REQUEST FOR APPROVAL

SUBMITTED BY:

Wright State University

B.S. in Electrical & Computer Engineering Technology

REQUEST

Date of submission:

Name of institution: Wright State University

Degree/degree program title: B.S. in Electrical & Computer Engineering Technology

Primary institutional contact for the request

Name: Brian Rigling
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Delivery sites:
Wright State University (Dayton campus) – 3640 Colonel Glenn Hwy, Dayton, OH 45345

Date that the request was approved by the institution's governing board (e.g. Board of Trustees, Board of Directors):

Proposed start date: Fall 2017

Institution's programs: *(e.g., associate, bachelor's, master's, doctorate)*
Associate, Bachelor's, Master's, Doctorate

Educator Preparation Programs:
Indicate the program request leads to educator preparation licenses or endorsements.

Licensure ***No***

Endorsement ***No***

SECTION 1: INTRODUCTION

1.1 *Provide a brief summary of the request that will serve as an introduction for the reviewers.*
To better serve existing and arriving industries in the Dayton area, there is an increasing need for students trained in electrical engineering, computer engineering, and software development, without necessarily possessing the programmatic breadth or mathematical depth of a typical engineering degree. There is also a demand among the local student population for a less-mathematically rigorous technical 4-year degree. Currently, such degrees are only available locally at the University of Dayton, a private school with much higher costs and more selective admission standards than Wright State University. To meet this market need Wright State University proposes to establish a B.S. in Electrical & Computer Engineering Technology (BSECET).

SECTION 2: ACCREDITATION

2.1 Regional accreditation

- *Original date of accreditation:* **07/26/1968**
- *Date of last review:* **2015-2016**
- *Date of next review:* **2025-2026**

2.2 Results of the last accreditation review

- Action with Interim Monitoring. IAC continued the accreditation of Wright State University with the next Reaffirmation of Accreditation in 2025-26. In conjunction with this action, IAC required the following interim monitoring.
    - Interim Report. An interim report due 6/30/17 on integrity in all operations, including auxiliary functions and development of a compliance program and establishment of a contracting organization. Institution must report findings/agreements of the ongoing Federal investigation as they emerge.
    - Interim Report. An interim report due 6/30/17 on documenting a credit hour policy that addresses all instructional modalities.

2.3 Notification of appropriate agencies

- Once the program has produced its first graduate, we will be eligible to request an evaluation for accreditation by the Engineering Technology Accreditation Commission (ETAC) of Accreditation Board for Engineering & Technology (ABET).

