



Bachelors of Applied Science in
ROBOTICS AND
ARTIFICIAL INTELLIGENCE



Program Proposal
October 2020

**EDMONDS
COLLEGE**
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New Degree Program Proposal Cover Sheet

Program Information

Institution Name: Edmonds College

Degree: Robotics and Artificial Intelligence BAS CIP Code: 11.0202

Name(s) of the existing technical associate degree(s) that will serve as the foundation for this program:
Robotics & Automation Technology AAS-T CIP Code: 15.0303 Year Began: 2020

Planned Implementation Date (i.e., Fall 2014): Spring 2022

Proposal Criteria: Please respond to all eight (8) areas listed in proposal criteria FORM D.
Page Limit: 30 pages

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8/15/20

Date

Introduction

Edmonds College is very proud to bring forward this proposal for a new Bachelor of Applied Science in Robotics and Artificial Intelligence (BAS ROBAI). Inspired by industry need, the educational programming gap, and the sustained volume of employment in the computer technology sector, specializing in robotics and applications of artificial intelligence, this program was developed and scheduled to start Spring 2022.

Labor market data for this degree was described in the Statement of Need, as was how this degree aligns with the mission of the college. This Program Proposal aims to demonstrate Edmonds College's commitment and readiness to offer this baccalaureate pathway. Edmonds College has experience implementing and establishing baccalaureate pathways through our BAS degree programs in Child, Youth, and Family Studies (Fall 2017), IT Application Development (Fall 2020), and Advanced Manufacturing and Materials Engineering Technology (Fall 2021). In January 2019, Edmonds College was approved as a baccalaureate degree-granting institution by Northwest Commission on Colleges and Universities (NWCCU). We will leverage our colleagues' work and use lessons learned from prior BAS program development experiences to adopt best practices to launch and implement this new BAS program successfully.

The college worked closely with the Center of Excellence for Information and Computing Technology (CoE for ICT) throughout the curriculum development process. The CoE for ICT worked with its robust advisory committee to identify the skills gap in the local labor market. Feedback received in the employer survey was used to validate the information collected from CoE for ICT. A set of upper-division classes, focusing on robotics and artificial intelligence, were created, addressing the skills gap. These classes, along with existing IT Application Development classes, were used to create an interdisciplinary degree that meets industry needs.

Next, the Engineering Technology (ETEC) Advisory Committee reviewed the proposed curriculum, which generated a lively discussion and enthusiastic support. Appendix 8 shows a full list of Advisory Committee members. The ETEC Advisory Committee members voted to approve the degree on May 13, 2020; see Appendix 9 for meeting minutes. We are currently developing strategies to increase the number of ETEC Advisory Committee members and to recruit members interested in serving on the new BAS ROBAI Advisory Committee. Finally, the faculty of two universities vetted the degree for this application.

Standard 1: Curriculum Demonstrates Baccalaureate Level Rigor

Appropriate Rigor

As a basis for establishing and demonstrating baccalaureate level rigor, the BAS ROBAI degree applied the Rigor/Relevance Framework model developed by the International Center for Leadership in Education (ICLE).¹ Figure 1 below illustrates the relationship between the complexity of thinking and flexibility of application.

The six levels on the X-axis look at the increasingly deep application of knowledge through action using Bill Daggett's Application Model.² On the Y-axis, Bloom's Taxonomy shows an increasingly deep assimilation of knowledge.

