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

**NEW CERTIFICATE PROGRAM FORM**

(Also requires Arkansas Department of Higher Education (ADHE) approval)

**[X ] Undergraduate Curriculum Council**

**[ ] Graduate Council**

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

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| Dr. Shubha Kher | 11/12/2020 |

**Department Curriculum Committee Chair** |

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**COPE Chair (if applicable)** |
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| Yeonsang Hwang | 11/12/2020 |

**Department Chair** |

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**Head of Unit (if applicable)**   |
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| Jason Stewart | 11/12/2020 |

**College Curriculum Committee Chair** |

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**Undergraduate Curriculum Council Chair** |
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| Abhijit Bhattacharyya | 11/12/2020 |

**College Dean** |

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**Graduate Curriculum Committee Chair** |
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**General Education Committee Chair (if applicable)**   |

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**Vice Chancellor for Academic Affairs** |

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

Dr. Yeonsang Hwang, yhwang@astate.edu, 870 972 3581

1. **Name of proposed Certificate Program (Program must consist of 6-21 semester credit hours):**

Controls and Automation

1. **Proposed effective date:**

Fall 2021

1. **Reason for proposed program implementation:**

Industrial automation has been in a state of rapid growth the last few decades.  With industries aiming to keep costs down by implementing more automation, there is a strong desire to hire engineering professionals with a background in controls and automation.  The proposed Certificate in Controls and Automation will be typically pursued by undergraduates majoring in Mechanical Engineering or Electrical engineering, and by industry professionals with the appropriate background in these disciplines. The objectives are to expose students and industry professionals to the breadth of knowledge required by the modern practice of control and automation, and enhance the skillset and capabilities within their discipline-specific field, which will supplement the BSEE and BSME degrees. With this in mind, the certificate includes not only courses in controls addressing underlying theory, but a hands-on approach in design and programming based on applications.  Additional background offered includes electronics and circuits, instrumentation, data acquisition and signal analysis, with applications.  This certificate is designed to help students specialize in this area and advance in their profession.  Furthermore, it will be useful to students intending  to pursue graduate studies in controls and/or automation.

1. **Provide the following:**
	* 1. Curriculum outline - List of courses in new program – Underline required courses

**Certificate (19 -21 Credit Hours \*)**

**Core (13 Credit Hours)**

 EE 4313 Control Systems Theory

 MATH 3243 Linear Algebra

 ME 3504 Process Monitoring and Control

 ME 3613 Control Systems for Mechanical Engineers

**Electives (Any two) (6-8 Credit Hours)**

EE 4344 Embedded Systems

 EE 4354 Intelligent Control Systems

 EE 479V Special Problems in Electrical Engineering (minimum: 3 credit hours)

 ME 3523 Introduction to Robotics Laboratory

 ME 4613 Introduction to Mechatronics

 ME 469V Special Problems in Mechanical Engineering (minimum: 3 credit hours)

**\*** Additional requirement: Must include at least 10 credit hours outside of the major.

* + 1. Total semester credit hours required for proposed program

19-21 Credit Hours

* + 1. New courses and new course descriptions

There are no new courses.

* + 1. Program goals and objectives

Goal: Package a marketable product for BSEE and BSME students to accentuate a desired industry driven skillset. The objectives are to expose students and industry professionals to the breadth of knowledge required by the modern practice of control and automation, and enhance the skillset and capabilities within their discipline-specific field, which will supplement the BSEE and BSME degrees.

* + 1. Expected student learning outcomes

Expose students to underlying theory in controls and automation and train students with a hands-on approach to design and programming based on applications

* + 1. Documentation that program meets employer needs

The EE and ME program directors have solicited input from employers in the area (Hytrol, Big River Steel, Nucor, Automation Outfitters etc.) as well as graduates of the EE and ME programs. There is a big need among employers for engineers to be trained in the principles and applications of control systems. In that context, the proposal to develop the certificate was very well received by both employers and alums of the EE, ME programs.

* + 1. Student demand (projected enrollment) for proposed program

10 -12 students a year.

* + 1. Program approval letter from licensure/certification entity, if required (attach): n/a
		2. Name of institutions offering similar programs and the institution(s) used as model to develop proposed program

None known

* + 1. Proposed program review date (within 10 years of program implementation)

Fall 2031

1. **Will this program be offered:**
	1. **Traditional/Face-to-face** Yes
	2. **Distance/Online** No
		1. **If yes, indicate mode of distance delivery, and the percentage of courses offered via this modality (<50%, 50-99%, or 100%).**

Enter text...

* + 1. **If online, will it be offered through Global Initiatives/Academic Partnerships (AP)?**

Enter text...

1. **Will this program be offered off-campus?** No
	1. **If yes, identify the off-campus location**

 Enter text...

**Bulletin Changes**

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| **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. Please include a before (with changed areas highlighted) and after of all affected sections.** **\*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.**  |

**Page 64 Before**



**Page 64 After**



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| Bone densitometry |
| Cardiovascular-Interventional Technology\* |
| Computer Tomography |
| Controls and Automation |
| Corporate Media |
| Debate and Forensics |
| Diagnostics Medical Technician |
| Free enterprise |
| Graphic Communication |
| Health Coaching |
| Information technology |
| Leadership Studies |
| Mammography\* |
| Marketing Analytics |

**Page 201**



**Page 202 Before**



**Page 202 After**

**Following description to be added immediately after Page 201**

**Engineering Program Certificates**

**Certificate in Controls and Automation**

The Certificate in Controls and Automation will be typically pursued by undergraduates majoring in Mechanical Engineering or Electrical Engineering and by industry professionals with the appropriate background in these disciplines.  The objectives are to expose students and industry professionals to the breadth of knowledge required by the modern practice of control and automation and enhance the skillset and capabilities within their discipline-specific field which will supplement the BSEE and BSME degrees.  With this in mind, the certificate includes not only courses in controls addressing underlying theory, but a hands-on approach in design and programming based on applications. Additional background offered includes electronics and circuits, instrumentation, data acquisition, and signal analysis with applications.

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| **Required courses \*** | **Sem. Hrs.** |
| EE 4313, Control Systems Theory  | 3 |
| MATH 3243, Linear Algebra  | 3 |
| ME 3504, Process Monitoring and Control  | 4 |
| ME 3613, Control Systems for Mechanical Engineering  | 3 |
| Any two electives: EE 4344, Embedded Systems  EE 4354, Intelligent Control Systems  EE 479V, Special Problems in Electrical Engineering ME 3523, Introduction to Robotics Laboratory ME 4613, Introduction to Mechatronics ME 469V, Special Problems in Mechanical Engineering \* Additional requirement: Must include at least 10 credit hours outside of the major. | 6-8 |
| **Total Required Hours:** | **19-21** |