SECTION 3: LEADERSHIP—INSTITUTION

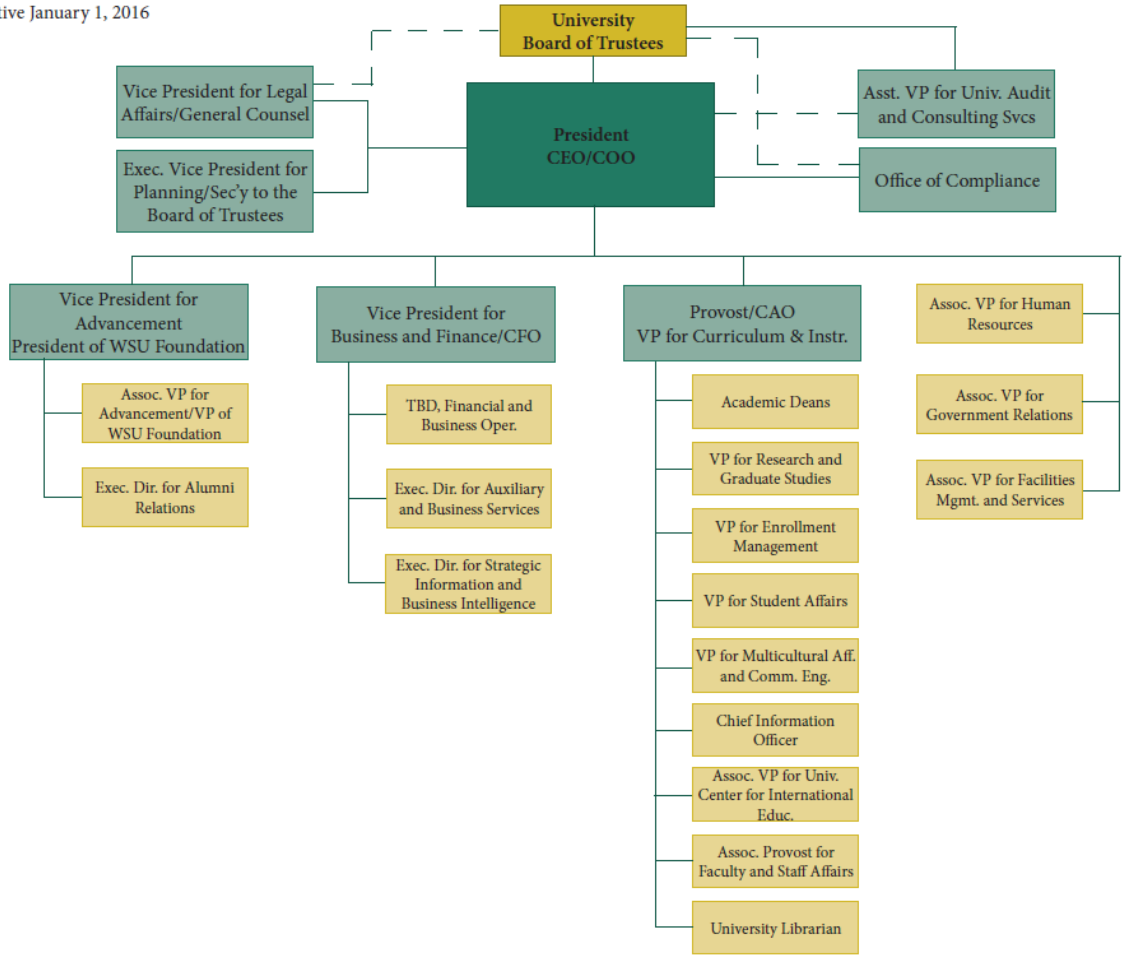
3.1 Mission statement

We transform the lives of our students and the communities we serve. We will:

- build a solid foundation for student success at all levels through high-quality, innovative programs;
- conduct scholarly research and creative endeavors that impact quality of life;
- engage in meaningful community service;
- drive the economic revitalization of our region and our state and empower all of our students, faculty, staff, and alumni to develop professionally, intellectually, and personally.

3.2 Organizational structure

Effective January 1, 2016



SECTION 4: ACADEMIC LEADERSHIP—PROGRAM

4.1 Organizational structure

- The proposed BSECET program will be housed within the Department of Electrical Engineering in the College of Engineering & Computer Science. The department, comprised of 20 faculty and 6 staff, is led by a department chair who reports to the college dean, who then reports to the university provost.

- Dr. Brian Rigling is professor and department chair for electrical engineering. His responsibilities are primary administrative oversight for the department's teaching, research, and service activities, including the management of department faculty and staff.

- The Department of Electrical Engineering Undergraduate Studies Committee developed and will maintain this program. The committee is presently led by Prof. Marty Emmert, who was elected by the committee faculty to serve as Director of Undergraduate Studies, which includes representing the department on the college curriculum committee. The Undergraduate Studies Committee typically meets 1-2 times per month during the academic year. Appointments to this committee are determined by the department chair, with faculty input, at the start of each academic year.

4.2 Program development

- The BSECET program primarily aligns with the first and fourth bullets of the university mission, which speak to student success and economic revitalization of the region, respectively. By seeking to graduate students that are prepared for employment in technical positions, we are striving for the career success of our students. Consistent with the university mission, we must maintain an innovative program. The field of electrical & computer engineering technology is changing continuously, and we must adapt as educators to keep up with it. Moreover, as the value of engineering degrees becomes increasingly apparent, the competitive market for engineering education also becomes more crowded, further driving our need for innovation. The economic revitalization of the region is being driven by a transition of traditional manufacturing jobs to a greater emphasis on high technology, a transformation in which the BSECET program can play a substantial role.

- The department conducted a brief needs assessment by surveying job postings in the Dayton area on a number of web sites. A variety of search criteria were used to intersect various job titles that would overlap with the skill set of proposed BSECET graduates. The results of these searches, by the number of search hits, is summarized in the table below.

Search Criteria	**engineeringjobs.com**	**monster.com**	**careerbuilder.com**	**indeed.com**
Application Engineer	-	1000+	68	410
Computer Systems Analyst	-	38	40	143

Controls Engineer	-	221	74	327
Electrical Engineering Technician	-	39	16	43
Electronics Engineer	17	21	23	153
Electronics Technician	-	95	9	165
Engineering Technician	-	328	30	123
Field Service Engineer	-	458	45	176
Field Test Engineer	-	28	24	136
Integration Engineer	-	133	29	216
Manufacturing Technician	-	390	42	225
Network Engineer	26	68	53	147
Sales Engineer	-	29	44	110
Software Engineer	360	1000+	75	488
Systems Engineer	213	417	124	682

- The Department of Electrical Engineering discussed the proposed program with its External Advisory Board, which consists of 15 representatives from local industry, on 12 August 2016, and with its Alumni Council, which consists of 17 alumni that have graduated from department programs over the past 15 years. Both groups provided helpful insight into potential value of such a degree and the content and structure necessary for it to be successful. They were overall supportive of this endeavor.

- The program was developed to be consistent with the accreditation requirements of the Engineering Technology Accreditation Commission of ABET. Accreditation cannot be sought until the program produces its first alumni. Assuming a program start of Fall 2017, we would tentatively expect to have our first graduate in Spring 2021. In which case, we would seek an initial accreditation visit during the 2021-2022 academic year.

4.3 Collaboration with other Ohio institutions

- There are no USO institutions within a 30-mile radius that offer the proposed program.

- This program was developed by Wright State University. We will seek to establish articulation agreements with community colleges, and some initial discussions to that effect have taken place.

SECTION 5: STUDENT SERVICES

5.1 Admissions policies and procedures

- Domestic high school students will be granted admission to Wright State University upon fulfilling one of the following options.
  - Option 1
    - Complete the Ohio Core curriculum (or equivalent curriculum),
    - Achieve a minimum cumulative high school grade point average of 2.0, and
    - Achieve an ACT composite score of 15 or SAT score of 740 (combined critical reading and math)
  - Option 2
    - Complete the Ohio Core curriculum (or equivalent curriculum),,
    - Achieve a minimum cumulative high school grade point average of 2.5, and
    - Submit any ACT/SAT score

  To be admitted to the BSECET major, students must complete 24 or more semester hours of college-level coursework with a 2.25 GPA or higher, must complete ENG 1100 (or any WSU Core First-Year Writing Course) with a C or higher, and must satisfy the admission requirements for the BSECET, which includes earning a C or higher in CEG 2170, (PHY 1110/L or PHY 2400/L), and (MTH 2240 or MTH 2300).

