|  |  |
| --- | --- |
| For Academic Affairs and Research Use Only | |
| CIP Code: |  |
| Degree Code: |  |

**New Minor Proposal Form**

**[✓] Undergraduate Curriculum Council**

Signed paper copies of proposals submitted for consideration are no longer required. Please type approver name and enter date of approval.

Email completed proposals to [curriculum@astate.edu](mailto:curriculum@astate.edu) for inclusion in curriculum committee agenda.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Shubhalaxmi Kher | 12/15/2019 |   **Department Curriculum Committee Chair** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **COPE Chair (if applicable)** |
| |  |  | | --- | --- | | Shubhalaxmi Kher | 12/15/2019 |   **Department Chair:** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Head of Unit (If applicable)** |
| |  |  | | --- | --- | | Jason Stewart | 1/10/2020 |   **College Curriculum Committee Chair** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Undergraduate Curriculum Council Chair** |
| |  |  | | --- | --- | | Abhijit Bhattacharyya | 1/10/2020 |   **College Dean** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Graduate Curriculum Committee Chair** |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **General Education Committee Chair (If applicable)** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Vice Chancellor for Academic Affairs** |

**i. Proposed Program Title**

Minor in Electrical Engineering

**ii. Contact Person** (Name, Email Address, Phone Number)

Shubhalaxmi Kher, [skher@astate.edu](mailto:skher@astate.edu), 972-2088

**iii. Proposed Starting Date**

Fall 2020

**Minor Justification**

1. Justification for introduction of new minor:

As the lines between engineering and scientific disciplines become increasingly blurred, many students are forced to make tough decisions about which major to choose. Traditionally there has been no formal mechanism within the College of Engineering and Computer Science to expose students to substantial academic preparation in more than one department, other than a double-major option, which generally entails a substantial investment of time. A Minor in Electrical Engineering (EE), offered through the Electrical Engineering program, is designed to fill this void by providing an avenue for a diverse education for students outside of the Electrical engineering discipline. Due to the extensive breadth of EE discipline areas, students seeking a minor in EE have a spectrum of choices for the program paths they choose. Path options include Applied Electromagnetics, Circuits, Communications, Control Systems, Embedded systems, etc.

1. Academic rationale (how will this minor fit into the mission established by the department for the curriculum?)  
   The EE minor will increase the value/marketability of BSCS students by providing them with the tools needed to understand and employ hardware as well as software solutions. Electrical Engineering impacts all current engineering practices. It involves hardware while Computer Science involves Software and both are crucial for Industries
2. List goals for the minor (faculty, enrollment and/or curricular goals.)

The minor will provide the coursework necessary to equip the BSCS majors with the electrical engineering background necessary for understanding and designing industrial solutions.

1. Student population served.

* BSCS students.
* Non-EE Engineering Majors

2. New minor objective:

The objective is to provide an avenue for additional knowledge and skills related to Electrical Engineering for non-EE majors.

3. Provide the following:

a. Curriculum outline - List of required courses

CS 2114 Structured Programming

EE 3331 Digital Electronics I Lab

EE 3333 Digital Electronics I

ENGR 2421 Electric Circuits I lab

ENGR 2423 Electric Circuits I

EE 4344 Embedded Systems

Any upper level EE/CS Elective

b. New course descriptions

N/A

4. Will the new minor be offered via distance delivery?

No

5. Mode of delivery to be used:

Standard classroom

6. Specify the amount of the additional costs required, the source of funds, and how funds will be used.

NA

7. Yes Is this new minor cognate embedded with a current bachelor’s degree?

* 1. If yes, what is the name of the Bachelor’s program? Bachelor of Science in Electrical Engineering (BSEE)
  2. If no, complete the New Minor Assessment section.