Figure 1: Rigor/Relevance Framework

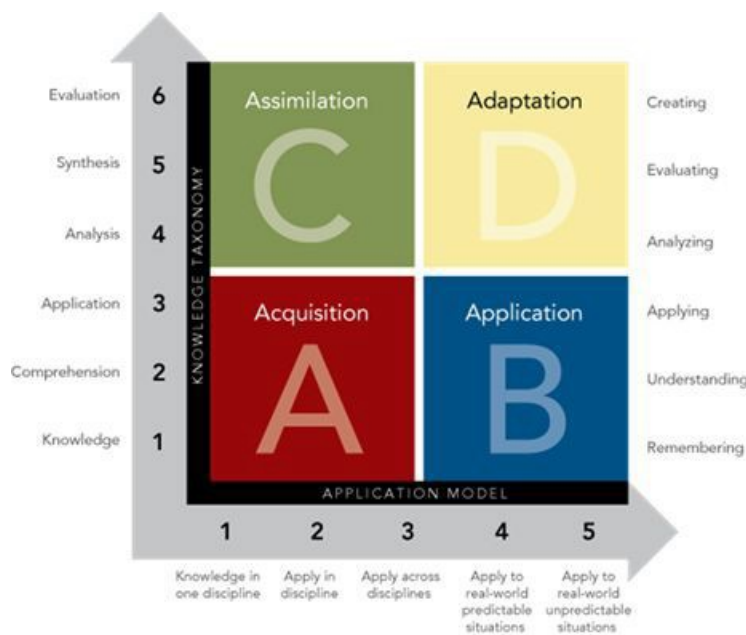


Table 1: Framework Quadrants Defined

A - Acquisition	Students gather and store bits of knowledge and information. Students are primarily expected to remember or understand this knowledge.
B - Application	Students use acquired knowledge to solve problems, design solutions, and complete work. The highest level of application is to apply knowledge to new and unpredictable situations.
C - Assimilation	Students extend and refine their acquired knowledge to use that knowledge automatically and routinely to analyze and solve problems and create solutions.
D - Adaptation	Students have the competence to think in complex ways.

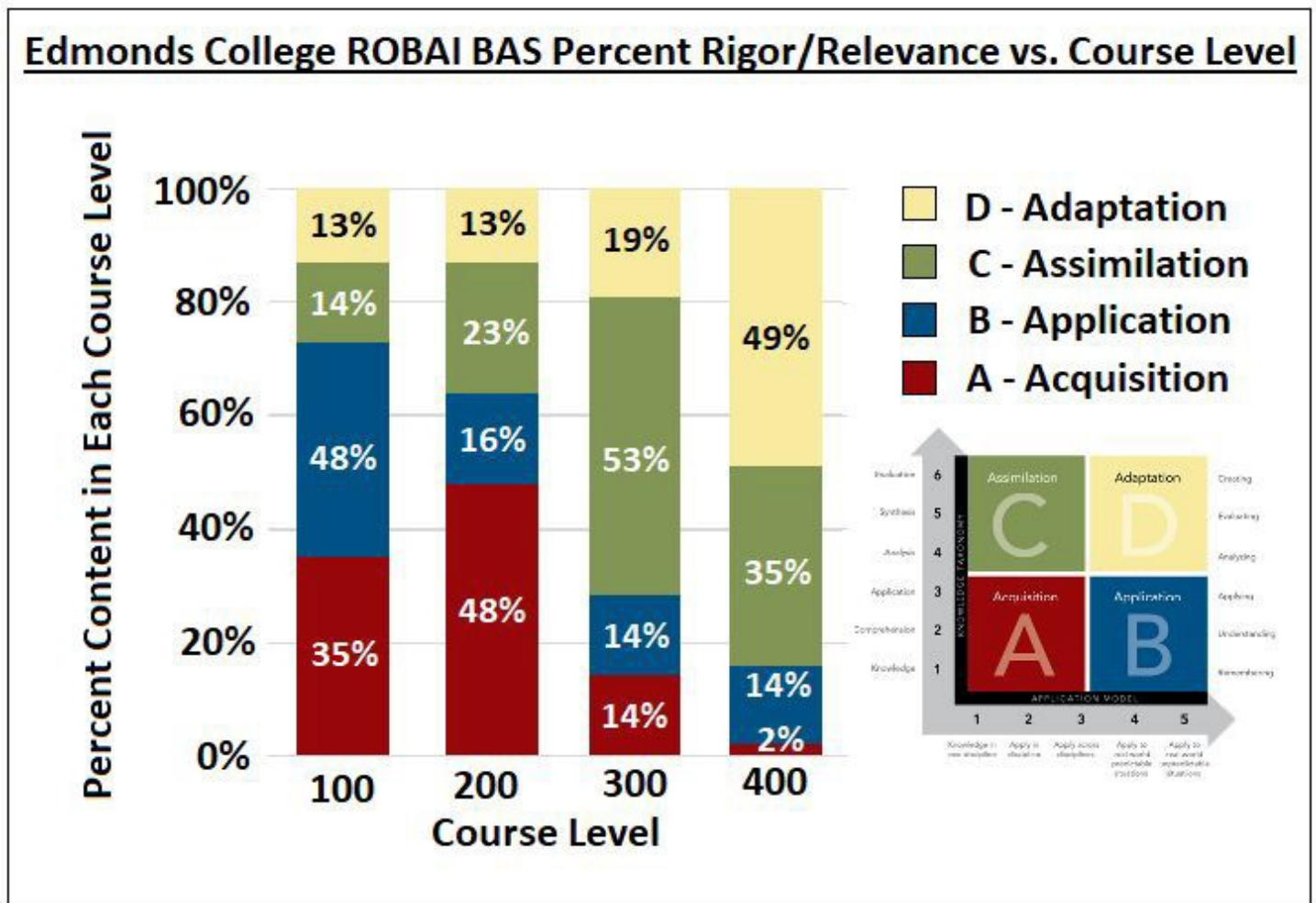
Edmonds College borrowed the Rigor/Relevance Framework adaptation, which was created by Pierce College, to demonstrate that the upper-division courses are appropriately rigorous for the 300-400 class range

