PURDUE UNIVERSITY FORT WAYNE | Faculty Senate

Senate Reference No. 25-27

MEMORANDUM

TO: 2025-2026 Senate Executive Committee
FROM: Alan Legg
Chair, Curriculum Subcommittee
DATE: 03/23/2026
SUBJECT: Concentration in Robotics and Automation for Computer Engineering

The Curriculum Subcommittee reviewed a proposal from ETCS for a new concentration in Robotics and Automation for the Computer Engineering program. We voted to approve the proposal and find it requires no Senate review.

Thank you for the opportunity to review this proposal.

Approve	**Oppose**	**Abstain**	**Absent**	**Present Non-Voting**
Alan Legg			Nurgul Aitalieva	Lucas Mollema
Tara Lewis			Abe Schwab	Sabene Rizvi
Terri Swim			Carl Drummond	
Cigdem Gurgur			Lacy Watson	
Yanfei Liu			Tiffany Taylor-Smith	
Steve Carr				

Degree/Certificate/Major/Minor/Concentration Cover Sheet

Date: 2/16/2026

Institution: Purdue

Campus: Fort Wayne

School or College: Engineering, Technology and Computer Science

Department: Electrical and Computer Engineering

Location: On Campus 80% or more online: Yes ◯ No ◯

County: Allen

Type: Majors/Concentrations: New

Program name:

Robotics and Automation for Computer Engineering Program

Graduate/Undergraduate: Undergraduate

Degree Code: BS

Brief Description:

The Robotics and Automation concentration provides students with hands-on experience in robotics, control systems, embedded systems, and intelligent automation technologies. Students learn to design, program, and integrate automated and robotic systems through laboratory-based and project-driven coursework. This concentration prepares graduates for internships, cooperative education, and capstone design projects in advanced manufacturing, automation, and smart systems industries.

Rationale for new or terminated program:

The addition of a Robotics and Automation concentration within the Electrical Engineering and Computer Engineering majors at Purdue University Fort Wayne is timely and strategically aligned with the economic landscape of Fort Wayne and the greater Northeastern Indiana region. This region is a national hub for advanced manufacturing, industrial automation, logistics, defense, and smart systems, generating strong demand for engineers with expertise in robotics, control systems, embedded intelligence, and automated production technologies. Establishing this concentration will prepare students with industry-relevant skills needed to design, integrate, and maintain next-generation automated systems while supporting regional workforce development and innovation.

The target audience for the Robotics and Automation concentration includes current undergraduate students majoring in Electrical Engineering or Computer Engineering, with an expected 5–10 graduates per year. Students completing the concentration gain specialized technical skills that enhance their readiness for internships, cooperative education experiences, senior capstone design projects, and employment in high-growth engineering fields. Graduates are well positioned for careers in robotics, automation, manufacturing, and related sectors that continue to experience strong demand both regionally and nationally.

CIP Code: 14.0101

Name of Person who Submitted Proposal:

Guoping Wang

Contact Information (phone or email): wang32@pfw.edu (260)481-6036

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Contact Information (phone or email): wang32@pfw.edu (260)481-6036

Docusign Envelope ID: BC5FAE18-E143-4EEC-A431-7A8E3EA8D8EA

Undergraduate Academic Program Memo

Date: 3/26/26

From: Guoping Wang

To: Sherif Elfayoumy, Carl Drummond

Re: New Concentration - Robotics and Automation for Computer & Electrical Engineering

Brief description of the program:

The Robotics and Automation concentration provides students with hands-on experience in robotics, control systems, embedded systems, and intelligent automation technologies. Students learn to design, program, and integrate automated and robotic systems through laboratory-based and project-driven coursework. This concentration prepares graduates for internships, cooperative education, and capstone design projects in advanced manufacturing, automation, and smart systems industries.

Brief rationale for program request:

The proposed Robotics and Automation concentration in Electrical and Computer Engineering is strategically aligned with the strong regional demand for engineers in advanced manufacturing, automation, logistics, defense, and smart systems. The concentration equips students with focused skills in robotics, control systems, and embedded intelligence while strengthening Purdue University Fort Wayne's role as a talent pipeline for high-growth engineering careers in Northeastern Indiana.

