earned to fulfill the writing-intensive requirement.

Roadmap
Adjust the table to the proposed curriculum, including Kent Core and general electives.

Course Subject and Title		**Credit Hours**
Semester One: [16 Credit Hours]		
MATH 11022	Trigonometry	3
TECH 26010	Introduction to Computer Engineering Technology	3
US 10097	Destination Kent State: FYE	1
Kent Core Requirement		3
Kent Core Requirement		3
Kent Core Requirement		3
Semester Two: [17 Credit Hours]		
MATH 11012	Intuitive Calculus	3
COMM 15000	Introduction to Human Communication	3
PHY 13001	General College Physics I	4
PHY 13021	General College Physics Laboratory I	1
Kent Core Requirement		6

Semester Three: [14 Credit Hours]		
ENG 20002	Introduction to Technical writing	3
PHY 13002	General College Physics II	4
PHY 13022	General College Physics Laboratory II	1
TECH 23010	Computer Hardware I	3
TECH 26200	Programming for Engineers I	3
Semester Four: [16 Credit Hours]		
TECH 21021	Survey of Electricity and Electronics	4
MIS 24163	Principles of Management	3
TECH 36200	Programming for Engineers II	3
Kent Core Requirement		3
Kent Core Requirement		3
Semester Five: [15 Credit Hours]		
TECH 36620	Project Management in Engineering Technology	3
TECH 33222	Digital Design for Computer Engineering	3
TECH 33223	Electronic Communication	3
General Electives (lower or upper division)		2
TECH 26301	Networking Hardware I	4
Semester Six: [15 Credit Hours]		
TECH 33320	Applied Embedded Systems I	3
TECH 36336	IT security	3
TECH 31000	Cultural Dynamics of Technology	3
TECH 36302	Networking Hardware II	3
MIS 24056	Fundamentals of Business Statistics	3
Semester Seven: [15 Credit Hours]		
TECH 46350	Network Management and Design Technology	3
TECH 46300	Network security	3
TECH 46316	Server Administration and Configuration	3
Technology upper division		3
Technology upper division		3
Semester Eight: [12 Credit Hours]		
TECH 46000	Computer Engineering Technology Capstone	3
TECH 43222	Computer Hardware Eng and Architecture	3

TECH 46312	Wireless Networks and Telecommunications Systems	3
TECH	elective (CET course)	3
		120

CET TECH Elective Group (3 credits)-Choose one of the following:

TECH 26310 WEB DESIGN AND DEVELOPMENT
TECH 33020 COMPUTER HARDWARE II
TECH 33095 ADVANCED ANDROID APPS
TECH 43320 APPLIED EMBEDDED SYSTEMS II

Computer Engineering Technology – B.S.
Student Learning Outcomes – Major Course Mapping

Major Course ID and Title	Student Learning Outcome 1: an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities; (skills, tools)			Student Learning Outcome 2: an ability to design a system, component, or process to meet desired needs within realistic constraints.			Student Learning Outcome 3: an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes; (cond. tests)		
	Introduced	Reinforced	Mastered	Introduced	Reinforced	Mastered	Introduced	Reinforced	Mastered
TECH 26010 Introduction to Computer Engineering Technology	X						X		
TECH 26200 Programming for Engineers I		X			X			X	
TECH 36200 Programming for Engineers II			X			X			X
TECH 33222 Digital Design for Computer Engineering		X			X			X	
TECH 21021 Survey of Electricity and Electronics	X			X			X		
TECH 23010 Computer Hardware I		X		X				X	
TECH 26301 Networking Hardware I		X			X			X	
TECH 36302 Networking Hardware II			X			X			X
TECH 36336 IT security	X			X			X		
TECH 33223 Electronic Communication	X			X			X		

TECH 36620 Project Management in Engineering Technology	X				X			X	
TECH 31000 Cultural Dynamics of Technology	X							X	
TECH 46350 Network Management and Design Technology		X				X		X	
TECH 43222 Computer Hardware Engineering and Architecture			X			X			X
TECH 46312 Wireless Networks and Telecommunications Systems			X		X		X		
TECH 46316 Server Administration and Configuration		X			X				X
TECH 46300 Network security			X		X			X	
TECH 46000 Computer Engineering Technology Capstone			X			X			X
TECH 33320 Applied Embedded Systems I			X			X			X

Summary of Program Assessment Plan

PROGRAM MISSION

The mission of the Computer Engineering Technology (CET) program is to train engineering students with a high level of technology problem solving skills and develop an engineering mindset to create solutions in information technology issues. Our bachelor's program is the practice of engineering concepts, techniques and methods in order to develop, analyze and solve information systems.

The program aims at training students with modern engineering tools and applications. The students will have a knowledge on human-computer interaction and software-hardware interface so that they are capable of analyzing the problems in the computer and networking industry and producing computer engineering, networking, and software solutions for them.

STUDENT LEARNING OUTCOMES:

Student Learning Outcome 1: an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities; (skills, tools)

TECH 36302 Networking Hardware II: Hands-on Lab Exercises, Exams, Quizzes
TECH 46312 Wireless Networks and Telecommunications Systems: Exams and Quizzes
TECH 46300 Network security: Hands-on Lab Exercises, Exams, Quizzes
TECH 36200 Programming for Engineers II: Lab Assignments and Final Project
TECH 46000 Computer Engineering Technology Capstone: Written Essays, Practicums and Final Project Presentation
TECH 43222 Computer Hardware Engineering and Architecture: Homework, Labs, Exams
TECH 33320 Applied Embedded Systems I: Homework, labs, final projects

Student Learning Outcome 2: an ability to design a system, component, or process to meet desired needs within realistic constraints

TECH 33320 Applied Embedded Systems I: Homework, labs, final projects
TECH 36302 Networking Hardware II: Hands-on Lab Exercises, Exams, Quizzes
TECH 36200 Programming for Engineers II: Lab Assignments and Final Project
TECH 43222 Computer Hardware Engineering and Architecture: Homework, Labs, Exams
TECH 46000 Computer Engineering Technology Capstone: Written Essays, Practicums and Final Project Presentation
TECH 46350 Network Management and Design Theory: Homework problems, exams, quizzes

Student Learning Outcome 3: an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes; (cond. tests)

TECH 33320 Applied Embedded Systems I: Homework, labs, final projects
TECH 36302 Networking Hardware II: Hands-on Lab Exercises, Exams, Quizzes
TECH 43222 Computer Hardware Engineering and Architecture: Homework, Labs, Exams
TECH 36200 Programming for Engineers II: Lab Assignments and Final Project
TECH 46000 Computer Engineering Technology Capstone: Written Essays, Practicums and Final Project Presentation

TECH 46316 Server Administration and Configuration: Homework, laboratory reports, final project

ASSESSMENT RESULTS:
Describe how assessment results will be used for future program improvement (how and by whom results are reviewed and analyzed and how resulting plan of action will be implemented).

Assessment on these three learning outcomes will be conducted biennially. Results will be presented to the faculty, the appropriate industrial advisory boards, the program director, and the dean. Faculty will use the results to guide curricular development.

DELL EMC

November 14, 2017

Robert G. Sines, Jr.
Interim Dean
College of Aeronautics and Engineering
1400 Lefton Esplanade
Kent, Ohio 44240

Dear Dean Sines:

Dell EMC is pleased to lend our support through our External Research & Academic Alliances (ERAA) Education program to the engineering programs in the College of Aeronautics and Engineering (CAE) at Kent State University. As a member, CAE has received access to 'open' curriculum-based education and faculty training on technology topics applicable to any vendor environment such as cloud computing, big data analytics, and information storage & management at no cost.

We support CAE's recommendation to move the computer engineering technology concentration under the Bachelor of Science in Applied Engineering program for it to be recognized as its own major. As a major, the program would be more visible and there would be more flexibility in the curriculum.

Having graduates with the skills and certifications that the computer engineering program provides is invaluable in the industry.

Sincerely,

Ryan Fournier

Ryan Fournier
VP, Portfolio Intelligence
Dell EMC | Office of the CTO
phone 508.293.6282
Ryan.Fournier@Dell.com

11/1/2017

Robert G. Sines, Jr.
Interim Dean
College of Aeronautics and Engineering
1400 Lefton Esplanade
Kent, Ohio 44240

Dear Dean Sines:

I am writing this letter on behalf of Juniper Networks, Inc. to express our support for the engineering programs in the College of Aeronautics and Engineering (CAE) at Kent State University. CAE would like to move the computer engineering technology under the Bachelor of Science in Applied Engineering program to its own major. As a major, the program would be more visible and there would be more flexibility in the curriculum.

Having graduates with the skills and certifications that the computer engineering program provides is invaluable in the industry. We at Juniper are continually searching for students who have the right mix of programming, network engineering, cybersecurity, virtualization, automation, and other skills taught by computer engineering technology program. We have been working with a group of instructors led by Professor Sarath Kunda for over two years now to provide students additional exposure to some of these skills, and we feel that moving the program to a full major would benefit the students at Kent State by making the industry take more notice of the fine work they are doing, and allowing the students to graduate even more well-prepared than they already are.

Juniper wholeheartedly endorses the proposal to move the computer engineering technology program to its own full major. Please do not hesitate to contact us if you have any questions.

Sincerely,

Adam Guglielmo

Global Program Manager
Juniper Networks Academic Alliance
+1 703.395-5672 (mobile)

JUNIPER NETWORKS
1194 North Mathilda Ave.
Sunnyvale, CA 94089
o +1408 745 2000
f +1408 745 2100
www.juniper.net

Robert G. Sines, Jr.
Interim Dean
College of Aeronautics and Engineering
1400 Lefton Esplanade
Kent, Ohio 44240

Dear Mr. Sines:

AMETEK HKP would like to express its support of Kent State's proposed Mechatronics Engineering, Mechatronics Engineering Technology, Computer Engineering Technology and Mechanical Engineering Technology programs. Over the next 5 years, we will need to hire graduates with experience in CAD, controls expertise, applying and testing stepper and servo motors and controls, and systems design.

It is difficult to find young talent that has theoretical and hands on electro-mechanical expertise. Thus, these programs resulting in graduates with a high level of knowledge as well as graduates with significant experience in the application, design, and use of today's machine control system architectures would give them a significant competitive advantage entering the workforce. All programs would provide graduates that would be a valuable resource of future employees for AMETEK.