- Transfer credit is first evaluated by the University Registrar, and as appropriate is posted to the student's transcript. Posted courses are then evaluated as needed by the Undergraduate Studies Committee to determine applicability to a student's program of study. For a BS degree, a minimum of 30 semester hours must be earned at Wright State University. Credit can also be granted via College Credit Plus and Prior Learning Assessment. Prior learning assessment is a student-centered and faculty-driven process for awarding students college credit for demonstrated knowledge that was adopted in 2015. Credit may be awarded through three mechanisms: standardized exams, internally administered exams, and portfolio assessment. Standardized exams include the following.
  - Advanced Placement (AP) examinations
  - College Level Examination Program (CLEP)
  - DANTES Subject Standardized Tests (DSST)
  - Excelsior Collee Credit by Examinations (ECE)
  - International Baccalaureate (IB) examinations

  Course equivalencies for the standardized tests are determined by academic unit that offers the course, subject to Ohio Board of Regents requirements. Courses available for credit by standard examination, along with the required score to earn credit, are listed on the Prior Learning Assessment web site.

5.2 Student administrative services

- The current student administrative services (e.g., admissions, financial aid, registrar, etc.) are adequate to support the proposed program. We do not anticipate a need for additional student administrative services.

5.3 Student academic services

- The Department of Electrical Engineering and College of Engineering & Computer Science is already staffed with full-time academic advisors that are adequate to support the program. The

college and university also provide centers for student career services. The Office of Disability Services provides excellent support for students with additional needs. Tutoring and other services geared towards student success are available through department, college, and university resources. We do not anticipate a need for additional student academic services.

SECTION 6: CURRICULUM

6.1 Introduction

- The B.S. in Electrical & Computer Engineering Technology prepares students for real-world problem solving and design of electronic, computer, and software systems through a comprehensive curriculum of modern electrical & computer engineering design skills. Electrical & Computer Engineering Technologists are in increasing demand across all fields of engineering: automotive, aerospace, defense, material handling, manufacturing, medical devices, etc.

6.2 Program goals and objectives

- The goal of the program is to train students in modern electrical & computer engineering design skills, with the objective of post-graduation employment in a related field. This will be achieved through attainment of the following student outcomes, as specified by the ABET Engineering Technology Accreditation Commission. Each of these outcomes is addressed in one or curricular requirements of the program.
  (a) an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities
  (b) an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies
  (c) an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes
  (d) an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives
  (e) an ability to function effectively as a member or leader on a technical team
  (f) an ability to identify, analyze, and solve broadly-defined engineering technology problems
  (g) an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature
  (h) an understanding of the need for and an ability to engage in self-directed continuing professional development
  (i) an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity
  (j) a knowledge of the impact of engineering technology solutions in a societal and global context
  (k) a commitment to quality, timeliness, and continuous improvement

6.3 Course offerings/descriptions

Course (name/number)	CH	Major	Gen Ed	Elec	OTM, TAG Or CT[2] equivalent course	New/ Existing Course
ENG 1100 Academic Writing	*3*		*X*		*X*	*Existing*

EGR 3350 Technical Communications for Engineers and Computer Scientists - OR – ENG 2140 Research, Technical Writing and Presentation for Scientists and Engineers	*3*		*X*		*X*	*Existing*
MTH 2300 Calculus I - OR – MTH 2240 Applied Calculus	*4*		*X*		*X*	*Existing*
Global Traditions Courses (2)	*6*		*X*		*X*	*Existing*
Arts/Humanities Course	*3*		*X*		*X*	*Existing*
Social Science Courses (2)	*6*		*X*		*X*	*Existing*
PHY 2400/L General Physics I - OR – PHY 1110/L Principles of Physics I	*5*		*X*		*X*	*Existing*
PHY 2400/L General Physics II - OR – PHY 1110/L Principles of Physics II	*5*		*X*		*X*	*Existing*
Additional core courses (2)	*6*		*X*		*X*	*Existing*
EE 1000 Introduction to Electrical Engineering	*1*	*X*				*Existing*
EE 2000/L Digital Design with HDL	*4*	*X*				*Existing*
EE 2010/L Circuit Analysis I	*4*	*X*				*Existing*
EE 2020/L Introduction to Mechatronics	*4*	*X*				*New*
EE 3310/L Electronic Devices & Circuits	*4*	*X*				*Existing*
EE 3510 Continuous & Discrete Linear Systems	*3*	*X*				*New*
EE 3520/L Feedback & Digital Control Systems	*4*	*X*				*New*
EE 4120/L Industrial Control & Automation	*4*	*X*				*Existing*
EE 4620/L Digital & Integrated Circuit Design with PLDs & FPGAs	*4*	*X*				*Existing*
EE 4910 Electrical Engineering Senior Design Project I	*3*	*X*				*Existing*
EE 4920 Electrical Engineering Senior Design Project II	*3*	*X*				*Existing*
CEG 2170/L Introduction to C Programming for Scientists & Engineers	*4*	*X*				*Existing*
CEG 2171/L C++ Programming for Scientists & Engineers	*4*	*X*				*Existing*
CEG 2350/L Operating System Concepts and Usage	*4*	*X*				*Existing*
CEG 3310/L Computer Organization	*4*	*X*				*Existing*
CS 2200 Discrete Structures and Their Algorithms	*4*	*X*				*Existing*
CS 3100 Data Structures and Algorithms	*3*	*X*				*Existing*
Electives	*18*			*X*		*Existing*

ENG 1100 – Academic Writing and Reading

Introduces students to principles of effective written communication and critical reading. Stresses invention, drafting, revising, editing, and self-assessment, along with effective critiquing and collaborating. Students may use any of the following courses to satisfy the requirements of the Core, but only one may count: ENG 1100, ENG 1110, ENG 1130, or ENG 1140.