CIP Code: 14.0101

For completion by Office of Academic Affairs

Signed by: Guoping Wang E4CFB6ED0172411... 3/2/2026

Department Chair Signature *Date*

DocuSigned by: Sherif Elfayoumy 5CC32880FFC14FA... 3/2/2026

School Dean Signature *Date*

DocuSigned by: Carl Drummond 27109142004745C... 3/3/2026

Vice Chancellor for Academic Affairs Signature *Date*

PLEASE NOTE: The Office of Academic Affairs will collect electronic signatures from the Chair, Dean, and Vice Chancellor for Academic Affairs after the form has been filled out and submitted to the Associate Vice Chancellor for Academic Programs with the rest of the program proposal.

Request for a New Concentration

Campus: PFW

School or College: ETCS

Department: Electrical and Computer Engineering

Degree and Major: Computer Engineering

Title of Concentration: Robotics and Automation

CIP Code: 14.0101

Effective Date (Session and Academic Year): Fall 2027

Mode of Delivery: Campus/Online/Distance/Hybrid

80% or more online:
_____Yes
_X___No

If Hybrid, explain:

Who will administer the online aspect of this program (vendor, program)?

Brief Description of Concentration: *This may be published in the Catalog. A brief explanation of what the student will experience and/or learn; no more than 2-3 sentences.*

The Robotics and Automation concentration provides students with hands-on experience in robotics, control systems, embedded systems, and intelligent automation technologies. Students learn to design, program, and integrate automated and robotic systems through laboratory-based and project-driven coursework. This concentration prepares graduates for internships, cooperative education, and capstone design projects in advanced manufacturing, automation, and smart systems industries.

Justification
This section provides statements regarding the mission of the proposed concentration.

Need for the concentration:

The addition of a Robotics and Automation concentration in the major of Computer Engineering at Purdue University Fort Wayne is both timely and strategically aligned with the economic landscape of Fort Wayne and the greater Northeastern Indiana region. This area is a major national hub for advanced manufacturing, industrial automation, logistics, defense, and smart systems, creating a strong and growing demand for engineers with expertise in robotics, control systems, embedded intelligence, and automated production technologies. Establishing this focus area will equip students with the skills needed to excel in the region's high-tech workforce, support local industry innovation, and strengthen PFW's role as a key talent pipeline

for employers seeking engineers prepared to design, integrate, and maintain next-generation automated systems.

Target audience, including the expected number of students and benefits to them:

The target audience for the Robotics and Automation concentration consists of current undergraduate students majoring in Computer Engineering. It is expected that approximately 5–10 students per year will graduate with this concentration. Students benefit from gaining specialized, industry-relevant skills in robotics, automation, control systems, and embedded intelligence, enhancing their readiness for internships, cooperative education experiences, senior capstone design projects, and employment in high-demand sectors such as advanced manufacturing, automation, and smart systems. Students graduating from the proposed Robotics and Automation concentration are well suited for the careers listed in Table 1, which are projected to experience rapid growth in Indiana.

Table 1. Occupation Project Growth Trend (2022-2032) in Indiana (from ONetOnline.org)

Occupation	Projected Growth in Indiana	Project Growth in the US
Robotics Engineers	6%	2% *
Electrical Engineers	13%	7% ****
Manufacturing Engineers	16%	11% ****
Computer Hardware Engineers	12%	7% ****
Industrial Engineers	16%	11% ****

Note: **** stands for a bright outlook for that career growth.

Focus of Research or career relevance:

The Robotics and Automation concentration focuses on preparing students for careers and advanced study in robotics, industrial automation, control systems, embedded intelligence, and smart manufacturing. The concentration emphasizes applied engineering skills in system integration, real-time control, and intelligent automation that are directly relevant to high-demand industries such as advanced manufacturing, logistics, defense, and autonomous systems. This focus also supports undergraduate research and graduate study opportunities in robotics, automation, and cyber-physical systems.

Description of how the concentration fits into and supports the existing degree program(s) and major(s).

The Robotics and Automation concentration is fully integrated into the existing Electrical Engineering and Computer Engineering programs by utilizing current required courses and approved technical electives. The concentration does not add additional credit hours or extend time to degree, allowing students to gain focused expertise in robotics, control systems, automation, and embedded systems while completing their standard degree requirements. By aligning closely with existing curricula, the concentration strengthens both majors and enhances students' preparation for internships, capstone design projects, and careers in advanced engineering fields.

Description of the relationship to other concentrations in the degree program:

There is no other concentration in either Computer Engineering program.