In addition to the in-class curriculum, we would be very interested in co-op or internship programs that expose your students to real world projects and opportunities. Again, this type of experience would provide your students with an important advantage when compared to other recent graduates.

Key industries such as consumer goods, life sciences, food and beverage, tire and automotive manufacturing are facing workforce shortages and the engineering and technical skills to design and maintain automated, mechanical and electrical systems is critical to their success.

Regards,

Phil Faluotico

330-357-6252

AMETEK®
PRECISION MOTION CONTROL

Phil Faluotico
Director of Engineering

www.ametekpmc.com
E-mail: phil.faluotico@ametek.com

100 East Erie Street
Kent, OH 44240
Phone: (330) 677-3741
Fax: (330) 677-3306
Cell: (330) 357-6252

PITTMAN Haydon kerk

Robert G. Sines, Jr.
Interim Dean
College of Aeronautics and Engineering
1400 Lefton Esplanade
Kent, Ohio 44240

Dear Mr. Sines:

My name is Kevin Ballard. I am 2010 graduate of your college and now serve as the Production Engineering Manager at Rambus' Lighting Division in Brecksville, OH. At Rambus, I lead a team that is charged with development of new manufacturing processes and technologies that enable our company to produce our industry leading product designs.

I would like to express my support of Kent State's proposed Mechatronics Engineering, Mechatronics Engineering Technology, Computer Engineering Technology and Mechanical Engineering Technology programs. Over the next five years, we will need to hire graduates with experience in articulated robotics, machine vision, machine safety, factory data analytics, and lean manufacturing.

It is difficult to find young talent that has any controls engineering expertise, or an understanding of how manufacturing systems, and the data they generate can be utilized to improve the operation of the business as a whole. It is also difficult to find people of any age that truly understand how the design of the equipment, robotics, and plant floor directly affect performance and uptime of the operation.

In addition to the in-class curriculum, we would be very interested in co-op or internship programs that expose your students to real world projects and opportunities. Again, this type of experience would provide your students with an important advantage when compared to other recent graduates.

With almost all Co-Ops, or traditional Mechanical Engineers that I have worked with thus-far, we have found very little comprehension of the concepts outlined above. The education background I received at Kent State has given me a unique advantage because I was able to build on the concepts from the moment I left school. We feel the lack of talent and knowledge in this field every day, whether it be through our own organization, or our suppliers of production equipment. With that being said, I believe that the prospects will continue to improve, for graduates of your programs.

Sincerely,

Kevin Ballard
Production Engineering Manager
Rambus Lighting Division
6611 W. Snowville Rd.
Brecksville, OH 44319
Kballard@rambus.com

North Central State College

October 18, 2017

Chancellor John Carey
Department of Higher Education
25 South Front Street
Columbus, Ohio 43215

Dear Chancellor Carey:

I am writing this letter on behalf of North Central State College to express support for the engineering programs in the College of Aeronautics and Engineering (CAE) at Kent State University. A goal of ours is to provide our students with different pathways and good opportunities when they leave North Central State College. Consequently, we have been working with staff and faculty at Kent State to create pathways for our students in which they would earn college credit from our institution that may be applied to programs in CAE. In particular, CAE would like to move three of the concentrations (mechatronics engineering technology, computer engineering technology and mechanical engineering technology) under the Bachelor of Science in Applied Engineering program to their own major. As majors, the programs would be more visible and there would be more flexibility in the curriculum. These programs complement our associate level programs and can provide a valuable next step in a student's career pathway.

One of the reasons that the programs in CAE are such a good fit for our programs is their applied nature. I understand that CAE is participating in the NEO RAPIDS 2 proposal in the hope of acquiring a FANUC Integrated Cell. Our students in our engineering tech programs have the opportunity to receive training on FANUC robots. Having the opportunity to work with the FANUC Integration Cell at Kent State is again, the perfect complement to the training they receive with us.

In addition, I understand that CAE would like to offer the more theoretical mechatronics engineering program beginning fall of 2018. This program will offer a higher level of math and theory providing an additional pathway for our students who are progressing along calculus pathways in engineering and may prefer careers with a stronger theoretical focus.

In short, we are impressed with the work being done to move CAE forward and make it a stronger partner with community colleges.

Respectfully,

Greg Timberlake, Psy.D.
Dean of Business, Industry, Technology, &
Workforce Development
North Central State College

2441 Kenwood Circle
Mansfield, OH 44906
419.755.4800
888.755.4899
www.ncstatecollege.edu

Computer Engineering Technology Concentration Requirements

[AR-BS-AENG-CET]

Concentration Requirements (courses count in major GPA)		
COMT 36320	COMPUTER FORENSICS	3
COMT 36330	LOCAL AREA NETWORK SECURITY FUNDAMENTALS	3
ENG 20002	INTRODUCTION TO TECHNICAL WRITING	3
MIS 24056	FUNDAMENTALS OF BUSINESS STATISTICS	3
TECH 23010	COMPUTER HARDWARE I	3
TECH 26010	INTRODUCTION TO COMPUTER ENGINEERING TECHNOLOGY	3
TECH 26301	NETWORKING HARDWARE I	3
TECH 26310	WEB DESIGN AND DEVELOPMENT	3
TECH 31000	CULTURAL DYNAMICS OF TECHNOLOGY (DIVD) (WIC) [1]	3
TECH 33222	DIGITAL DESIGN FOR COMPUTER ENGINEERING	3
TECH 33223	ELECTRONIC COMMUNICATION	3
TECH 36302	NETWORKING HARDWARE II	3
TECH 36620	PROJECT MANAGEMENT IN ENGINEERING AND TECHNOLOGY	3
TECH 43060	MANAGEMENT OF TECHNOLOGY INNOVATION	3
TECH 43222	COMPUTER HARDWARE ENGINEERING AND ARCHITECTURE	3
TECH 46000	COMPUTER ENGINEERING TECHNOLOGY CAPSTONE (ELR)	3
TECH 46312	WIRELESS NETWORK AND TELECOMMUNICATION SYSTEMS	3
TECH 46350	NETWORK MANAGEMENT AND DESIGN TECHNOLOGY	3
Technology (TECH) Elective		3
Technology Upper-Division Elective (TECH 30000 or 40000 level)		9
Additional Requirements (courses do not count in major GPA)		
MATH 11012	INTUITIVE CALCULUS (KMCR)	3
MATH 11022	TRIGONOMETRY (KMCR)	3
MIS 24163	PRINCIPLES OF MANAGEMENT [2]	3
PHY 13001	GENERAL COLLEGE PHYSICS I (KBS)	4
PHY 13002	GENERAL COLLEGE PHYSICS II (KBS)	4
PHY 13021	GENERAL COLLEGE PHYSICS LABORATORY I (KBS) (KLAB)	1
PHY 13022	GENERAL COLLEGE PHYSICS LABORATORY II (KBS) (KLAB)	1
Kent Core Social Sciences (must be from two disciplines)		6
General Electives (total credit hours depends on earning 120 credit hours, including 39 upper-division credit hours)		3
Minimum Total Credit Hours:		94

1 A minimum C grade must be earned to fulfill the writing-intensive requirement.

2 Equivalent to BMRT 11009

Mechanical Engineering Technology Concentration REquirements

[AR-BS-AENG-MERT]

Concentration Requirements (courses count in major GPA)		
ENG 20002	INTRODUCTION TO TECHNICAL WRITING	3
TECH 20002	MATERIALS AND PROCESSES	3
TECH 26010	INTRODUCTION TO COMPUTER ENGINEERING TECHNOLOGY	3
TECH 23581	COMPUTER-AIDED ENGINEERING GRAPHICS	3
TECH 31000	CULTURAL DYNAMICS OF TECHNOLOGY (DIVD) (WIC) [2]	3
TECH 33031	PROGRAMMABLE LOGIC CONTROLLERS	3
TECH 33033	HYDRAULICS/PNEUMATICS	3
TECH 33111	STRENGTH OF MATERIALS	3
TECH 33363	METALLURGY AND MATERIALS SCIENCE	3
TECH 34002	ADVANCED COMPUTER-AIDED DESIGN II	3
TECH 43080	INDUSTRIAL AND ENVIRONMENTAL SAFETY	3
TECH 43550	COMPUTER-AIDED MANUFACTURING	3
TECH 43580	COMPUTER-AIDED MACHINE DESIGN	3
TECH 43800	APPLIED ENGINEERING TECHNOLOGY SEMINAR (ELR)	3
Technology (TECH) Elective		3
Technology Upper-Division Elective (TECH 30000 or 40000 level)		3
Technical Electives, choose from the following:		12
Elective Group I (9-12 credits)		
TECH 33040	MOTORS AND CONTROLLERS	
TECH 43030	MECHATRONICS	
TECH 43031	MECHATRONICS II	
TECH 43096	INDIVIDUAL INVESTIGATION IN APPLIED SCIENCE AND TECHNOLOGY	
TECH 43700	COMPUTER INTEGRATED MANUFACTURING	
TECH 47200	SYSTEMS ENGINEERING	
TECH 47210	SUSTAINABLE ENERGY I	
TECH 47211	SUSTAINABLE ENERGY II	
Elective Group II (0-3 credits)		
TECH 31065	CAST METALS	
TECH 36620	PROJECT MANAGEMENT IN ENGINEERING AND TECHNOLOGY	
Additional Requirements (courses do not count in major GPA)		
ACCT 23020	INTRODUCTION TO FINANCIAL ACCOUNTING	3
CHEM 10050	FUNDAMENTALS OF CHEMISTRY (KBS)	3
ECON 22060	PRINCIPLES OF MICROECONOMICS (KSS)	3
MATH 11010	ALGEBRA FOR CALCULUS (KMCR)	3
MATH 11022	TRIGONOMETRY (KMCR)	3
MATH 12002	ANALYTIC GEOMETRY AND CALCULUS I (KMCR)	5
PHY 13001	GENERAL COLLEGE PHYSICS I (KBS)	4
PHY 13002	GENERAL COLLEGE PHYSICS II (KBS)	4
PHY 13021	GENERAL COLLEGE PHYSICS LABORATORY I (KBS) (KLAB)	1
PHY 13022	GENERAL COLLEGE PHYSICS LABORATORY II (KBS) (KLAB)	1
Kent Core Social Sciences (cannot be ECON)		3
General Electives (total credit hours depends on earning 120 credit hours, including 39 upper-division credit hours)		1
Minimum Total Credit Hours:		94

1 Equivalent to BMRT 11009

2 A minimum C must be earned to fulfill the writing-intensive requirement.

Mechatronics Concentration Requirements

[AR-BS-AENG-MECH]

HIGHER LEARNING COMMISSION

FORM

New Programs

Substantive Change Application

Institution: Kent State University City, State: Kent, Ohio

Name of person completing this application: Therese E. Tillett

Title: Executive Director, Curriculum Services Phone: 330-672-8558 Email: ttillet1@kent.edu

Date Submitted:

The questions are designed to elicit brief, succinct, detailed information, rather than a narrative or references to extensive supporting documents. Do not attach other documents unless they are specifically requested in the questions and are germane to the request. The total submission should be no more than 10–12 pages on a single classification of change. (The page limit excludes attachments. However, the overall length, including attachments, should not exceed 200 pages.)