EGR 3350 – Technical Communications for Engineers and Computer Scientists
A modular approach to oral and written communication of complex technical information to an expert audience. Includes describing technical mechanisms and processes; designing and using tables, graphs, charts, and figures; producing technical proposals, progress reports, feasibility reports, and formal reports; and doing technical briefings.

ENG 2140 – Research, Technical Writing and Presentation for Scientists and Engineers
Adapts principles introduced in ENG 1100 and equivalents to writing for professional audiences in engineering and computer science and lay readers. Stresses argument, research, and effective use of source materials.

MTH 2300 – Calculus I
Examines limits, the derivative, differentiation, applications of the derivative, antiderivatives, Riemann sums, the definite integral, and the fundamental theorem of calculus.

MTH 2240 – Applied Calculus
Functions (including exponential and logarithmic functions), limits, derivatives and rates of change, applications of derivatives including graphing and optimization, and indefinite and definite integrals with applications. Credit will not be given for MTH 2240 for students who have already successfully completed MTH 2300.

PHY 2400/L – General Physics I
Introductory survey of mechanics for science and engineering students. Uses of interpreting physical phenomena. Topics include vectors, kinematics, dynamics, energy, momentum, rotation, oscillation and thermodynamics.

PHY 1110/L – Principles of Physics I
Fundamental physics of mechanics. Topics include laws of motion, work and energy, momentum, circular and rotational motion, gravity, fluids, mechanical waves and thermodynamics.

PHY 2410/L – General Physics II
Introductory survey of electricity and magnetism. Uses calculus in interpreting physical phenomena. Topics include electric field and potential, currents, DC circuits, magnetic fields, Faraday's law, and optics.

PHY 1120/L – Principles of Physics II
Fundamentals of charge, electric field, magnetism, optics and modern physics. Topics include electric and magnetic fields, electromagnetics induction, electromagnetic waves, geometric and wave optics, optical instruments, relativity, quantum theory, and nuclear physics.

EE 1000 – Introduction to Electrical Engineering and Engineering Physics
This course is designed to acquaint incoming Electrical Engineering and Engineering Physics students with the programs, expectations, goals and career paths. Outcome expectations are that the student will be more prepared in choosing an appropriate course of study and field of concentration. Restrictions: Must be enrolled in one of the following Colleges: College of EGR and Computer Sci.

EE 2000/L – Digital Design with HDL

Introduction to combinational and synchronous sequential digital system design and optimization. Use of structural hardware description language (HDL) with CAD tools for design and simulation in a field programmable gate array (FPGA) based laboratory environment. Design and testing of simple combinational and synchronous sequential circuits.

EE 2010/L – Circuit Analysis I
Basic elements and laws, circuit analysis techniques and concepts, energy storage elements, first and second order circuits, sinusoidal steady state analysis.

EE 2020/L – Introduction to Mechatronics – Approved by the University Curriculum Committee
Introduction to microcontrollers, sensors, actuators, and supporting circuitry. Each of these topics represents a core component of integrated mechatronic systems. This course is for undergraduate students to gain practical, working knowledge of methods for gathering data and interacting with the systems environment.

EE 3310/L – Electronic Devices and Circuits
Introduction to basic solid-state electronic devices for discrete and integrated circuits. Major topics include carrier flow in semi-conductors, p-n junction theory, semiconductor diodes, bipolar junction transistors, field effect transistors, biasing introduction to amplifiers, and frequency response.

EE 3510 – Continuous & Discrete Linear Systems – Approved by the University Curriculum Committee
Introduction to circuit and system analysis through linear transform methods. Continuous and discrete signals and systems are introduced and analyzed. Simulation tools are used to example systems and verify expected behaviors.

EE 3520/L – Feedback & Digital Control Systems – Approved by the University Curriculum Committee
Introduction to control system analysis through system analysis, root locus, feedback controller design, and system response. Systems are introduced, analyzed, and designed in continuous and discrete contexts.

EE 4120/L – Industrial Controls and Automation
Wiring diagram creation, hardware selection, and programmable logic controller design and operation.

EE 4620 – Digital Integrated Circuit Design with PLDs and FPGAs
Digital design with behavioral level VHDL; application of VHDL to the design, analysis, and synthesis of digital integrated circuits; field programmable gate arrays (FPGAs) and design and application of digital integrated circuits using FPGA's. CAD tools, devices and boards will be used in the lab portion of the course. Topics include registers, counters, memory devices, register-level design, microcomputer system organization. Students must show competency in design of digital systems.

EE 4910 – Electrical Engineering Senior Design Project I
A project-oriented design course integrating design methodology with the principles of major electrical engineering disciplines. Students from working groups, define design projects and select faculty advisors according to their interests, needs and knowledge bases, Integrated Writing course.