**NEW MINOR ASSESSMENT**

**University Outcomes**

1. Please indicate the university-level student learning outcomes for which this new program will contribute. Please complete the table by adding program level outcomes (PLO) to the first column, and indicating the alignment with the university learning outcomes (ULO). If you need more information about the ULOs, go to the [University Level Outcomes Website](http://www.astate.edu/a/assessment/student-learning-outcomes/files/ULOs%20for%20Website2.pdf).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **ULO 1: Creative & Critical Thinking** | **ULO 2: Effective Communication** | **ULO 3: Civic & Social Responsibility** | **ULO 4: Globalization & Diversity** |
| **PLO 1** |  |  |  |  |
| **PLO 2** |  |  |  |  |
| **PLO 3** |  |  |  |  |

**MINOR Student Learning Outcomes**

2. Please fill out the following table to develop a continuous improvement assessment process for this minor.

*For further assistance, please see the ‘Expanded Instructions’ document available on the UCC - Forms website for guidance, or contact the Office of Assessment at 870-972-2989.*

***Note: Best practices suggest 4-7 outcomes per program; minors would have 1 to 4 outcomes.***

|  |  |
| --- | --- |
| **Outcome 1** | Type outcome here. What do you want students to think, know, or do when they have completed the program? |
| Assessment Procedure Criterion | Please include direct and indirect assessment measure for outcome. |
| Which courses are responsible for this outcome? | List courses. |
| Assessment  Timetable | What semesters, and how often, is the outcome assessed? |
| Who is responsible for assessing and reporting on the results? | Who is responsible for assessing, evaluating, and analyzing results, developing action plants, etc.? |

*Please repeat as necessary.*

**Bulletin Changes**

|  |
| --- |
| **Instructions** |
| **Please visit** [**http://www.astate.edu/a/registrar/students/bulletins/index.dot**](http://www.astate.edu/a/registrar/students/bulletins/index.dot) **and select the most recent version of the bulletin. Copy and paste all bulletin pages this proposal affects below. Follow the following guidelines for indicating necessary changes.**  **\*Please note: Courses are often listed in multiple sections of the bulletin. To ensure that all affected sections have been located, please search the bulletin (ctrl+F) for the appropriate courses before submission of this form.**  - Deleted courses/credit hours should be marked with a red strike-through (~~red strikethrough~~)  - New credit hours and text changes should be listed in blue using enlarged font (blue using enlarged font).  - Any new courses should be listed in blue bold italics using enlarged font (***blue bold italics using enlarged font***)  *You can easily apply any of these changes by selecting the example text in the instructions above, double-clicking the ‘format painter’ icon 🡪 , and selecting the text you would like to apply the change to.*  *Please visit* [*https://youtu.be/yjdL2n4lZm4*](https://youtu.be/yjdL2n4lZm4) *for more detailed instructions.* |

**Page 66- 67**

Arkansas State University offers ~~66~~67 minors with requirements varying from 18-24 semester hours. Specific requirements for each minor are stated in the respective college sections of this bulletin. The minors offered are listed below in alphabetical order. Refer to the index for the appropriate page references of each minor offered.

|  |
| --- |
| Accounting |
| African-American Studies |
| Agricultural Business |
| Agricultural Mechanics |
| Animal Science |
| Art |
| Art History |
| Biology |
| Chemistry |
| Children’s Advocacy Studies |
| Cognitive Science |
| Criminology |
| Crop Consulting and Agronomic Services |
| Digital Design |
| Economics |
| Electrical Engineering |
| Electronic Commerce |
| Engineering |
| English |
| Entrepreneurship |
| Finance |
| Financial Wealth Management |
| Folklore Studies |
| French |
| General Business |
| German |
| History |
| History and Philosophy of Science and Technology |
| Homeland Security and Disaster Preparedness |
| Horticulture |
| Interdisciplinary Family Studies |
| International Business |
| Leadership Studies |
| Logistics |
| Management |
| Marine Science |
| Marketing |
| Mathematics |
| Medieval Studies |
| Military Science and Leadership |
| Modern European Studies |
| Multimedia Journalism |
| Music |
| Philosophy |
| Physics |
| Plant Science |
| Political Science |
| Precision Agriculture |
| Psychology |
| Religion Studies |
| Renewable Energy Technology |
| Sales Leadership |
| Sociology |
| Spanish |
| Surveying |
| Strategic Communication |
| Statistics |
| Theatre |
| United States History |
| Women and Gender Studies |
| Writing Studies |