If the person completing this application is not the CEO, CAO or the ALO of the institution, it is understood that the person completing and submitting this application has consulted with and informed those individuals.

Submit the completed application as a single PDF file on the following webpage: http://www.hlcommission.org/document_upload/.

Part 1: General Questions

1. **Requested Change(s).** Concisely describe the change for which the institution is seeking approval.

   The College of Aeronautics and Engineering is seeking approval to move the Computer engineering technology concentration under the Bachelor of Science in Applied Engineering to a major.

   Computer Engineering Technology, currently, is one of four concentrations in the ATMAE-accredited Applied Engineering major.

   Due to the gradual development of the concentrations in the Applied Engineering major to meet their respective market needs, the percentage of major courses for each of the concentrations has reduced to be 10 percent of the entire curriculum. Since the Ohio Department of Higher Education requires concentrations to comprise a minimum 50 percent of the major curriculum, this program is not in compliance.

The noncompliance primarily is due to the program's incremental development to keep up with the perpetually developing nature of technology. For this field of study to remain relevant to students and employers, it must continue to develop and diverge from its fellow concentrations of study. The program is currently ATMAE-Accredited and the college will design this curriculum such that students will graduate with industry recognized certifications to ensure the highest quality of instruction and value to students and employers. Thus, the concentration must evolve to become its own major to remain an asset to the state and its population and to meet the market needs.

2. **Is this application being submitted in conjunction with another application?**

☐ Yes

☒ No

3. **Classification of Change Request.**
Note: not every institutional change requires prior review and approval. Review the "Overview of HLC Policies and Procedures for Institutional Changes Requiring HLC Notification or Approval" to make certain that current HLC policy requires the institution to seek approval.

New academic program(s):

☐ Certificate ☒ Bachelor's ☐ Diploma ☐ Master's/specialist

☐ Associate's ☐ Doctorate ☐ *Check if program is at a new degree level*

An institution submitting more than one change request should complete multiple applications, one for each type of change. The types of change requests include:

- Change in mission
- Change in student body
- Competency-based education (credit-based; direct assessment; hybrid) programs
- Consortial arrangement
- Contractual arrangement
- Substantially changing the clock or credit hours required for a program
- Change in academic calendar (e.g., quarters to semester) or change in credit allocation
- Teach-out plan if closing location provides total degree programs
- Distance or correspondence education
- New programs
- Certificate programs
- Branch campuses and additional locations

4. **Special conditions.** Indicate whether any of the conditions identified below fit the institution (Yes or No). If Yes, explain the situation in the space provided.

a) Is the institution, in its relations with other regional, specialized, or national accrediting agencies, currently under or recommended for a negative status or action (e.g., withdrawal, probation, sanction, warning, show-cause, etc.)?

No.

b) Is the institution now undergoing or facing substantial monitoring, special review, or financial restrictions from the U.S. Deptartment of Education or other federal or state government agencies?

No.

c) Has the institution's senior leadership or board membership experienced substantial resignations or removals in the past year?

No.

d) Is the institution experiencing financial difficulty through such conditions as a currently declared state of exigency, a deficit of 10% or more, a default or failure to make payroll during the past year, or consecutive deficits in the two most recent years?

No.

e) Is the institution experiencing other pressures that might affect its ability to carry out the proposal (e.g., a collective bargaining dispute or a significant lawsuit)?

No.

5. **Approvals.** Mark whether each type of approval is required prior to implementing the proposed change. If "Yes," attach documentation of the approval to the request. If "No," attach evidence that approval is not needed.

Internal (faculty, board) approvals	☒ Yes	☐ No	
System approvals	☐ Yes	☐ No	☒ Not Applicable
State approval	☒ Yes	☐ No	
Foreign country(ies) approvals	☐ Yes	☐ No	☒ Not Applicable

For Distance or Correspondence Education only:

Process in place to ascertain and secure state approval(s) as required	☐ Yes	☐ No

6. **Specialized Accreditation.** Complete this section only if specialized accreditation is required for licensure or practice in program(s) covered by this change application.

☐ The institution has already obtained the appropriate specialized accreditation. Attach a copy of the letter from the agency granting accreditation.

☐ The institution has begun the process of seeking or plans to seek specialized accreditation. Specify the name of the agency and the timeline for completing the process in the space below. (If approval is a multi-stage process, the institution should contact the HLC staff liaison to discuss the timeline before submitting this change application form.)

☐ The institution does not plan to seek specialized accreditation. Provide a rationale for not seeking this accreditation in the space below.

7. **Changes Requiring Visits.** This section is not for HLC-mandated visits such as additional location confirmation visits or campus evaluation visits.

Note: Complete this section only if the institution is already aware that the proposed change will need to be reviewed through a visit. (If the institution is unsure whether a visit is required, HLC will advise the institution based on the information provided in both Part 1 and Part 2 of the change application.)

☐ Request to schedule a Change Visit.

☐ Request to add a proposed change to an already scheduled visit. Specify type of visit and date scheduled:

Whether the change will be reviewed through a separate Change Visit or embedded in an already scheduled visit, the following schedule will apply.

- Part 1 of this change form must be submitted at least four months before the visit. If the visit has not already been scheduled, this filing will initiate the process of scheduling the visit.
- The institution files Part 2 of this change form at least two months before the scheduled visit. If the change will be embedded in an already scheduled visit, the form should be filed as an attachment to the report prepared for that visit. Provide URLs to the Faculty/Staff Handbook and Catalog below. If the URLs are not available, please do not submit the full handbook or catalog as attachments. HLC will provide directions on how to submit electronic versions of these documents prior to the visit.

  Faculty/Staff Handbook URL:

  Catalog URL:

Please note: HLC plans to update the change forms annually, on or about September 1 of each year. However, if a Change Application form was accessed more than 90 days prior to filing, it is recommended that the institution visit http://www.hlcommission.org/change to ensure that there have been no changes in the application form in the intervening time.

Part 2: Topic-Specific Questions

An institution should submit a separate application for each requested program (unless the programs represent closely related disciplines). If more than one program is being requested in this application, please be sure to sufficiently address each program when answering the following questions, particularly in Sections A, D, E and F. Each proposed new program should be identified by using the *Classification of Instructional Programs* terminology (CIP codes). CIP codes are established by the U.S. Department of Education's National Center for Education Statistics as a taxonomic scheme that supports the accurate tracking and reporting of fields of study and program completions activity. More information is available at http://nces.ed.gov/ipeds/cipcode/.

Attach the "Substantive Change Application, Part 1: General Questions" as page one of your application. That completed form and your answers to the questions below will constitute your request for approval of a substantive change. This form will be the basis for review of this application.

Section A. Characteristics of the Change Requested

1. Identify the basic characteristics of the proposed educational program as indicated below:

a) The full name of the proposed program, the specific degree (if applicable) or the instructional level (if not a degree program), and the six-digit CIP code XX.XXXX of the program (CIP codes, program name, and additional description [optional])

Bachelor of Science in Computer Engineering Technology *Contact Therese Tillett for CIP code.*

b) Total credit hours (indicate whether semester or quarter) for completion of the program

There are 120 total credit hours in the program. This program is based on semesters.

c) Normal or typical length of time for students to complete the program

The program is designed to be completed in eight semesters.

d) Proposed initial date for implementation of the program

The proposed date of implementation of the program is fall 2018.

e) Primary target audience for the program (e.g., full-time, part-time, traditional college age, working adults, transfer students, military personnel, or particular ethnic group)

The primary target audience is full-time, traditional college age, transfer and part-time students.

f) Projected life of the program (single cohort or ongoing)

This will be an ongoing program.

g) Whether the program will be part of contractual or consortial arrangement

Not applicable.

2. Identify if the institution is requesting new stipulations for the proposed program and provide a rationale for this request.

   Not applicable.

3. If the institution is planning any involvement by external organizations (other than accredited higher education institutions) in key operations as identified below, provide the information requested below and complete the Contractual Screening Form for each planned involvement. (Note that such involvement by a parent company or by one of its subsidiaries external to the institution in any of these operations should be reported.) If the screening form indicates contractual approval is required, complete the full contractual application and submit it in conjunction with the program application. If the screening form indicates no further action is required, attach the confirmation email from HLC.

Type of Involvement	Name(s) of External Organization(s)	Percent of Involvement
A. Recruitment and admission of students	Not applicable	
B. Course placement and advising of students	Not applicable	
C. Design and oversight of curriculum	Not applicable	
D. Direct instruction and oversight	Not applicable	
E. Other support for delivery of instruction	Not applicable	

Section B. Institution's History With Programs

4. Does the institution currently offer a program at the same instructional level and with the same 4-digit CIP code (XX.XX) as the proposed program? If so, identify the program currently offered and whether it is a degree program. Will the proposed program replace the program currently offered?

   Contact Therese Tillett for the information.

5. Does the institution currently offer two or more programs at the same instructional level with the same 2-digit CIP code (XX.) as the proposed program? If so, identify the two such programs with the highest numbers of graduates during the past year, along with their numbers of graduates.

Contact Therese Tillett for the information.

Section C. Institutional Planning for Program Change

6. What impact might the proposed program have on challenges identified as part of or subsequent to the last HLC review and how has the institution addressed the challenges?

No identified challenges. Kent State University has adequate faculty and other resources for existing programs and the proposed program.

7. Briefly describe the planning process for determining the need for this new program, including the role of faculty in the planning and approval process.