4920 – Electrical Engineering Senior Design Project II

A project-oriented design course integrating design methodology with the principles of major electrical engineering disciplines: project planning and management, design specifications, implementation, testing and evaluations, electronic documentation, written and oral reports. Integrated Writing course.

CEG 2170/L – Introduction to C Programming for Scientists and Engineers
Basic engineering problem solving using the C programming language. Topics include loops, selection, input/output, files, functions, arrays, complex variables, pointers, structures, and dynamic memory. Students will learn how to approach solving problems in engineering and science; how to develop algorithms, using advanced techniques such as recursion, searching, sorting and linked lists, to solve those problems; and how to implement those algorithms in the C language.

CEG 2171/L – C++ Programming for Scientists and Engineers
Object-oriented programming using the C++ programming language. Topics include abstract data types, inheritance, polymorphism, abstract classes, templates, pointers, linked lists, stacks, queues, recursion, sorting algorithms, and binary trees. Students will apply problem-solving techniques and algorithm development to solve problems in engineering and science, and will implement those algorithms in the C++ language. Integrated Writing course.

CEG 2350/L – Operating System Concepts and Usage
Provides introduction to Linux and Windows operating systems and system administration. Covers files and directories, ownership and sharing, programs and processes, system calls, libraries, dynamic linking, command line shells, scripting, regular expressions and secure network protocols.

CEG 3310/L – Computer Organization
Organization and sequential operation of digital computers. Binary and hexadecimal number systems, 2's complement arithmetic, program control, memory organization and hierarchy, addressing modes, stacks and parameter passing, interrupts and traps, I/O devices, DMA, cache, and virtual memory.

CS2200 – Discrete Structures and Their Algorithms
Discrete structures and their algorithms for computer science. Emphasis on rigorous proof and formal argumentation.

CS 3100 – Data Structures and Algorithms
Study of the implementation of data structures and control structures in professional computer programs. Introduction to the fundamentals of complexity and analysis. Study of common standard problems and solutions (e.g., transitive closure and critical path). Emphasis on high-level language software design.

6.4 Program sequence

Provide the intended/ideal sequence to complete the program in the table below. An example is provided. Add additional time periods as needed.

Time period	Curriculum component	Time period	Curriculum component
Year 1, Fall	Courses/Activities	*Year 1, Spring*	Courses/Activities
	ENG 1100 Academic Writing		MTH 2310 Calculus II
	EE 1000 Intro to EE		CEG 2170 Intro to C Prog
	MTH 2300 Calculus I		PHY 2400 General Physics I
	EE 2000/L Digital Design		Global Traditions 1

	Social Sciences 1		
Time period	Curriculum component	Time period	Curriculum component
Year 2, Fall	Courses/Activities	*Year 2, Spring*	Courses/Activities
	EE 2010/L Circuits I		EE 3310/L Electronic Devices
	PHY 2410/L General Physics II		EE 3510 Cont & Disc Lin Systems
	CEG 2171 C++ Programming		EE 4120/L Industrial Control
	Global Traditions 2		CEG 2350/L Operating Systems
Time period	Curriculum component	Time period	Curriculum component
Year 3, Fall	Courses/Activities	*Year 3, Spring*	Courses/Activities
	EE 3520/L Feedback & Dig Cont		EE 2020/L Intro Mechatronics
	EE 4620/L Dig & Int Circuit Design		CS 2200 Discrete Structures
	CEG 3310/L Computer Org		Social Science 2
	EGR 3350 Technical Writing		Electives (6 SH)
Time period	Curriculum component	Time period	Curriculum component
e.g., Year 4 Fall Semester	Courses/Activities	*e.g., Year 4 Spring Semester*	Courses/Activities
	EE 4910 Senior Design 1		EE 4920 Senior Design 2
	Arts/Humanities		Electives (6 SH)
	CS 3100 Data Structures		Additional Core (2 SH)
	Electives (6 SH)		

6.5 Alternative delivery options (please check all that apply):

☐ More than 50% of the program will be offered using a fully online delivery model
☐ More than 50% of the program will be offered using a hybrid/blended delivery model
☐ More than 50% of the program will be offered using a flexible or accelerated delivery model

For the purposes of this document, the following definitions are used:

- *an **online course** is one in which most (80+%) of the content is delivered online, typically without face-to-face meetings;*
- *a **hybrid/blended course** is one that blends online and face-to-face delivery, with substantial content delivered online;*
- *a **flexible or accelerated program** includes courses that do not meet during the institution's regular academic term as well as courses that meet during the regular academic term but are offered in a substantially different manner than a fixed number of meeting times per week for all the weeks of the term.*

6.5 Off-site program components (please check all that apply):

☐ Co-op/Internship/Externship
☐ Field Placement
☐ Student Teaching
☐ Clinical Practicum
☐ Other

SECTION 7: ASSESSMENT AND EVALUATION

7.1 Program assessment

- For undergraduate programs in the Department of Electrical Engineering, the continuous improvement process, which includes program assessment, evaluation, and actions, is under the charge of the Undergraduate Studies Committee, which is chaired by the faculty member elected as Director of Undergraduate Studies. Consistent with ABET best practices, student outcomes in support of each program are assessed on a 3-year cycle. Outcomes are assessed by collecting student performance indicators from graded student work (e.g., quiz/exam problems, projects, lab reports) within classes required by the program that impact those outcomes or that have relevant course prerequisites.
- Per the 3-year cycle, data on 1/3rd of student outcomes is collected in each year. That data is then evaluated by the Undergraduate Studies Committee in the following year, and any curricular actions are implemented in the year after that (the 3rd year of the cycle). At the point, a new data collection cycle will have begun, and data is collected of those same outcomes again to close the loop and check for improvements in student performance. As part of this process, the Undergraduate Studies Committee produces an annual report on program assessment and improvement actions that is distributed to the full department faculty for review and that is archived for future accreditation visits.
- The program assessment schedule for the proposed program is illustrated in the table below.