¹ International Center for Leadership in Education (2014)

² Daggett, B., If Not Common Core, Then What?: Rigor and Relevance: The Foundation of Effective Instruction. International Center for Leadership in Education. (2014).

(Figure 2). Following this framework, the faculty evaluated and mapped the course outcomes of the upper-division and lower-division classes (100-200 range) to each quadrant. This process ensures that students in 300 and 400 level classes develop skills that fall in Assimilation (quadrant C) and Adaptation (quadrant D). Through Figure 2, the reader can see the lower level classes (100 and 200 level) focus on acquisition and application while the upper-division classes (300 and 400 level) focus on assimilation and adaptation. The focus on assimilation and adaptation requires more complex thinking, flexibility in application, and an increasingly deep assimilation of knowledge.

Figure 2: ROBAI Course Level Outcomes Summary Breakdown by Course Level Using the Rigor Relevance Framework



Program Evaluation Criteria and Process

For the first few years, the entire pathway, including this degree, will be heavily scrutinized as the program is built, tried, and adjusted to achieve the best outcomes for students. Assessment will start with the lead faculty, gathering feedback from stakeholders. Feedback sources may include adjunct faculty teaching in the program, faculty who are teaching general education classes, local employers (once there are graduates), and students in the first few cohorts. In addition to this critical feedback, an advisory committee will be set-up for the program. The committee will frequently meet during the first three years of the program to review course and program outcomes and any feedback gathered by the lead faculty.

After that, Edmonds College has a Program Review process that requires a detailed look at each program on a three-year cycle. The method for assessing programs and program-level outcomes can be reviewed on the college's Assessment webpage at <http://www.edcc.edu/assessment/>. The table below shows the enhancements made to the program review process for the BAS Degree:

Table 2: Program review process for BAS (See Appendix 5 for further details on the program review process)

	Standard Edmonds College Program Review Process	Enhanced Review Process for BAS ROBAI Program
Course Review	<ul style="list-style-type: none"> ● One-third of courses reviewed annually ● Updates to course learning objectives and assessment procedures ● Involves faculty, division dean, and curriculum committee (if significant changes needed) 	<ul style="list-style-type: none"> ● All courses reviewed annually for the first three years of the program ● Updates to course learning objectives and assessment procedures ● Will involve faculty, BAS Manager, division dean, and curriculum committee
Program Review	<ul style="list-style-type: none"> ● Every three years ● Includes analysis of enrollment trends, industry standards, program learning outcomes, completion rates, and resource allocation ● Involves faculty, division dean, curriculum committee, and Executive Vice President for Instruction 	<ul style="list-style-type: none"> ● Annually for the first three years of the program ● Focus groups of current students will be held annually ● Surveys of current students, graduates, and employers are conducted annually ● Will include analysis of enrollment trends, library and student services support, industry standards, program learning outcomes, completion rates, employment data, and resource allocation ● Will involve faculty, BAS Manager, division dean, student services, library representative, curriculum committee, and Executive Vice President for Instruction
Involvement of the Advisory Board	Meets twice a year for input and approval	Will meet at least quarterly (or more frequently if needed) for first three years of the program for input, detailed review, refinement of courses and degree, and approval