The College of Aeronautics and Engineering offers the Computer Engineering Technology concentration under the Bachelor of Science in Applied Engineering (BSAE). The enrollment has steadily increased. Currently, the BSAE has four concentrations: Computer Engineering Technology, Applied Engineering and Technology Management, Mechatronics and Computer Engineering Technology. The lead faculty member for each concentration, periodically reviews the curriculum to ensure its relevancy. Due to the gradual modifications in the curriculum of the concentrations in the BSAE program to meet their respective market needs, the percentage of common courses of in the four concentrations has gradually reduced to be 10% of the entire curriculum. Since the state requires that the common courses of different concentrations of the same major be at least 50% of the entire curriculum and it is impossible to meet this requirement due to different market needs of each concentration, it is necessary to change the CET concentration to a Major of Bachelor of Science in Computer Engineering Technology. In addition, while the program is currently ATMAE accredited, the curriculum has been updated by the faculty to include material necessary for students to sit for industry certifications. Any changes made are discussed and voted on by the other Applied Engineering faculty. If approved, the college curriculum committee discusses and votes on changes.

8. What are the physical facilities and equipment needed to support the program? Indicate the impact that the proposed change will have on the physical resources and laboratories that currently accommodate existing programs and services, or identify new laboratory and preceptor needs.

Since the program already exists, there will be no impact on the physical resources and laboratories currently supporting the program.

9. What is the evidence that a market for the new program(s) exists? How has estimated program demand been factored into realistic enrollment projections? How has this evidence been used in planning and budgeting processes to develop a quality program that can be sustained?

This area of study continues to remain relevant to the economic future of Ohio. Industry relies heavily on information technology systems to deliver better service and cost savings to operational bottom lines. The Bureau of Labor Statistics analysis for the decade between 2014 and 2024 proves this by indicating a continued growth of between eight percent (as fast as average) and 27 percent (much faster than

average) for various labor markets in IT employment, including those for web developers[1], computer systems analysts[2], computer network architects[3], information security analysts[4] and network and computer systems administrators[5]. This range of growth, at its minimum, is on par or with that of other healthy labor markets and, at its maximum, far exceeds the average growth for the labor market in general.

In addition, Ohio is ranked fifth in the nation with the highest employment for computer systems analysts and ninth overall with the highest concentration of jobs in this occupation[6]

These trends and data have not been ignored by other college and universities in Ohio. Every major state institution in Ohio offers an array of computer science, computer engineering, computer information systems and similar programs of study. However, few of these institutions offer a program that merges the core concepts of engineering design and computer technology as defined by industry. Students also have noticed the relevance of this field of study. The appeal of the existing concentration has been reflected in a threefold increase in enrollment from fall 2012 to fall 2016.

Fall Semester Student Enrollment (15th Day Census)
Computer Engineering Technology Concentration

2012	2013	2014	2015	2016
28	43	61	57	65

10. If the program request is approved, what future growth do you anticipate (e.g., in the next six months, three years) and how do you plan to manage this growth?

    If the program request is approved, future growth is expected to be at about the same rate as shown above or slightly higher because the program will be more visible (as a major compared to a concentration). The resources are currently available to manage the program now, but if the program continues to grow as expected, it may eventually be necessary to hire additional faculty.

[1] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Web Developers. Retrieved from www.bls.gov/ooh/computer-and-information-technology/web-developers.htm.

[2] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Computer Systems Analysts. Retrieved from www.bls.gov/ooh/computer-and-information-technology/computer-systems-analysts.htm.

[3] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Computer Network Architects. Retrieved from www.bls.gov/ooh/computer-and-information-technology/computer-network-architects.htm.

[4] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Information Security Analysts. Retrieved from www.bls.gov/ooh/computer-and-information-technology/information-security-analysts.htm.

[5] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition*, Network and Computer Systems Administrators. Retrieved from www.bls.gov/ooh/computer-and-information-technology/network-and-computer-systems-administrators.htm.

[6] Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Employment Statistics, May 2016*, Computer Systems Analysts. Retrieved from www.bls.gov/oes/current/oes151121.htm#st.

11. How does this program fit into the current and expected financial picture of the institution? In particular, will the program be financially self-sufficient within three years? If not, when do you expect the program to be financially self-sufficient and how do you expect the program to operate until then?

This proposal is to convert our existing technology concentration in Computer Engineering Technology to a Computer Engineering Technology major.

The college is seeking approval to convert this and two other applied engineering concentrations to engineering technology majors. These three programs along with the proposed new Mechatronics Engineering program form a portfolio that share courses, faculty and physical resources. Computer engineering connects to the University's digital sciences program and is bridged to mechanical engineering technology by mechatronics engineering and mechatronics engineering technology.

The fiscal impact sought through the Computer Engineering Technology major is an increase in enrollment as the program migrates from a concentration in the technology program to a major. At present the program is financially self-sufficient. This will enhance that position. The college has allocated a portion of the income growth to promote this area as part of an overall portfolio of related programs: Mechatronics Engineering, Mechatronics Engineering Technology, Mechanical Engineering Technology, and Computer Engineering Technology. This portfolio of closely related programs supports enhanced student recruitment and thus growth in all four areas. Computer engineering technology also shares resources with digital science, which provides an additional path for enrollment growth, and support of financial stability.

12. What controls are in place to ensure that the information presented to all constituencies in advertising, brochures, and other communications will be accurate?

Any materials generated by the college will be reviewed by several, appropriate faculty and staff.

Section D. Curriculum and Instructional Design

13. Please list all the courses that comprise the program and identify if the program will include any new courses. Include course descriptions and number of credit hours for each.

The new courses in the Computer engineering technology program are as follows:

TECH 26200– Programming for Engineers I (PENG I)-3 credits. This course has been developed to serve as the introductory programming course for engineering students. This course applies traditional programming concepts towards the engineering discipline of applied problem solving.

TECH 36200– Programming for Engineers II (PENG II)- 3 credits. This course was developed to build upon TECH 26200, Programming for Engineers I and furthers the instruction of computational problem solving and data manipulation for engineering problem solving.

TECH 26301-Networking Hardware I -4 credits. This course currently exists but been changed from a three credit to a four credit hour course to allow for sufficient time to prepare students for the CCNA I exam.

TECH 36336 - IT SECURITY -3 Credit Hours. This course provides the foundation for understanding the key issues associated with protecting information assets. This course was added to the curriculum because if further supports the mission of the program and prepares students to take the CompTIA's Security+SYO-501 certification exam.

TECH 46300-NETWORK SECURITY - 3 Credit Hours. This course is an introduction to network security with emphasis in identifying, analyzing and preventing various threats and attack patterns on computer networks. Students will gain practical knowledge on network security protocols, firewalls, VPN, intrusion detection and prevention systems. Prepares students for the CCNA Security industry certification.

TECH 46316 Server Administration and Configuration -3 credit hours. This course emphasizes on administering and configuring server operating systems to solve engineering problems. Students are expected to learn MS server management, Active Directory, OUs and server roles by utilizing a variety of on-based and cloud based solutions.

This course has replaced a 3-credit tech elective in the CET curriculum.

The proposed courses in this program were chosen based on the updated program mission, which is- To give students the knowledge of human-computer interaction and software-hardware interface so that they are capable of analyzing the problems in the computer and networking industry and producing subsequent computer engineering, networking, and software solutions. COMT 36320 (COMPUTER FORENSICS) is being replaced by IT Security, TECH 36336, which is a broader course that emphasizes hands-on network tools and topics covered by the COMPTiA Security+ certification such as access control, cryptography, physical security, perimeter defenses, host defenses and application defenses.

COMT 36330 (LOCAL AREA NETWORK SECURITY FUNDAMENTALS) is being replaced by the higher level TECH 46300-Network Security course which not only teaches LAN 1, but also teaches user security and preparation for the CCNA Security certification.

Computer Engineering Technology

COMM 15000 INTRODUCTION TO HUMAN COMMUNICATION (KADL) 3 Credit Hours

An inquiry into the nature and function of human communication in interpersonal, group and public contexts.

Prerequisite: None.

Schedule Type: Lecture

Contact Hours: 3 lecture

ECON 22060 PRINCIPLES OF MICROECONOMICS (KSS) 3 Credit Hours

Course covers principles and policies affecting prices, including factor incomes, under alternative market structures. Students develop tools to examine social problems, including poverty, crime, pollution and international relations.

Prerequisite: Minimum 45 ALEKS math score; or minimum 22 ACT math score; or minimum 530 SAT math score; or one course from MATH 00023 to 49999.

Schedule Type: Lecture

Contact Hours: 3 lecture

ENG 20002 INTRODUCTION TO TECHNICAL WRITING 3 Credit Hours

Introduction to communication practices within technical communities. Planning, drafting, revising and editing. Process descriptions, object descriptions, instructional texts, technical correspondence, problem reports, critical reflection.

Prerequisite: ENG 11011 or HONR 10197.

Schedule Type: Lecture

Contact Hours: 3 lecture

MATH 11022 TRIGONOMETRY (KMCR) 3 Credit Hours

Solution of triangles, trigonometric equations and identities.

Prerequisite: Minimum 67 ALEKS math score; or minimum C grade in MATH 10774 or MATH 10775 or MATH 11010.

Schedule Type: Lecture

Contact Hours: 3 lecture

MATH 11012 INTUITIVE CALCULUS (KMCR) 3 Credit Hours

Designed to give an overview of differential and integral calculus to business and life-science majors. Does not include trigonometric functions. No credit earned toward a degree for this course if the student already earned credit for MATH 12002.

Prerequisite: Minimum 67 ALEKS math score; or minimum C grade in MATH 10774 or MATH 10775 or MATH 11010.

Schedule Type: Lecture

Contact Hours: 3 lecture

MIS 24056 FUNDAMENTALS OF BUSINESS STATISTICS 3 Credit Hours

(Equivalent to BMRT 21004) Introduction to concepts in statistical methods and their applications to real world problems. Examines both the theoretical and practical side of the different methods.

Prerequisite: MATH 11010 or MATH 11012 or MATH 12002.