Student outcome / Course Used for Assessment *Assessment year in cycle for each outcome indicated by number in intersection of outcome and course*	*EE3310*	*EE3510*	*EE3520*	*EE4120*	*EE4620*	*EE4910*	*EE4920*
(a) an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities				*2*	*2*		
(b) an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies	*3*	*3*	*3*				
(c) an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes	*1*		*1*				
(d) an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives				*1*		*1*	*1*
(e) an ability to function effectively as a member or leader on a technical team						*2*	*2*
(f) an ability to identify, analyze, and solve broadly-defined engineering technology problems					*2*		
(g) an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature						*1*	*1*
(h) an understanding of the need for and an ability to engage in self-directed continuing professional development						*2*	*2*
(i) an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity						*3*	*3*

(j) a knowledge of the impact of engineering technology solutions in a societal and global context						*3*	*3*
(k) a commitment to quality, timeliness, and continuous improvement						*1*	*1*

7.2 Measuring student success

- During their academic program, individual student performance is tracked through the normal system of course grades. The Department of Electrical Engineering employs an Academic Advisor that meets with students in good standing on an annual basis to monitor and review their progress through their program of study. The Academic Advisor meets with students on probation before registration each semester.
- At the conclusion of each student's program, an exit interview is conducted by the academic advisor to get feedback on their complete academic experience and to collect information on any career plans that they may have. The results of student exit interviews are shared with the Undergraduate Studies Committee for their review. Student names are omitted.
- Lastly, the Department of Electrical Engineering maintains an Alumni Council that meets twice per year to advise the department on curricular and strategic matter. We are also developing a process of broader alumni engagement through local events.

SECTION 8: FACULTY

8.1 Faculty appointment policies

- Tenure-track faculty may be designated assistant professor, associate professor, or professor. The university's promotion and tenure process and the department's bylaws establish criteria of accomplishment in areas of teaching, research, and service to earn promotion to successive ranks and for the awarding of tenure. The department bylaws are included as an appendix.
- Non-tenure track faculty may be designated as instructor, lecturer, or senior lecturer. These designations are differentiated by the amount of teaching experience and to a lesser degree service contribution.
- The Department of Electrical Engineering also employs adjunct faculty on an as needed basis.
- All non-adjunct faculty hold a terminal degree in electrical engineering or a related field. Non-tenure track faculty and adjuncts must hold a degree at least one level higher than the level at which they are teaching. However, exceptions can be made for members of the professional community whose work experience gives them unique experience in their area of instruction. Such exceptions must be approved by the department chair and dean.
- The standard teaching load for full-time, tenure-track faculty members is 4 courses per academic year, generally 2 courses per semester. This comprises 2/3 of a faculty member's workload during the academic year, with the remaining 1/3 reserved for service, research, and scholarly activities. Faculty members that are particularly active in service to the department, for example serving as director of our graduate program or director of undergraduate studies and accreditation, are given reduced teaching loads. Faculty members also have the freedom to buy out of courses through external funding, as department teaching needs permit. Faculty members that are measured to be less active in research and service may be assigned 1-2 additional courses per year to teach.
- The teaching load for full-time, non-tenure-track faculty members is 24 credit hours per year with minimal service expectations. If a non-tenure-track faculty member chooses to engage in "significant service" – including committee work, outreach activities, student advising, etc. – the

standard teaching load in engineering is 6 or 7 courses per year, depending on whether the majority of the courses are 3 or 4 credit hours each, respectively.

- We do not expect to need to hire any additional faculty to establish the proposed program.

8.2 Program faculty

- *Provide the number of existing faculty members available to teach in the proposed program.*

  Full-time: 13
  Less than full-time: 1

- *Provide an estimate of the number of faculty members to be added during the first two years of program operation.*

  Full-time: 0
  Less than full-time: 0

8.3 Expectations for professional development/scholarship

- The Department of Electrical Engineering bylaws (Appendix 3) set forth criteria for promotion and tenure based on teaching, research, and service activities. For promotion to associate professor with tenure, there are requirements placed on classroom instruction, graduate student advising, publishing of scholarly works, and awarding of external grants. The Collective Bargaining Agreement for Non-Tenure Eligible faculty (Appendix 5) specifies the process for promotion, which is based on the number of years of exemplary teaching performance and subsequent service contributions.