Robotics and Artificial Intelligence BAS Degree

The BAS ROBAI degree comprises three areas, 60 credits of technical education, 60 credits of general education, and 60 credits of upper-division classes. Each of these areas is outlined in Table 3 and described in detail below. The degree was developed with assistance from the Center of Excellence for Information and Computing Technology (CoE for ICT). The CoE for ICT worked with their advisory committee members to build the program level outcomes (PLO's) and 25 credits of upper-division ROBAI course level outcomes (CLO's). The remaining upper-division credits will consist of a ROBAI Capstone class (5 credits) and classes from Information Technology Applications Development (ITAD) BAS program (30 credits). After the CoE for ICT reviewed our newly developed ITAD BAS classes, the group decided that six classes would appropriately complement the ROBAI courses, providing students with the combination of skills employers requested.

Graduates of the BAS ROBAI program will enter the workforce with skills and knowledge in application development, computer vision, robotics, applications of artificial intelligence and machine learning, autonomous systems, robotics/mechatronics design, and language and speech technology. The skills gained prepare graduates for careers as Application Developers, Data Analysts, Analytics Consultants, Software Development Leads, Controls Engineers, or similar positions.

The Program/Degree Outcomes

BAS Outcomes - Upon completion of the BAS ROBAI, students will:

1. Solve analytical and statistical problems, implement machine learning algorithms, design and test embedded software, and develop robotic control commands using appropriate software languages and libraries.
2. Model, design, and analyze embedded system hardware and software architectures and communication protocols.
3. Design and construct models and prototypes for robotics and embedded electronics using additive manufacturing (3D printing.)
4. Identify, evaluate, and implement multiple robotic sensing systems, including computer vision, voice recognition, tactile and proximity sensors, and environmental/scientific probes.
5. Demonstrate an understanding of the applications and trends in AI, machine learning, and robotics and their societal and ethical implications.
6. Apply research and critical thinking to solve technological problems in machine learning and robotics.
7. Utilize effective communication skills when working in groups, writing specifications and documentation, and presenting ideas to stakeholders.

The BAS ROBAI curriculum will additionally incorporate effective research strategies, appropriate research search tools and techniques, and emphasize essential legal and ethical issues relating to information use. These skills ensure graduates have the research and information literacy they need to be successful in the workforce.

Table 3: BAS ROBAI Degree

Category	Course	Course Title	Credits
Proficiency (60 credits from AAS-T)	100 and 200 level	Foundational Courses in Electronics Technology, Mechatronics, Robotics & Automation, or similar program	60
General Education (60 credits)			
Communication	ENGL&10 1	English Composition	5
Communication	ENGL&23 5	Technical Writing (strongly recommended)	5
Quantitative Symbolic Reasoning	MATH&141	Pre-calculus I	5
Humanities	CMST&210	Interpersonal Communication (strongly recommended)	5
Humanities		Any Humanities course from the distribution list	5
Natural Sciences	CS 115	Intro to Computer Programming or equivalent	5
Natural Science (Lab)		Any Lab Science	5
Social Sciences	PHIL 110	Contemporary Moral Issues	5
Social Sciences		Any Social Science course from the distribution list	5
General Elective	MATH&146	Statistics	5
General Elective		Any course from distribution lists	5
General Elective		Any course from distribution lists	5
Upper Division (60 credits from BAS ROBAI)			
	ITAD 300	Software Engineering	5
	ITAD 315	Discrete Math for Developers	5
	ITAD 330	Database Models and Design	5
	ITAD 360	Application and Data Integration	5
	ROBAI 370	Advanced Computer Vision/Sensors	5
	ROBAI 380	Architectural Robots & Mechatronic Design	5
	ITAD 400	Mobile Applications	5
	ROBAI 401	Language and Speech Technology	5
	ROBAI 405	Advanced AI & Applications for Machine Learning	5
	ROBAI 410	Autonomous Systems	5
	ITAD 430	Embedded Systems	5
	ROBAI 415	Capstone I	5
Total Credits for BAS ROBAI Degree			180

Technical Associates Degree Course Preparation (Proficiency Requirements)

Staff anticipates the student applicants for the BAS ROBAI will come from diverse backgrounds and educational/work experiences, such as Robotics & Automation, Mechatronics, Electronics Technology, or other similar programs. With this in mind, the program was developed with minimal entry requirements barriers and opportunities for students to complete the required courses to prepare them for the content and increased rigor of upper-division classes.