Schedule Type: Lecture

Contact Hours: 3 lecture

MIS 24163 PRINCIPLES OF MANAGEMENT 3 Credit Hours

(Equivalent to BMRT 11009) Introductory course in management and organizational design. The leading contributions in the area are reviewed and practical implications are developed. The course covers the principles that most management professors have come to expect in an introductory course: planning, organizing, leading, and controlling. In addition, the students need to be aware of critical issues managers must be aware of to succeed: diversity, globalization, ethics, technology, among them. The course serves as an introduction to many upper level business courses.

Prerequisite: minimum sophomore standing.

Schedule Type: Lecture

Contact Hours: 3 lecture

PHY 13001 GENERAL COLLEGE PHYSICS I (KBS) 4 Credit Hours

Principles of mechanics, heat and sound.

Prerequisite: Minimum C grade in MATH 11022 or MATH 12001; or pre/corequisite MATH 12002 or MATH 12012 or MATH 12021.

Corequisite: PHY 13021.

Schedule Type: Lecture, Recitation

Contact Hours: 3 lecture, 1 other

PHY 13002 GENERAL COLLEGE PHYSICS II (KBS) 4 Credit Hours

Principles of electricity and magnetism, optics and modern physics. Three hours lecture and one hour recitation weekly.

Prerequisite: PHY 13001 or PHY 23101.

Corequisite: PHY 13022.

Schedule Type: Lecture, Recitation

Contact Hours: 3 lecture, 1 other

PHY 13021 GENERAL COLLEGE PHYSICS LABORATORY I (KBS) (KLAB) 1 Credit Hour

Introductory lab to accompany PHY 13001 or PHY 13011.

Corequisite: PHY 13001 or PHY 13011.

Schedule Type: Laboratory

Contact Hours: 2 lab

PHY 13022 GENERAL COLLEGE PHYSICS LABORATORY II (KBS) (KLAB) 1 Credit Hour

Introductory lab to accompany PHY 13002 or PHY 13012.

Corequisite: PHY 13002 or PHY 13012.

Schedule Type: Laboratory

Contact Hours: 2 lab

TECH 21021 SURVEY OF ELECTRICITY AND ELECTRONICS 4 Credit Hours

Survey of DC and AC circuits, semiconductors, and electronic devices, including diodes and transistors. Includes laboratory.

Prerequisite: PHY 13002.

Schedule Type: Laboratory, Lecture

Contact Hours: 3 lecture, 2 lab

TECH 23010 COMPUTER HARDWARE I 3 Credit Hours

Introduction to the hardware, architecture and operation of the personal computer and associated devices. Topics include personal computer architecture and operation fundamentals; basic hardware;

data buses and ports; hardware component packaging; auxiliary hardware components; computer assembly; basic hardware installation and configuration; and basic troubleshooting.

Prerequisite: DSCI 26010 or TECH 26010.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 26200 PROGRAMMING FOR ENGINEERING I 3 Credit Hours

Introduction to engineering problem solving and use of programming language to solve those problems is the base of this course. Students with engineering major (including mechatronics, mechanical engineering technology and CET) are expected to develop basic mathematical modeling and engineering problem solving skills using mathematical and conventional computational tools. Developing modeling and logical thinking are the core objective of this course.

Pre/corequisite: Sophomore Status

Schedule Type: LLB

Contact Hours: 2 lecture, 2 Lab

TECH 26301 NETWORKING HARDWARE I 3 Credit Hours

A hands-on, applied engineering-focused course emphasizing the operation, maintenance, and performance aspects of personal computer networking hardware. Topics include networking hardware operation, characteristics, configuration, and troubleshooting fundamentals. Course also includes network standards, protocols, configuration, topologies, and administrative fundamentals as related to networking hardware systems. Note: This course is part of the Networking Hardware course sequence required for students enrolled in the Computer Engineering Technology concentration.

Prerequisite: DSCI 26010 or TECH 21021 or TECH 26010.

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 31000 CULTURAL DYNAMICS OF TECHNOLOGY (DIVD) (WIC) 3 Credit Hours

Study of technology and the forces it exerts upon society.

Prerequisite: ENG 21011.

Schedule Type: Lecture

Contact Hours: 3 lecture

TECH 33222 DIGITAL DESIGN FOR COMPUTER ENGINEERING 3 Credit Hours

Introduction to digital design. The operation and use of digital devices and components as used in microprocessors and digital computers. Topics include binary arithmetic operations, Boolean algebra, logic gates, combinational and sequential logic, buffers, registers, memory devices, counters, latches, timers, comparators, encoders, decoders, multiplexers and demultiplexers.

Prerequisite: TECH 21021.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 33223 ELECTRONIC COMMUNICATION 3 Credit Hours

Principles of digital and analog telecommunications and data signals. Topics include electromagnetic signal time and frequency characteristics, signal propagation, signal modulation, transmission lines, wireless signals, antennas, digital signal characteristics and protocols, signal multiplexing, microwave devices and applications.

Prerequisite: TECH 21021.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 33320 Applied Embedded Systems I

This course builds upon the content of several other applied engineering courses to establish a foundation for students to utilize embedded systems for engineering problem solving. The course will expose the student to the history of the microcontroller that is at the heart of modern embedded systems. Student will learn about the different classes of embedded systems and will form a foundation from which the student can begin to develop solutions to simple real world problems using simple embedded microcontrollers, electronic devices and sensors. Basic coding principals are explained from an engineering problem solving perspective.

TECH 36200 PROGRAMMING FOR ENGINEERING II 3 Credit Hours

Emphasizes engineering problems and applications of programming language and mathematical tools to analyze and solve them. Students with engineering major (including mechatronics, mechanical engineering technology and computer engineering technology) are expected to learn problem solving techniques, modeling, simulation and presentation of engineering application oriented problems using conventional computation and mathematical tools. Advanced modeling, simulations and analysis are the core objectives of this course.

Prerequisite: Junior Status, TECH 26200

Schedule Type: LLB

Contact Hours: 2 Lecture, 2 Lab

TECH 36302 NETWORKING HARDWARE II 3 Credit Hours

Continuation of TECH 26301. In-depth coverage of personal computer-based enterprise networking systems hardware with a focus on network hardware and software configuration, fault analysis, diagnostics, and troubleshooting. Topics include router and switch operation, programming, configuration, and troubleshooting, along with overall enterprise network maintenance, troubleshooting, and repair. Course also includes WAN and VLAN fundamentals, intermediate TCP_IP, and network administration and maintenance as related to fielding and maintaining networking hardware components and systems.

Prerequisite: TECH 26301.

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 36336 IT SECURITY 3 Credit Hours

This course provides the foundation for understanding the key issues associated with protecting information assets. It covers the essential principles for information security and risk management; making it an important stepping stone of an IT security career. This course is supported with case=based security problems in the industry and in-depth simulations to solve these problems. Additionally, it prepares students for CompTIA's Security+SYO-501 certification exam.

Prerequisite: NA

Schedule Type: Lecture

Contact Hours: 3 lecture

TECH 43222 COMPUTER HARDWARE ENGINEERING AND ARCHITECTURE 3 Credit Hours

Internal architecture and operation of digital computers. Topics include computer processor datapaths and control, computer memory datapaths and control, pipelining and parallel processing, memory architecture and management, IO control, system bus architecture and properties, and computer control timing and synchronization.

Prerequisite: DSCI 26010 or TECH 33222.

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 46000 COMPUTER ENGINEERING TECHNOLOGY CAPSTONE (ELR) 3 Credit Hours

The course provides students with an integrative experience, applying aspects of the student's required coursework in computer engineering technology. Students gain experience in developing requirements in engineering specifications for a practical problem in networking and or telecom-related projects. This course will address emerging issues, capabilities and challenges in the current field of study. A minimum C grade TECH 46330 or an approved object-oriented programming language is required for enrollment in the course.

Prerequisite: senior standing.

Corequisite: TECH 36620 and TECH 46350.

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 46300 NETWORK SECURITY 3 Credit Hours

This course is an introduction to network security with emphasis in identifying, analyzing and preventing various threats and attack patterns on computer networks. Students will gain practical knowledge on network security protocols, firewalls, VPN, intrusion detection and prevention systems. Prepares students for industry certification.

Prerequisite: TECH 26301 and TECH 36302

Schedule Type: Laboratory, Lecture, Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

TECH 46316 SERVER ADMINISTRATION AND CONFIGURATION 3 Credit Hours

This course emphasizes on administering and configuring server operating systems to solve engineering problems. Students are expected to learn MS server management, Active Directory, OUs and server roles by utilizing a variety of on-based and cloud based solutions.

Prerequisite: TECH 26301

Schedule Type: Combined Lecture and Lab

Contact Hours: 2 lecture, 2 lab

UC 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE 1 Credit Hour

(Equivalent to UC 10002 or UC 20007) Course assists students in making a successful academic transition to the university through experiential or intellectually engaging discipline-based content. Required of all first year students. Not required of transfer students with 25 or more credit hours.

Prerequisite: none.

Schedule Type: Colloquium

Contact Hours: 1 other

14. What are the requirements students must fulfill to complete the program successfully (including specific courses, course options, and any other requirements)?

Program Requirements: Computer Engineering Technology
Adjust the table to the proposed curriculum, including the Kent Core and general elective requirements.

Major Requirements (courses count in major GPA)			
Course	**Title**		**Credits**
TECH	26010	Introduction to Computer Engineering Technology	3
TECH	21021	Survey of Electricity and Electronics	4
TECH	23010	Computer Hardware I	3
TECH	26301	Networking Hardware I	4
TECH	26200	Programming for Engineers I	3
TECH	36200	Programming for Engineers II	3
TECH	31000	Cultural Dynamics of Technology	3

TECH	36302	Networking Hardware II	3
TECH	33222	Digital Design for Computer Engineering	3
TECH	33223	Electronic Communications	3
TECH	36620	Project Management in Engineering Technology	3
TECH	33320	Applied Embedded Systems I	3
TECH	36336	IT Security	3
TECH	43222	Computer Hardware Engineering and Architecture	3
TECH	46000	Computer Engineering Technology Capstone	3
TECH	46300	Network Security	3
TECH	46312	Wireless Networks and Telecommunications Systems	3
TECH	46316	Server Administration and Configuration	3
TECH	46350	Network Management and Design	3
TECH		CET Elective	3
TECH		TECH Elective-upper division	6
Additional Program Requirements			
US	10097	Destination Kent State: First Year Experience	1
COMM	15000	Introduction to Human Communication	3
MATH	11022	Trigonometry	3
MATH	11012	Intuitive Calculus	3
MIS	24056	Fundamentals of Business Statistics	3
MIS	24163	Principles of Management	3
PHY	13001	General College Physics I	4
PHY	13002	General college physics II	4
PHY	13021	General College Physics Laboratory	1
PHY	13022	General College Physics Laboratory II	1
ENG	20002	Introduction to Technical Writing	3
Kent Core Composition			6
Kent Core Humanities and Fine Arts (minimum one course from each)			9
Kent Core Social Sciences			6
General Electives (total credit hours depends on earning 120 credit hours, including 39 upper-division credit hours			3
			121

Graduation Requirements:
Minimum Major GPA: 2.25
Minimum Overall GPA: 2.00
Additional Graduation Requirements: A minimum C grade must be earned to fulfill the writing-intensive requirement.