Participating faculty, including name, academic rank, and departmental affiliation:

Name	Academic Rank / Title	Departmental Affiliation
Dr. Guoping Wang	Chair, Associate Professor of Electrical & Computer Engineering	Department of ECE
Dr. Bin Chen	Associate Professor of Electrical & Computer Engineering	Department of ECE
Dr. Chao Chen	Professor of Computer Engineering	Department of ECE
Dr. David S. Cochran	Professor, Systems Engineering; Director of Systems Engineering	Department of ECE
Dr. Todor Cooklev	Professor	Department of ECE
Dr. Claudio Freitas	Assistant Professor of First-Year Engineering	Department of ECE
Dr. Yanfei Liu	Associate Professor	Department of ECE
Dr. Elizabeth Thompson	Professor of Electrical Engineering	Department of ECE
Dr. Antian Wang	Assistant Professor of Computer Engineering	Department of ECE
Perry Falk	Limited Term Lecturer	Department of ECE
James Isaacs	Limited Term Lecturer	Department of ECE
Stephen O'Shaughnessey	Limited Term Lecturer	Department of ECE
Bruce Reidenbach	Limited Term Lecturer	Department of ECE
William Westrick	Limited Term Lecturer	Department of ECE
Keith Hood	Limited Term Lecturer	Department of ECE
Edward P. Lyvers	Limited Term Lecturer	Department of ECE

Prospective Curriculum – *Please create a plan of study for the degree. If new courses are being created, all course proposals must be completed in order to add to this block.* (note any that are variable title; **min of 9 hours of unique courses for a GRAD concentration**):

Curriculum for Computer Engineering program with Robotics and Automation Concentration
Students in BSE with major in Computer Engineering may declare their concentrations in Robotic and Automation by completing three courses (minimum of 9 credits) among the following robotic/automation related courses*:

- ECE 30300 – Engineering Software Design
- ECE 33300 – Automatic Control Systems
- ECE 47800 – Robotics and Automation
- ECE 44901 – Machine Learning
- ECE 31000 – Motor and Engine Control
- ECE 56900 – Intro to Robotic
- ECE 66100 – Computer Vision
- ECE 49500 – Selected Topics in Electrical Engineering (3 credits)
- ECE 49600 – Electrical and Computer Engineering research project with subjects/topics in Robotics/automation area

* With approval of the Computer Engineering curriculum committee, course substitution may be permitted.

Learning outcomes (e.g., unique knowledge or abilities, capacity to identify and conduct original research, ability to communicate to peer audiences, critical thinking and problem-solving skills, etc.):

The Graduates with the concentration will also have:

a. **Concentration Outcome RA-1: Integrated Automated Systems Design**
   Graduates will be able to design, integrate, and validate robotics and automation systems that combine sensing, actuation, control, and embedded computation to meet specified technical and operational requirements.

b. **Concentration Outcome RA-2: Automation Implementation in Industrial Contexts**
   Graduates will be able to implement, program, and deploy automation and control solutions using industry-relevant tools, platforms, and standards, while considering safety, reliability, and operational constraints in real-world applications.

Will new courses be created for this concentration?

_____Yes
__X__No

If yes, list new courses and if proposals have been submitted:

Name of Person who Submitted Proposal: Guoping Wang

Contact Information (phone and email): wang32@pfw.edu (260)481-6036

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School or College: ETCS

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- ECE 46500 – Embedded Systems
- ECE 47800 – Robotics and Automation
- ECE 44901 – Machine Learning
- ECE 31000 – Motor and Engine Control
- ECE 56900 – Intro to Robotic
- ECE 66100 – Computer Vision
- ECE 49500 – Selected Topics in Electrical Engineering (3 credits)
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Liaison Librarian Memo

Date: 2/16/2026

From: Sarah Wagner, Information Services and Instruction Librarian

To: Dr. Carl N. Drummond, Vice Chancellor for Academic Affairs

Re: New ECE concentration in Robotics and Automation

Describe availability of library resources to support proposed new program:

The proposed concentration in Robotics and Automation is primarily based on existing coursework and few additional library would be required to support this concentration. Most of the resources (databases, journals, books, etc.) most likely to be used by students and faculty in this program are either owned or subscribed to by the library at this time. The subject areas of robotics and automation are fast-changing and will require attention to keep the library's collection current.

Comments:

While currently the resources likely to be needed by these programs are available, the library will need to take continuing support of these programs into its future budget requests in order to maintain current subscriptions and to consistently update the print and electronic collections in this area.

Sarah Wagner 1-12-2026

Liaison Librarian Signature *Date*

Please email academic_program@pfw.edu with questions about this form.
Send signed original to Associate Vice Chancellor for Academic Programs
Kettler Hall, Room 174