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**(Insert the following title and table below the existing table on p. 208)**

**Minor in Electrical Engineering**

|  |  |
| --- | --- |
| **Required Courses**  Students must maintain a minimum GPA of 2.5 OR a grade of at least “C” for each course in the minor | **Sem. Hrs.** |
| CS 2114 Structured Programming | 4 |
| ENGR 2421 Electric Circuits I Laboratory | 1 |
| ENGR 2423 Electric Circuits I | 3 |
| EE 3331 Digital Electronics I Laboratory | 1 |
| EE 3333 Digital Electronics I | 3 |
| EE 4344 Embedded Systems | 4 |
| Any Upper level EE or CS Course | 3 |
| **Total Required Hours:** | 19 |

**LETTER OF NOTIFICATION   
New Minor**

1. Institution submitting request:

Arkansas State University

2. Contact person/title:

Shubhalaxmi Kher, Director of Electrical Engineering

3. Phone number/e-mail address:

(870)972-2088, skher@astate.edu

4. Proposed effective date:

Fall 2020

5. Title of degree program: (Indicate if the degree listed above is approved for distance delivery)

Bachelor of Science in Electrical Engineering (BSEE)

6. CIP Code:

14.1001

7. Degree Code:

14.10

8. Proposed name of new minor:

Electrical Engineering

9. Reason for proposed action:

To offer non-EE majors an option for further exposure and training in Electrical Engineering.

10. New minor objective:

The minor will provide the basic Electrical Engineering knowledge to better prepare the Computer Science or other engineering majors for the workforce in the “Internet of Things (IoT)” scenario.

11. Provide the following:

* 1. Curriculum outline - List of courses in new minor – Underline required courses

1. CS 2114 Structured Programming, 2. EE 3331 Digital Electronics I Lab, 3. EE 3333 Digital Electronics I, 4. ENGR 2421 Electric Circuits I lab 5. ENGR2423 Electric Circuits I , 6. EE 4344 Embedded Systems , 7. Any upper level EE/ CS Elective of at least 3 hours

* 1. Total semester credit hours required for minor

19

* 1. New courses and new course descriptions

N/A

Goals and objectives of minor

The EE minor will increase the value/marketability of BSCS and other engineering students by providing them with the tools needed in the IoT Scenario. Electrical Engineering is the backbone of all the hardware development over which software is developed, and these courses will provide students with a better understanding of the basic EE background to meet the workforce requirements.

* 1. Expected student learning outcomes

**Table VI-3. Relation of Student Outcomes to Curriculum**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Electrical**  **Engineering Program Engineering Courses** | **Student Outcome Number** | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Engineering Core** | All students must complete the 20 hours of engineering core courses. | | | | | | |
| **ENGR 1402**, Concepts of Engineering |  |  |  |  |  |  |  |
| **ENGR 1412**, Software Applications for Engineers |  |  |  |  |  |  |  |
| **ENGR 2401**, Applied Engineering Statistics |  |  |  |  |  |  |  |
| **ENGR 2403**, Statics |  |  |  |  |  |  |  |
| **ENGR 3433**, Engineering Economics |  |  |  |  |  |  |  |
| **ENGR 4401**, Senior Seminar |  |  |  |  |  |  |  |
| **ENGR 4453**, Numerical Methods for Engineers |  |  |  |  |  |  |  |
| **ENGR 4463**, Senior  Design I | A |  | A | A | A |  | A |
| **ENGR 4482**, Senior  Design II |  |  | A |  | A |  | A |
| **Electrical Engineering Required Courses** | All students must complete 60 hours of electrical engineering courses (51 hrs. from required, 9 hrs. from electives). | | | | | | |
| **ENGR 2421**, Electric Circuits I Laboratory |  |  |  |  |  |  |  |
| **ENGR 2423**, Electric Circuits I |  |  |  |  |  |  |  |
| **ENGR 3443**, Engineering Thermodynamics I |  |  |  |  |  |  |  |
| **CS 2114**, Structured Programming |  |  |  |  |  |  |  |
| **EE 2322**, Electrical Workshop |  |  |  |  |  |  |  |
| **EE 3313**, Electric Circuits II |  |  |  |  |  | A |  |
| **EE 3331**, Digital Electronics I Laboratory |  |  |  |  |  |  |  |
| **EE 3333**, Digital Electronics I |  |  |  | A |  |  |  |
| **EE 3343**, Engineering Fields and Waves |  | A |  |  |  |  |  |
| **EE 3353**, Signals and Systems |  |  |  |  |  |  |  |
| **EE 3363**, Semiconductor Materials and Devices | A |  |  |  |  |  |  |