Roadmap
Adjust the table to the proposed curriculum, including Kent Core and general electives.

Course Subject and Title	Credit Hours
Semester One: [16 Credit Hours]	
MATH 11022 Trigonometry	3
TECH 26010 Introduction to Computer Engineering Technology	3
US 10097 Destination Kent State: FYE	1
Kent Core Requirement	3
Kent Core Requirement	3
Kent Core Requirement	3
Semester Two: [17 Credit Hours]	
MATH 11012 Intuitive Calculus	3
COMM 15000 Introduction to Human Communication	3
PHY 13001 General College Physics I	4
PHY 13021 General College Physics Laboratory I	1
Kent Core Requirement	6
Semester Three: [14 Credit Hours]	
ENG 20002 Introduction to Technical writing	3
PHY 13002 General College Physics II	4
PHY 13022 General College Physics Laboratory II	1
TECH 23010 Computer Hardware I	3
TECH 26200 Programming for Engineers I	3
Semester Four: [16 Credit Hours]	
TECH 21021 Survey of Electricity and Electronics	4
MIS 24163 Principles of Management	3
TECH 36200 Programming for Engineers II	3
Kent Core Requirement	3
Kent Core Requirement	3
Semester Five: [15 Credit Hours]	
TECH 36620 Project Management in Engineering Technology	3
TECH 33222 Digital Design for Computer Engineering	3
TECH 33223 Electronic Communication	3
General Electives (lower or upper division)	2
TECH 26301 Networking Hardware I	4
Semester Six: [15 Credit Hours]	
TECH 33320 Applied Embedded Systems I	3

TECH 36336 IT security	3
TECH 31000 Cultural Dynamics of Technology	3
TECH 36302 Networking Hardware II	3
MIS 24056 Fundamentals of Business Statistics	3
Semester Seven: [15 Credit Hours]	
TECH 46350 Network Management and Design Technology	3
TECH 46300 Network security	3
TECH 46316 Server Administration and Configuration	3
Technology upper division	3
Technology upper division	3
Semester Eight: [12 Credit Hours]	
TECH 46000 Computer Engineering Technology Capstone	3
TECH 43222 Computer Hardware Eng and Architecture	3
TECH 46312 Wireless Networks and Telecommunications Systems	3
TECH elective (CET course)	3
	120

CET TECH Elective Group (3 credits)-Choose one of the following:

TECH 26310 WEB DESIGN AND DEVELOPMENT
TECH 33020 COMPUTER HARDWARE II
TECH 33095 ADVANCED ANDROID APPS
TECH 43320 APPLIED EMBEDDED SYSTEMS II

15. For programs using prior learning credit, compressed time frames, online delivery, accelerated formats, or other approaches to learning, explain how the institution will ensure that student work and the levels of knowledge and competencies comparable to those required in traditional formats have been achieved.

For Tech Prep -all programs are required to use the Career Field Technical Content Standards documents. Every Career Tech/Tech Prep program in the state follows the same curriculum which was developed by both HS and college faculty and business and industry representatives. Thus, the competencies are the same for all programs in a particular career field state-wide. All students are tested via the same state EOC (End of Course) exams which were developed by HS and college faculty.

Section E. Institutional Staffing, Faculty, and Student Support

16. How many and what types of faculty (full-time or part-time) will be employed in the program? Why is the number and type of faculty sufficient to support the program? How many, if any, new faculty will be hired for the program?

    There are 2 part-time and 7 full-time faculty that support the TECH courses in this program.

17. What will the impact of the new initiative be on faculty workload?

    The program is currently underway as a concentration so there will not be additional workload.

18. Provide a brief attachment that inventories each faculty member employed to teach in the program, including names of existing personnel, a description of each faculty member's academic qualifications, their prior instructional responsibility and other experiences relevant to the courses they will teach in the program in question, each faculty member's course load in the new program, and the course work each teaches in other programs currently offered. (Note: Do not attach full CVs for each faculty member; rather, the requested information should be summarized in one paragraph for each faculty member.)

    Shown below.

19. For graduate programs, document scholarship and research capability of each faculty member; for doctoral programs, document faculty experience in directing student research.

    Not applicable.

20. What library and information resources—general as well as specific to the program(s)—and staffing and services are in place to support the initiative? If the proposed new program is at the graduate level, document discipline-specific refereed journals and primary source materials.

    The Science Librarian, determined that the collection of print and electronic resources were adequate enough to support the program proposed. The Science Librarian works closely with the library representative from the college to determine the need for additional resources as needed, and fulfills direct requests from faculty in need of additional resources. There is an annual budget allocated by the library and administered by the Science Librarian to support the resource needs of the college. In addition, the Science Librarian teaches information literacy classes that focus on the usage of these materials.

Section F. Evaluation

21. Describe the process for monitoring, evaluating and improving the overall effectiveness and quality of the program, and articulate program-level learning outcomes and objectives.

    The goal for this program is to be able to offer students the opportunity to receive such industry credentials as juniper, cisco, dell, etc.

    The program outcomes are as follows:

    1) an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities; (skills, tools)

2) an ability to design a system, component, or process to meet desired needs within realistic constraints.

3) an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes; (cond. tests)

See attached Learning Outcomes pages for additional information

22. Describe the process for assessing and improving student learning, including student persistence and completion, in the new program.

While the traditional means to assess learning are employed with this program, such as quizzes, exams, papers and problem sets, the nature of an engineering technology program lends itself to a natural assessment process. So many of the courses in this program have a lecture and a lab component to them, which provides students the opportunity to learn the material during the lecture and then apply what they have learned during the lab. Labs provide an active way to learn which helps students stay engaged. This along with designing the course material so that students will understand how the material is relevant to them, how it applies to their everyday life and how it improves their chances of getting the job they may someday want, increases persistence.

Another way student learning is assessed is through internships. While this program does not require that every student participate in an internship, they are encouraged to do so. If the student chooses to receive credit for working an internship, he/she is required to journal about his/her experience weekly and write a paper at the end of the semester. This encourages the student to articulate what they have learned. This is a good assessment tool. The employer is also asked to evaluate the student and provide feedback about the student's knowledge and performance. Having a "real-world" experience provides the student with the opportunity to understand why they take the courses that they do, implement what they have learned and determine what they may like to do in the future, which increases persistence.

Md Amiruzzaman, Ph.D.

Assistant Professor

Dr. Amiruzzaman is an Assistant Professor at College of Aeronautics and Engineering. Before accepting the teaching position at Kent State University, he has worked as a computer programmer for almost 10 years for several companies (both nationally and internationally). Also, he has worked as a research assistant at Sejong University, and at Korea University. He completed his Bachelor's degree in Computer Science from National University. He completed his Master's degrees in following fields: computer engineering, computer science, and technology. He completed his Doctorate degree from Kent State University. Prior to Kent State University, he taught at the National University and Korea University.

Dr. Amiruzzaman teaches 15 credits in the applied engineering programs each semester. He will teach the Programming for Engineers I and II courses in the Computer Engineering Technology program.

COMPUTER HARDWARE ENGINEERING AND ARCHITECTURE
VISUAL BASIC PROGRAMMING IN ENGINEERING TECHNOLOGY
REQUIREMENTS ENGINEERING AND ANALYSIS
WEB DATABASE INTEGRATION
PROGRAMMING FOR ENGINEERS I & II
ADVANCED ANDROID APPS

Aminur Chowdhury, Ed.D.

Dr. A. R. Chowdhury is a Professor in Applied Science and Technology Division, in the area of Quality Control/Reliability Engineering and Manufacturing Systems. In his over 30 years of higher education professional career, he has served as the Academic/Faculty Dean at three major universities in USA (i.e. Kent State University, Minnesota State University and Texas Southern University), and as Department Head/Chair at North Carolina A&T State University and Bowling Green State University, Ohio, and coordinator of graduate studies of Industrial Education and Technology at Eastern Kentucky State University in USA. His teaching, scholarship and research interests include; Project Management, Quality Control, Reliability Engineering, Burn-in/Stress Testing for Component/System Reliability, and the Six-Sigma applications in Industrial Productivity/Measurement and Analysis. In addition to his Industrial Management and Manufacturing Systems background, his teaching and research also includes Technology Assessment, Technology Forecasting, Logistics, Value Engineering, Process/production Control, and, Production Planning and Decision Making. He has published and presented extensively in areas of his technical expertise, and technology based higher education curriculum. In recent years, he has integrated STEM (Science, Technology, Engineering and Mathematics) as fundamental concepts into the curriculum of Technology based education programs at Kent State University.

Dr. Chowdhury teaches 12 credit hours per semester in the applied engineering and master of technology programs. He will be teaching cultural dynamics of technology for the computer engineering technology program.

CULTURAL DYNAMICS OF TECHNOLOGY
AUTOMATED MANUFACTURING
APPLIED RELIABILITY ENGINEERING
SIX-SIGMA: TOOLS AND APPLICATIONS FOR TECHNOLOGY MANAGEMENT
QUALITY SYSTEMS AND INDUSTRIAL PRODUCTIVITY

Brian Gardner, Mtec

Professor Gardner has worked in the I.T. industry since 1998, During that time, he has focused on client network integration. With the rapid evolution and industry adoption of wireless systems, Professor Gardner has studied extensively on extending the functionality of wireless network systems beyond the typical client access model. These efforts involve detailed analysis of wireless systems requirements engineering based on environmental factors and client needs with an ultimate goal of enhanced performance over traditional guided media systems. He received his Master of Technology degree in 2013.

Brian Gardner is a full-time faculty member who teaches 15 credit per semester.