8.4 Faculty matrix

Name of Instructor	Rank or Title	Full-Time or Part-Time	Degree Titles, Institution, Year Include the Discipline/Field as Listed on the Diploma	Years of Teaching Experience In the Discipline/ Field	Additional Expertise in the Discipline/ Field (e.g., licenses, certifications, if applicable)	Title of the Course(s) This Individual Will Teach in the Proposed Program Include the course prefix and number	Number of Courses this Individual will Teach Per Year at All Campus Locations
Marty Emmert	Professor	FT	Ph.D., Computer Engineering 1999 University of Cincinnati	17	N/A	EE 2000/L Digital Design with HDL EE 4620/L Digital & Integrated Circuit Design with PLDs & FPGAs	4

Jiafeng Xie	Assistant Professor	FT	Ph.D., Electrical Engineering 2014 University of Pittsburgh	2	N/A	EE 2000/L Digital Design with HDL EE 2010/L Circuit Analysis I	4
Kefu Xue	Associate Professor	FT	Ph.D. Electrical Engineering 1987 Pennsylvania State University	30	N/A	EE 2010/L Circuit Analysis I EE 3310/L Electronic Devices & Circuits	4
Henry Chen	Professor	FT	Ph.D., Electrical Engineering 1989 University of Minnesota	28	N/A	EE 3310/L Electronic Devices & Circuits	4
Teri Piatt	Lecturer	FT	Ph.D., Electrical Engineering 1999 University of Colorado	5	N/A	EE 2010/L Circuit Analysis I EE 3510 Continuous & Discrete Linear Systems EE 3520/L Feedback & Digital Control Systems	6
Zach Fuchs	Assistant Professor	FT	Ph.D., Electrical & Computer Engineering 2012 University of Florida	2	N/A	EE 2020/L Introduction to Mechatronics	4
Matthew Rickey	Adjunct Instructor	PT	M.S., Electrical Engineering 2010 Wright State University	6	N/A	EE 4120/L Industrial Control & Automation	2
Fred Garber	Professor	FT	Ph.D., Electrical Engineering 1983 University of Illinois	34	N/A	EE 4910 Electrical Engineering Senior Design Project I EE 4920 Electrical Engineering Senior Design Project II	4
Michael Saville	Associate Professor	FT	Ph.D., Electrical Engineering 2006 University of Illinois	10	PE	EE 4910 Electrical Engineering Senior Design Project I	4

						EE 4920 Electrical Engineering Senior Design Project II	
Vanessa Starkey	Lecturer	FT	MS Computer Science, Wright State University, 1997	18	None	CEG 2170 Introduction to C Programming for Scientists & Engineers CEG 2171 C++ Programming for Scientists & Engineers	6
Erik Buck	Instructor	FT	B.Sc. Computer Science, University of Dayton, 1991	4	None	CEG 2350 Operating System Concepts and Usage	6
Michael Raymer	Professor	FT	Ph.D. Computer Science, Michigan State University, 1995	16	None	CEG 3310 Computer Organization	4
Derek Doran	Assistant Professor	FT	Ph.D. Computer Science and Engineering, University of Connecticut, 2014	3	None	CS 2200 Discrete Structures and their Algorithms	2
Michelle Cheatham	Assistant Professor	FT	Ph.D. Computer Science and Engineering, Wright State University, 2014	6	None	CS 3100 Data Structures Algorithms	4

SECTION 9: LIBRARY RESOURCES AND INFORMATION LITERACY

9.1 Library resources

- The Department of Electrical Engineering is in frequent communication with the engineering librarian, Phil Flynn. Through his support the department receives adequate support for its teaching and research missions, both through electronic media and hardcopy. These resources will be adequate for the proposed program as well.

- The University Libraries are the scholarly information center for Wright State University. In support of the University's mission of educational excellence, the Libraries collect, organize, preserve, and facilitate access to scholarly resources in all formats; support teaching, learning, and research in an intellectually open environment; and provide instruction in the use of traditional and new information resources and technologies. In addition, the University Libraries are members of OhioLINK, which provides access to a significant array of online resources as well as over 48 million library items in academic libraries and research institutions

throughout the state. Students and faculty can request books and other materials online from OhioLINK libraries and receive them for checkout within three to four days.

The University Libraries' website (http://www.libraries.wright.edu) provides online access to a wide variety of information resources including electronic books and journals, research databases, media, and selected internet resources. Required course readings, called "Course Reserves," are also on the Libraries website which is available 24 hours a day, seven days a week, from campus computer labs, residence halls, and off-campus locations.

Librarians are available during most open hours to assist users in accessing and using resources. The Paul Laurence Dunbar Library also houses the STAC (Student Technology Assistance Center). In the STAC, students can use new information technologies and multimedia to create original academic and creative works, such as presentations, web pages, videos, podcasts, etc.

The subject librarian for engineering is Phil Flynn who fosters relationships between the library and the engineering departments. He works with faculty members in several different roles:

- Collection Development – Work with faculty to develop the book, journal, and media collections.
- Reference – Assist with citation verification and database searches, building subject bibliographies, and establishing professional alerts.
- Instruction – Work with faculty to create library assignments, library/literature guides, workshops, demonstrations, and other activities that lead to student success.

Engineering students and faculty are served by several important digital collections: Electronic Journal Center (including Science Direct and Springer Link content), ACM Digital Library SPIE Digital Library, and IEEExplore Digital Library. Digital book collections include the Electronic Book Center (Springer, Academic Press, and other STEMM publishers), NetLibrary, and Safari Online. The Libraries integrate references from citation databases, such as Compendex and the Web of Science, to e-content collections through the OhioLINK Find-It link resolver. The Libraries support faculty research by purchasing individual articles when the material is not available through other sources. Faculty, staff and students may also request book purchases. Methods include marking publishers' catalogs, advertisements, submitting e-mail requests, and completing the Libraries web form.