**Table VI-3. Relation of Student Outcomes to Curriculum (continued)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Electrical**  **Engineering Program Engineering Courses** | **Student Outcome Number** | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Electrical Engineering**  **Required Courses** | All students must complete 60 hours of electrical engineering courses (51 hrs. from required, 9 hrs. from electives). | | | | | | |
| **EE 3383**, Principles and Practices in Electrical Engineering |  |  |  |  |  |  |  |
| **EE 3393**, Probability and Random Signals |  |  |  |  |  |  |  |
| **EE 3401**, Electronics I Laboratory |  |  |  |  |  |  |  |
| **EE 3403**, Electronics I |  |  |  |  |  |  |  |
| **EE 4313**, Control Systems |  |  |  |  |  |  |  |
| **EE 4333**, Communications Theory |  |  |  |  |  |  |  |
| **EE 4353**, Power Systems |  |  |  |  |  |  |  |
| **EE 4373**, Electronics II |  |  |  |  |  |  |  |
| **EE 4773**, Electronics II Laboratory |  |  |  |  |  |  |  |
| **Electrical Engineering Elective Courses** | All students must complete 6 hours of electrical engineering electives. | | | | | | |
| **EE 4303**, Electromagnetic Waves |  |  |  |  |  |  |  |
| **EE 4323**, Electrical Machinery |  |  |  |  |  |  |  |
| **EE 4343**, Digital Signal Processing |  |  |  |  |  |  |  |
| **EE 4344**, Embedded Systems |  |  |  |  |  |  |  |
| **EE 4354**, Intelligent Control Systems |  |  |  |  |  |  |  |
| **EE 4383**, Digital Electronics II |  |  |  |  |  |  |  |
| **EE 4743**, Digital Communications |  |  |  |  |  |  |  |

N/A to minor. However, all courses specified in this minor are part of the assessed BSEE program with learning outcomes identified as shown (by outcome number – full descriptions available upon request) in the table.

* 1. Documentation that minor meets employer needs

This minor will help prepare the non EE majors for the future needs of the industries.

* 1. Student demand (projected enrollment) for minor: 5-7 per year

* 1. Name of institutions offering similar programs or and the institution(s) used as a model to develop the proposed program option

No institution in the state of Arkansas has an Electrical Engineering minor to go along with a computer science degree that I am aware of or can find. The Electrical Engineering minor is looking to the future needs of local industries.

12. Institutional curriculum committee review/approval date:

13. **No** Will the new minor be offered via distance delivery?

If yes, indicate mode of distance delivery:

Enter text...

14. Explain in detail the distance delivery procedures to be used, if applicable:

N/A

15. Specify the amount of additional costs required for program implementation, the source of funds, and how funds will be used.

N/A

16. Provide additional program information if requested by ADHE staff.

President/Chancellor Approval Date: Click here to enter a date.

Board of Trustees Notification Date: Click here to enter a date.

Chief Academic officer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: Enter date.

Name (printed): Click here to enter text.