DIGITAL DESIGN FOR COMPUTER ENGINEERING
COMPUTER HARDWARE ENGINEERING AND ARCHITECTURE
WIRELESS NETWORK AND TELECOMMUNICATION SYSTEMS
ELECTRONIC COMMUNICATION
COMPUTER ENGINEERING TECHNOLOGY CAPSTONE
ADVANCED WIRELESS TELECOMMUNICATION SYSTEM AND NETWORK TECHNOLOGIES
APPLIED ENBEDDED SYSTEMS I&II

Evren Koptur, Ph.D.

Dr. Koptur is an Assistant Professor. His internship experience includes:

IT Support and Technical Service where he developed and tested new financial reporting system using Visual Basic, built local area networks, developed and tested the new inventory management system using SQL, provided object-oriented design, programming and implementation support to the customer billing system, written in C++, prepared test plans and data, and user documentation for customer billing system. Dr. Koptur earned an undergraduate degree in 2003 in Computer Engineering at the University of Bahcesehir, Istanbul, Turkey, Master’s in 2005 in Technology at Kent State University, and Ph.D. in Instructional Technology at College of Education, Kent State

Dr. Koptur teaches 15 credits each semester and will teach introduction to computer engineering technology for the mechanical engineering technology program. The other courses he teaches supports the computer engineering technology program and the master of technology program.

INFORMATION TECHNOLOGY
INTRODUCTION TO COMPUTER ENGINEERING TECHNOLOGY
COMPUTER HARDWARE I
COMPUTER HARDWARE II
IT SECURITY
SERVER ADMINISTRATION AND CONFIGURATION
NETWORK MANAGEMENT AND DESIGN

Sarath Kunda, MS

Mr. Kunda Graduated from JNTU Hyderabad with Bachelors in Technology with Electronics and Communications Engineering as his major. He graduated from Kent State University with a Masters of Digital Science degree in Telecommunications and Computer Networks. He has been working with the College of Aeronautics and Engineering since 2016. His areas of expertise include Telecommunications, Computer Networking, Cisco Technologies, Juniper Networks, Embedded systems.

Certifications:

CCNA, CCNA security, JNCIA

Intro to Telecommunications, Networking Hardware I, Networking Hardware II, Network Management and Design Technologies, Advanced Networking, Advanced Wireless Technologies, Juniper Networks- JNCIA, and Network Security. "

Chuck Ivan, MBA

Mr. Ivan has his Bachelor of Science in Electrical Engineering from Youngstown State and his MBA from the University of Akron. He is a certified quality auditor by the American Society of Quality (ASQ) and a RAB certified in quality management. He is a member of the American Society of Quality. He has worked as a chief engineer for The Superior Technology Company, a manager of assembly with the Vistar/King Company, a technical support manager with Diebold, an electrical assembly manager for The Meta Fab Company and the Director of TQM/QA for the Will Burt Company. He also has extensive experience as an ISO 9000 Management Representative.

Mr. Ivan is a part-time faculty member and will be teaching Quality Techniques for the mechatronics engineering technology program.

QUALITY TECHNIQUES

PROJECT MANAGEMENT IN ENGINEERING AND TECHNOLOGY
INTRODUCTION TO LEAN SIX SIGMA

Nuttapong Phantkankum, ME

Master of Technology in Computer and Electronics technology: Kent State University - 2015, Master of Engineering in Mechanical Engineering: Chiang Mai University, Chiang Mai, Thailand - 2008; Bachelor of Engineering in Electronics Engineering: King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand - 2004; Mr. Nuttapong Phantkankum has been a part time instructor at Kent State University since 2016.

Mr. Phantkankum is a part-time faculty member and usually teaches 9 credit per semester. He will teach engineering graphics I and the lab portion of the survey of electricity and electronics course for the mechanical engineering technology program.

ENGINEERING GRAPHICS I
SURVEY OF ELECTRICITY AND ELECTRONICS

Jackie Ruller, MS

Jackie Ruller graduated from Alfred University with a Bachelor of Science degree in Ceramic Engineering and a Master of Science degree in Glass Science. Ms. Ruller has had a very diverse, technical career with experience in hands-on research, university interface and marketing, project management and intellectual property. She is a co-author on over 15 publications, including a patent. She is currently the interim Director of Applied Engineering at Kent State University in the College of Aeronautics and Engineering. During her time at Kent State, she has implemented an internship program for the college and developed a co-op course that allows students to leave for a semester to work full time in their field of study while maintaining full time student status. The course is now offered to all students at Kent State University. She has worked to secure grants from the state of Ohio for internship development and infrastructure as well as capital equipment for the engineering programs in the college. Providing quality programs to students and increasing industry partnerships are her top priorities. She teaches the first year experience course for all of the applied engineering students in the college so that she is familiar with the new students in the program.

UC - 10097 DESTINATION KENT STATE: FIRST YEAR EXPERIENCE

Mike Testa, MBA, MSM

Mr. Testa earned an M.B.A. from Youngstown State University (1994) in general business and an M.S.M. from The University of Akron (1997) in information systems. He has over 25 years of experience working in the technology field with experiences as a business professional and instructor. In the private sector and in higher education, Mike has held technical and management level positions, including leading IT departments as the Director of IT and Director

of Infrastructure. Mike has planned, designed, and implemented many complex projects using a wide variety of software and hardware technologies. Areas of expertise and experience include:

Networking
802.11a/b/g/n/ac wireless networking
server virtualization
data center design and renovation
project management
department and project based budgeting
management of personnel

Mr. Testa is active in educating students, customers, and peers in technical and business subjects. In the classroom, Mike has taught various subjects including computer networking, wireless networking, network security, virtualization, computer hardware, operating systems, office applications, accounting, payroll, and management.

Mr. Tesa is a Cisco Network Academy Instructor (CCAI) for CCNA Routing & Switching and CCNA Security. Industry certifications held are Cisco CCNA Routing and Switching; Juniper JNCIA-Junos; Cisco CCDA (past); and Microsoft MCSE (past).

Mr. Testa is a full-time professor who teaches 15 credits per semester. The courses he teaches support the computer engineering technology program and the masters of technology.

INTRODUCTION TO COMPUTER ENGINEERING TECHNOLOGY
NETWORK MANAGEMENT AND DESIGN
COMPUTER HARDWARE I, II
ADVANCED WIRELESS TELECOMMUNICATION SYSTEM AND NETWORK TECHNOLOGIES
ADVANCED NETWORKING
NETWORK SECURITY

Roberto Uribe, Ph.D.

Roberto Uribe, Ph.D., is a professor whose research interests are in the areas of radiation effects in materials as well as in radiation measurements and standards specifically in the development of techniques used to measure the energy absorbed by materials during electron beam irradiations. Work related to this area comprises experiments in the NEO Beam facility for several research institutions as well as private companies interested in studying the effects of radiation in semiconductor and solar cell materials for space applications as well as in food and polymeric materials.

Dr. Uribe is a full-time faculty member who will teach survey of electricity and electronics for the computer engineering technology program. The other courses he teaches support the master of technology program and the proposed mechatronics engineering program.

SURVEY OF ELECTRICITY AND ELECTRONICS

FUNDAMENTALS OF CIRCUIT ANALYSIS
ELECTONIC DEVICES
ELECTRIC MACHINERY
RADIATION DOSIMETRY AND SAFETY
DESIGN AND ANALYSIS OF EXPERIMENTS IN TECHNOLOGY

Kent State University

Fiscal Impact Statement

Enrollment Increase Associated with Change from Computer Engineering Concentration to Computer Engineering Technology Major

	Year 1	Year 2	Year 3	Year 4
I. Projected Enrollment				
Headcount full-time	4	10	18	29
Headcount part-time	1	4	6	9
Full-time equivalent (FTE) enrollment	5	13	23	36
II. Projected Program Income				
Tuition (total for KSU)	$ 28,850	$ 89,004	$ 167,464	$ 273,378
Expected state subsidy (total for KSU)	$ 9,107	$ 28,096	$ 52,864	$ 86,298
Externally funded stipends, as applicable	$ -	$ -	$ -	$ -
Other Income	$ -	$ -	$ -	$ -
Total Projected Program Income	**$ 37,957**	**$ 117,099**	**$ 220,328**	**$ 359,677**
III. Program Expenses				
New personnel:				
- Instruction				
Full-time: 0 (but may share new full time under Mechatronics Engineering)				
Part-time: 0				
-Non-instruction				
Full-time: 0				
Part-time: 0				
Current personnel:				
- Instruction				
Full-time: Part of 1 to 13*	$ 798	$ 5,028	$ 11,733	$ 26,891
Part-time: Part of 1 to 3*	$ -	$ 530	$ 1,967	$ 2,859
-Non-instruction				
Full-time: 0		$ -	$ -	$ -
Part-time: 0	$ -	$ -	$ -	$ -
Benefits for all personnel	$ 300	$ 1,970	$ 4,707	$ 10,540
New facilities/building/space renovation (describe in narrative below)	$ -	$ -	$ -	$ -
Scholarship/stipend support	$ -	$ -	$ -	$ -
Additional library resources	$ 100	$ 200	$ 300	$ 400
Additonal technology or equipment needs	$ 2,000	$ 4,000	$ 6,000	$ 8,000
Other expenses (see below)	$ 35,445	$ 97,073	$ 168,290	$ 258,490
Total Projected Program Expenses	**$ 38,643**	**$ 108,802**	**$ 192,996**	**$ 307,179**
Projected Program Net	**$ (686)**	**$ 8,298**	**$ 27,331**	**$ 52,498**

Other Expenses				
Allocation of expenses covered by general fee	$ -	$ -	$ -	$ -
RCM overhead - estimated at 50%	$ 5,866	$ 24,714	$ 58,496	$ 110,060
RCM tuition+SSI allocation to other colleges (pays expenses of other colleges)	$ 26,225	$ 67,671	$ 103,336	$ 139,557
Professional development	$ 104	$ 688	$ 1,708	$ 3,373
Supplies (office, computer software, duplication, printing)	$ 500	$ 1,000	$ 1,500	$ 2,000
Telephone, network, and lines	$ 250	$ 500	$ 750	$ 1,000
Other info and communication pool	$ 2,500	$ 2,500	$ 2,500	$ 2,500
Total Other Expenses	**$ 35,445**	**$ 97,073**	**$ 168,290**	**$ 258,490**

BUDGET NARRATIVE:

[This section is for describing facilities, scholarship/stipend support, library resources, additional technology, etc., if applicable.]