- We do not anticipate needing any additional library resources for the program.

9.2 Information literacy

- During the program's first-year learning community course (EE1000), a host of topics related to the university environment are covered, including library resources. Phil Flynn, engineering librarian, is a guest speaker during one of the class meetings.

SECTION 10: BUDGET, RESOURCES, AND FACILITIES

10.1 Resources and facilities

- Extensive classroom spaces are available within the Russ Engineering Center and across campus. With the opening of the new Student Success Center, multiple scale-up format classrooms are now available. The department also has well-outfitted laboratories in support of existing electrical engineering courses that can be used to support the new program as well. Any minor additions to laboratory resources will be drawn from existing technology fees on an annual basis.
- We do not anticipate needing any new classroom or laboratory facilities to offer this program.

10.2 Budget/financial planning

Complete the table on the following page to describe the financial plan/budget for the first four years of program operation.

Wright State University
Academic Program Financial Analysis

Program Name:	**BS Electrical & Computer Engineering Technology**
College or School:	**College of Computer Science & Engineering**
Program Contact:	**Marty Emmert**
Date Prepared:	**13-Jan-17 original (v4-March 2017)**

DESCRIPTION

Definition: A program that prepares individuals to apply basic engineering principles and technical skills in support of computer engineers engaged in designing and developing computer systems and installations. Includes instruction in computer electronics and programming, prototype development and testing, systems installation and testing, solid state and microminiature circuitry, peripheral equipment, and report preparation.

CIP Code: 15.1201 CIP Title: Computer Engineering Technology/Technician
IPEDS National Center for Education Statistics
http://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=87810

		Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5			
Projected Enrollment	**Yr of Program**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25**
Head-count Full Time	1st Yr	2.0	6.0	12.0	20.0	20.0	20.0	20.0	20.0
	2nd Yr		1.4	4.1	8.3	13.8	13.8	13.8	13.8
	3rd Yr			1.0	3.0	6.0	10.0	10.0	10.0
	4th Yr				0.6	1.9	3.7	6.2	6.2
Total Headcount Full Time (New UG & 2+2 Transfers)		5	18.2	40.7	73.1	90.3	96.1	98.6	98.6
Part Time Student Headcount		6	6	6	6	6	6	6	6
Part Time Student Avg. SCH per Student		15	15	15	15	15	15	15	15
Part Time Students - TOTAL SCH		90	90	90	90	90	90	90	90
Full Time Equivalent (FTE) Enrollment - Full & Part Time Students (30 SCH = 1 FTE)		8.0	21.2	43.7	76.1	93.3	99.1	101.6	101.6
PROJECTED TOTAL SSI		**$ -**	**$3,935**	**$24,086**	**$74,701**	**$169,632**	**$302,089**	**$416,667**	**$497,150**
PROJECTED TOTAL I&G FEES		**$79,110**	**$198,589**	**$406,740**	**$714,484**	**$891,307**	**$965,615**	**$1,009,310**	**$1,029,496**
PROJECTED GRAND TOTAL SSI & FEE REVENUE		**$79,110**	**$202,524**	**$430,826**	**$789,185**	**$1,060,939**	**$1,267,704**	**$1,425,976**	**$1,526,646**

PROJECTED EXPENSES

Direct Expense								
Faculty Cost (Including benefits)	$ 26,642	$ 72,148	$ 151,478	$ 268,798	$ 336,175	$ 364,444	$ 381,034	$ 388,655
Adjunct Cost (Including benefits)		$ -	$ -	$ -	$ -	$ -	$ -	$ -
GTA/GRA/GA Cost	$ 8,227	$ 22,280	$ 46,779	$ 83,009	$ 103,816	$ 112,546	$ 117,669	$ 120,023
Operational Expenses		$ -	$ -	$ -	$ -	$ -	$ -	$ -
PROJECTED DIRECT EXPENSES	**$ 34,869**	**$ 94,428**	**$ 198,257**	**$ 351,807**	**$ 439,991**	**$ 476,990**	**$ 498,703**	**$ 508,677**
Other Expense								
Start Up Cost								
Fee Waivers	$ 6,530	$ 17,683	$ 37,125	$ 65,879	$ 82,392	$ 89,321	$ 93,387	$ 95,254
PROJECTED OTHER DIRECT EXPENSES	**$ 6,530**	**$ 17,683**	**$ 37,125**	**$ 65,879**	**$ 82,392**	**$ 89,321**	**$ 93,387**	**$ 95,254**
PROJECTED TOTAL DIRECT EXPENSES	**$ 41,398**	**$ 112,111**	**$ 235,382**	**$ 417,686**	**$ 522,383**	**$ 566,311**	**$ 592,090**	**$ 603,932**
PROJECTED INDIRECT EXPENSES	**$ 25,667**	**$ 69,509**	**$ 145,937**	**$ 258,965**	**$ 323,877**	**$ 351,113**	**$ 367,096**	**$ 374,438**
PROJECTED GRAND TOTAL EXPENSES	**$ 67,065**	**$ 181,620**	**$ 381,319**	**$ 676,651**	**$ 846,261**	**$ 917,424**	**$ 959,186**	**$ 978,370**
REVENUE/ EXPENSE RATIO	**1.18**	**1.12**	**1.13**	**1.17**	**1.25**	**1.38**	**1.49**	**1.56**