Students may apply to the program once prerequisites have been completed. Prerequisites include:

- Associates degree (should include 60 proficiency credits)
- ENGL&101 English Composition
- MATH&141(or higher)
- Humanities (CMST&210 recommended)
- Introduction to Computer Programming

The Edmonds College Robotics & Automation Technology AAS-T (Appendix 2) will provide a seamless transition for students applying for the BAS ROBAI program. Students completing an associate degree at another Community and Technical College (CTC) will be encouraged to apply. Still, they may need to take additional classes depending on the degree completed and prior work experience. Additional coursework may include computer programming classes (Java I and II or C++ I and II) and an introductory course in robotics and artificial intelligence. These classes provide students with the important foundational knowledge needed to prepare them for the upper-division coursework. Students should complete these classes within the first year after acceptance into the program. A work history and educational transcript(s) will be reviewed during the admission process to help students transition smoothly. This review will determine which classes are needed (if any), and to create a personalized plan for completion. Edmonds College staff will work closely with local CTC's offering programs in robotics & automation, mechatronics, and electronics technology to promote the BAS ROBAI program and develop clear pathways for interested students.

Students will also need to demonstrate the core abilities desired for the robotics and artificial intelligence industry. These abilities can be developed directly through employment or indirectly through a variety of alternative careers or educational experiences. Core foundational skills including the following:

- Analytical and Problem -Solving Skills: Must be able to recognize the needs of customers and analyze and assess relevant information to create applications that answer those needs. They must also be able to think critically and make decisions that move the project forward.
- Communication: Must be able to clearly communicate their ideas to teammates, management, and customers.
- Creativity : Must think creatively to help invent new ways of approaching problems and developing innovative ways of using artificial intelligence applications.

- Customer-Service: Need excellent customer service skills to answer questions and fix issues.
- Attention to Detail: Understand that applications have many parts, and all must work together for the application to function.
- Teamwork: As part of a large team, employees must have the ability to work well with others.

Of these foundational abilities, many, if not all, can be demonstrated through a completed degree and relevant coursework at the 100 and 200 level at any community or technical college.

General Education Requirements

Besides the technical education credits, students are required to complete 60 credits of general education classes. The credits include distribution areas such as Communication, Humanities, Social Sciences, and Natural Sciences. Students completing any AAS-T in Washington will have met at least 20 of these credits; Edmonds College graduates will enter the program with 30 general education credits. Through the development process, a few classes have been identified as required or strongly recommended. These classes include English Composition (required), Technical Writing (required), Pre-calculus (required), Interpersonal Communication (strongly recommended), and Ethics (strongly recommended). Table 3 above shows how these classes can be used to meet some of the required distribution areas. When possible, Edmonds College will apply any additional courses a student completes, including prerequisite classes, to the general education credits. Suppose a student has general education classes remaining. In that case, they can choose from a robust selection of classes offered in various instructional modes, allowing students to complete the remaining requirements while working on upper-division courses. As previously stated, Edmonds College will evaluate all transcripts a student submits for evaluation and is committed to transferring all general education credits whenever possible.

Upper Division Coursework

The BAS ROBAI has 60 credits of upper-division classes, which Edmonds College plans to offer in an evening, hybrid format. The 60 credits include 30 credits of ITAD coursework and 30 credits of newly developed ROBAI coursework. The mixture was decided on and developed with assistance from CoE ICT. The Center of Excellence Director worked with their advisory committee and local employers to identify skills and knowledge needed in the field at the baccalaureate level. After reviewing the feedback, Edmonds College and the CoE ICT determined existing ITAD classes covered half the content identified, and the college would complete the development of the remaining classes. Since the college did not initially have expertise in artificial intelligence on campus, staff and faculty leaned on the CoE ICT to develop the course level outcomes for the ROBAI coursework. The advanced classes cover a collection of topics to prepare graduates for employment in application development or robotics technology, specializing in artificial intelligence. These upper-division classes include Advanced AI & Applications of Machine Learning, Architectural Robotics & Mechatronics Design, Autonomous Systems, Language & Speech Technology, Embedded Systems, and Database Models & Design. A full list

of classes, including descriptions and course-level outcomes, can be found in Appendix 6. Additionally, Appendix 7 outlines a sample of full-time and part-time sequence of classes.