This program is built around existing courses, so it will use existing facilities, library resources, equipment and technology with minor upgrades that are shared with existing programs.

The technology and equipment line is for consumables in the lab courses in this case.

A minor amount of marketing and promotion of this program are included under Other info and communications pool.

Allowances are provided for professional development, supplies, and telephone, network and lines.

Since this is a change from a concentration to a major, no targeted scholarship funds are included.

This evaluation considers the enrollment increase in an existing program only. So it will not have a substantial impact on the University's or College's net income. However, it will make contributions to the RCM overhead and funds flowing to other Colleges, which will also contribute to the RCM overhead (in year 4 the total contribution to RCM overhead will be approximately $180k).

* Faculty counts - Refer to Cost Calc by Course, and to Assumption 10.

ADDENDUM TO HIGHER LEARNING COMMISSION SUBSTANTIVE CHANGE APPLICATION TO ESTABLISH A NEW UNDERGRADUATE DEGREE PROGRAM

Proposed Major: Computer Engineering Technology

Proposed Degree: Bachelor of Science

Administrating College: College of Aeronautics and Engineering

Administrating Department: Applied Engineering

Provide the title of the lead administrator for the proposed program and a brief description of the individual's duties and responsibilities.

Kent State's College of Aeronautics and Engineering, functions as one organizational unit with two separate and distinct program areas (aeronautics and engineering); each program area is led by a program director. The proposed Computer Engineering Technology degree program will reside in the engineering program area under the leadership of Jackie Ruller, interim Director. She is responsible for the administrative duties of the engineering programs such as course scheduling.

Indicate whether any institutions of higher education offer the proposed program within a 30-mile radius of the campus(es) at which the proposed program will be offered. If so, list the institutions that offer the proposed program and provide a rationale for offering an additional program at this campus.

There are no BS in Computer Engineering TECHNOLOGY programs within 30 miles.

CATALOG COPY

Description of Program:
Describe the program as you would to a prospective student.

The curriculum for the computer engineering technology major is designed to give graduates the human-computer interaction and software-hardware interface so that they are capable of analyzing the problems in the computer and networking industry and producing computer engineering, networking, and software solutions.

Fully Offered At:
List all campuses/locations and methods (e.g., online, accelerated) for which a student can fully complete the program.

A student may fully complete this program at the Kent State University, Kent campus.

Accreditation:
List specialized or professional accreditor for the program if applicable.

The computer engineering technology concentration is currently accredited by ATMAE.

Admission Requirements:
If program does <u>not</u> have additional admission criteria above and beyond the minimum to be admitted to a Kent State associate or bachelor's degree, write "standard admission criteria for the degree." If program has additional admission criteria (e.g., audition, 3.0 high school GPA, 2.75 overall GPA for transfer students), list those requirements.

Standard admission criteria for the degree.

Program Learning Outcomes:
List the specific knowledge and skills directly related to the program's discipline that you expect students to acquire as part of their educational experience in the program. The outcomes must be observable and measureable, rather than what students "know," "think," "understand, "appreciate," etc.

Student Learning Outcome 1: an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities; (skills, tools)

Student Learning Outcome 2: an ability to design a system, component, or process to meet desired needs within realistic constraints.

Student Learning Outcome 3: an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes; (cond. tests)

Program Requirements:
Adjust the table to the proposed curriculum, including the Kent Core and general elective requirements.

Major Requirements (courses count in major GPA)			
Course	**Title**		**Credits**
TECH	26010	Introduction to Computer Engineering Technology	3
TECH	21021	Survey of Electricity and Electronics	4
TECH	23010	Computer Hardware I	3
TECH	26301	Networking Hardware I	4
TECH	26200	Programming for Engineers I	3
TECH	36200	Programming for Engineers II	3
TECH	31000	Cultural Dynamics of Technology	3
TECH	36302	Networking Hardware II	3
TECH	33222	Digital Design for Computer Engineering	3
TECH	33223	Electronic Communications	3
TECH	36620	Project Management in Engineering Technology	3
TECH	33320	Applied Embedded Systems I	3
TECH	36336	IT Security	3
TECH	43222	Computer Hardware Engineering and Architecture	3
TECH	46000	Computer Engineering Technology Capstone	3
TECH	46300	Network Security	3
TECH	46312	Wireless Networks and Telecommunications Systems	3
TECH	46316	Server Administration and Configuration	3
TECH	46350	Network Management and Design	3
TECH		CET Elective	3
TECH		TECH Elective-upper division	6
Additional Program Requirements			
US	10097	Destination Kent State: First Year Experience	1
COMM	15000	Introduction to Human Communication	3
MATH	11022	Trigonometry	3

MATH	11012	Intuitive Calculus	3
MIS	24056	Fundamentals of Business Statistics	3
MIS	24163	Principles of Management	3
PHY	13001	General College Physics I	4
PHY	13002	General college physics II	4
PHY	13021	General College Physics Laboratory	1
PHY	13022	General College Physics Laboratory II	1
ENG	20002	Introduction to Technical Writing	3
Kent Core Composition			6
Kent Core Humanities and Fine Arts (minimum one course from each)			9
Kent Core Social Sciences			6
General Electives (total credit hours depends on earning 120 credit hours, including 39 upper-division credit hours			2
			120

Graduation Requirements:
Minimum Major GPA: 2.25
Minimum Overall GPA: 2.00
Additional Graduation Requirements: A minimum C grade must be earned to fulfill the writing-intensive requirement.

Roadmap
Adjust the table to the proposed curriculum, including Kent Core and general electives.

Course Subject and Title		**Credit Hours**
Semester One: [16 Credit Hours]		
MATH 11022	Trigonometry	3
TECH 26010	Introduction to Computer Engineering Technology	3
US 10097	Destination Kent State: FYE	1
Kent Core Requirement		3
Kent Core Requirement		3
Kent Core Requirement		3
Semester Two: [17 Credit Hours]		
MATH 11012	Intuitive Calculus	3
COMM 15000	Introduction to Human Communication	3
PHY 13001	General College Physics I	4
PHY 13021	General College Physics Laboratory I	1
Kent Core Requirement		6

Semester Three: [14 Credit Hours]		
ENG 20002	Introduction to Technical writing	3
PHY 13002	General College Physics II	4
PHY 13022	General College Physics Laboratory II	1
TECH 23010	Computer Hardware I	3
TECH 26200	Programming for Engineers I	3
Semester Four: [16 Credit Hours]		
TECH 21021	Survey of Electricity and Electronics	4
MIS 24163	Principles of Management	3
TECH 36200	Programming for Engineers II	3
Kent Core Requirement		3
Kent Core Requirement		3
Semester Five: [15 Credit Hours]		
TECH 36620	Project Management in Engineering Technology	3
TECH 33222	Digital Design for Computer Engineering	3
TECH 33223	Electronic Communication	3
General Electives (lower or upper division)		2
TECH 26301	Networking Hardware I	4
Semester Six: [15 Credit Hours]		
TECH 33320	Applied Embedded Systems I	3
TECH 36336	IT security	3
TECH 31000	Cultural Dynamics of Technology	3
TECH 36302	Networking Hardware II	3
MIS 24056	Fundamentals of Business Statistics	3
Semester Seven: [15 Credit Hours]		
TECH 46350	Network Management and Design Technology	3
TECH 46300	Network security	3
TECH 46316	Server Administration and Configuration	3
Technology upper division		3
Technology upper division		3
Semester Eight: [12 Credit Hours]		
TECH 46000	Computer Engineering Technology Capstone	3
TECH 43222	Computer Hardware Eng and Architecture	3

TECH 46312	Wireless Networks and Telecommunications Systems	3
TECH	elective (CET course)	3
		120

CET TECH Elective Group (3 credits)-Choose one of the following:
TECH 26310 WEB DESIGN AND DEVELOPMENT
TECH 33020 COMPUTER HARDWARE II
TECH 33095 ADVANCED ANDROID APPS
TECH 43320 APPLIED EMBEDDED SYSTEMS II

Cisco Networking Academy®

Mind Wide Open™

December 14, 2017

J Robert G. Sines, Jr.
Interim Dean
College of Aeronautics and Engineering
1400 Lefton Esplanade
Kent, Ohio 44240

Dear Dean Sines:

I am writing this letter on behalf of Cisco Systems, Inc. to express our support for the engineering programs in the College of Aeronautics and Engineering (CAE) at Kent State University.

It is my understanding that CAE would like to move their computer engineering technology program under your Bachelor of Science in Applied Engineering program, to its own major. As a major, this program would be more visible to your students and there would be more flexibility in the offering of the curriculum.

From my experience managing the Cisco Networkoing Acdemy program for over fifteen years, having graduates with the in demand skills and certifications that the computer engineering program would provides is invaluable in the IT industry specifically to our Cisco channel partners, distributors and generic customers.

The mission of the Cisco Networking Academy program is to provide quality educational curriculum designed to meet the current and future needs of the Information Technology (IT) industry and then connect post secondary students with career opportunities via our Talent Bridge proram.

As a global leader in corporate citizenship, Cisco supports programs that improve access to quality education and promotes economic empowerment in communities around the globe. As you may know, the Cisco Networking Academy program is the largest and longest running private-public partnership program at Cisco.

We license at no cost, a comprehensive set of IT curricula that enables students to develop valuable information and communication technology skills and, in turn, enables increased access to career opportunities in our global economy.

The Cisco Networking Academy program has over one million active students and is present in more than 170 countries around the world, with 20,000 instructors and 9,600 academies. Since program inception, it has served 6.9 million students globally. In the United States, there are over 3,000 instructors and nearly 120,000 students in more than 1,700 academies located in high schools, colleges and universities. We continue to look for ways to ensure that a diverse student population understands the opportunity for career pathways in Science, Technology, Engineering and Math.

We hope that Kent State's participation will strengthen America's talent pipeline, providing students with education that combines rigorous academic and career-focused curriculum to increase their employability in in-demand industries and prepare them for employment opportunities.

I fully support the goal of Kent State and look forward to your success.

Sincerely,

Marie Zwickert

Marie Zwickert, M.Ed.
Business Development Manager,
Cisco Systems, Inc.