Standard 2: Qualified Faculty

Edmonds College will open a full-time, tenure-track faculty position to lead and teach in this new degree program, with a minimum educational level of master's degree required, with a doctorate strongly preferred (see Appendix 3 for the drafted job description/posting). A combination of both education and practical experience is critical, and the dean is optimistic that Edmonds College can draw candidates with both a doctorate and field experience. This new faculty member will be the lead instructor teaching many of the core courses in the degree and further developing the new program.

The BAS faculty member will work closely with the Engineering Technology and Computer Science department faculty who first envisioned the degree and outlined the curriculum, to ensure a smooth transition for students from the AAS-T pathway and to make sure that the feedback collected during the curriculum development process is honored. The new BAS faculty member will also serve as the department head, which means he or she will assist with finding and interviewing part-time faculty, scheduling courses, and advising students. Edmonds College provides release time for the lead faculty member to do this work.

The General Education courses listed at the 100 to 200 level will be taught by existing college faculty in the specific discipline. Edmonds College requires that faculty teaching transfer courses hold a minimum of a master's degree. Some of our existing faculty members have earned doctorates. In addition, if any upper-division general education courses are developed, the educational requirements for faculty teaching will be increased to require a doctoral degree.

The initial expectation is for there to be a total of about 1.25 FTEF of teaching load needed in the program (including release time for the lead faculty member), increasing to 2.0 with the addition of a second student cohort. This does not include the faculty teaching General Education courses. Students in the program will be taking these already-existing courses with the regular student population. If there are specific courses that most of the BAS students need and are not available at a convenient time, they will be added to the class schedule as needed.

Edmonds College intends to hire the one tenure-track position mentioned before, and cover the other courses with adjunct faculty who specialize in a particular curriculum-content area (for example, Speech and Language Technology) so that experts teach the students. All faculty members who teach at least 10 credits per quarter will be certified as professional-technical instructors, with a professional development plan on file. All faculty who consistently teach 10 credits per quarter or more in the Engineering Technology program, and all administrators of those programs, meet the professional-technical certification standards required in the Washington Administrative Code.

Below is a table showing the credentials and departmental affiliation of some of the current Edmonds College faculty (Table 4) and some of the faculty teaching General Education courses (Table 5).

Table 4: Credentials and Departmental Affiliation of Edmonds College Faculty Who May Teach as Adjunct in BAS ROBAI Program

Faculty Name	Credentials	Edmonds College Department	Years of Professional/Teaching Experience
Ross Monroe	MS Engineering	Engineering Technology	27 years of professional experience, 11 years of teaching.
Mark Einfeld	MSc – Information Technology	Computer Information Systems (CIS)	5 Years of professional experience, 13 years of teaching.
Linda Zuvich	MS Physics, MS Software Engineering	Computer Science	20 years of professional experience, 13 years of teaching.
William Hamp	Ph.D. Aeronautics and Astronautics Engineering	Engineering	7 years of professional experience, 7 years of teaching.
Haley Benjamins	MS Library Science	Library	8 years of teaching experience
Louis Ho	MS - Electrical Engineering	Computer Information Systems (CIS)	25 Years of professional experience, 15 years of teaching experience

Table 5: Small Sample of Edmonds College Faculty Teaching General Education Courses

Faculty Name	Credentials	Courses Teaching	Years of Teaching Experience
Rachel Wade	Ph.D.- Education MS - Ocean Physics	Physics	20 years
Thomas Murphy	Ph.D. -Anthropology	Anthropology	16 years
Kathleen Murphy	MA - English	English	30 years
Erin Davidson	MA - Communication	Communication	8 years
Patrick Averbeck	Ph.D. - Math Education MS - Applied Mathematics	Math	24 years
Tom Shelly	Ph.D. - Math MS - Math	Math	4 years
Susanne Meslans	MA - English	Humanities	38 years

Maria Kelly	MS - Hydrologic Sciences	Environmental Science	20 years
Frederick Weitz	MS -Psychology	Psychology	32 years
Jeff Owen	Ph.D. -Chemistry	Chemistry	15 years

The Edmonds College faculty are well-qualified to teach in their current roles, and some would be competitive for teaching individual classes within the BAS program.

Standard 3: Selective Admissions Process

Admissions Philosophy

Admission criteria have been developed to create opportunities for a broad range of applicants, consistent with the open-door admissions policy of Edmonds College while optimizing the potential for successful completion of the BAS ROBAI. The college demonstrates its commitment to diversity in the strategic plan goals, including a long-term strategy focusing on attracting a diverse student population by:

- Creating a welcoming place for all students to thrive in our global and intercultural learning environment.
- Bolstering the Adult Basic Education and English as a Second Language infrastructure (technology, staffing, and space) to respond to increasing demand.
- Increasing access, retention, and success for all students facing cultural bias and educational opportunity gaps.
- Enhancing recruitment presence in local communities by adding a bilingual outreach specialist to work with Latinx families and creating a college microsite translated into Spanish.
- Work with industry partners to identify targeted outreach strategies for incumbent workers.
- Develop marketing materials for the Outreach and Recruitment Team for campus and community events.

An example of our commitment to student diversity is the Center for Cultural Diversity and Inclusion, which serves all students, focusing on ethnically diverse, homeless, female, gay, lesbian, and other gender-diverse students. In addition to promoting cultural awareness and advocacy, the center provides resource assistance to help students:

- Understand and adapt to college life
- Connect to a conversation partner program to help second-language speakers with English
- Resource library with items student can check out for a full quarter
- Computer lab with Internet access for students

Admissions Requirements

As stated previously, Edmonds College anticipates a diverse application pool applying to this program. Keeping with our open-access mission, we have developed admission criteria that allow students with various degrees to apply to this program. With that in mind, prospective students need to have demonstrated completion of a 90-credit associate degree, ENGL&101 English Composition, MATH&141 Precalculus, Introduction to Computer Programming, and a Humanities course before applying to the BAS ROBAI program. Students completing the Robotics and Automation Technology AAS-T (Appendix 2) at Edmonds College will have a seamless transition into the upper-division classes. They will not need to take any additional classes. However, due to the advanced nature of the upper-division classes, students completing a two year-degree at any of the other CTC's can apply and be admitted into the program but may be required to complete additional classes to help prepare them for the upper-division content. These classes include Introduction to Robotics and Artificial Intelligence, Java (I and II) or C++ (I and II). This set of classes must be completed within the first year of being admitted into the program. During the application process, Edmonds College will make every effort to review prospective students' previous work and educational experiences to identify and waive or transfer all equivalent credits. The remaining classes needed would be built into their individualized education plan from the beginning, so students have a clear path to completion from the start. Table 6 shows a list of prerequisite classes required for the program.

Table 6: Prerequisite Courses

Course	Title	Credits	Prerequisite
Associate Degree	Any two-year degree - recommend: Mechatronics, Robotics and Automation, Information Technology, or Electronics Engineering	90+	Prerequisite
ENGL&101	English Composition	5	Prerequisite
MATH&141 (or higher)	Pre-calculus I	5	Prerequisite
CS 115 or similar course	Intro to Computer Programming	5	Prerequisite
Humanities	Any course from distribution list (CMST&210 recommended)	5	Prerequisite

A minimum Grade Point Average (GPA) of 2.0 in the prerequisite classes and a minimum overall GPA of 2.0 in an associate degree is required. Conditional admission may be considered on a case-by-case basis for students who are only one or two classes short of an applicable degree. Meeting minimum

requirements will not guarantee admission, as the number of applicants may exceed the number of available enrollment spaces.

In addition, the applicants will turn in:

- A completed application for the BAS ROBAI Degree Program.
- A copy of official transcripts showing a minimum 2.0 GPA in prerequisite class and a minimum overall GPA of 2.0 in an associate degree.
- Statement of Purpose, answering the following questions:
 1. How does this degree fit into your long-term career goals?
 2. Employers have identified core abilities desired in the industry, including analytical thinking/problem solving, communication, creativity, attention to detail, teamwork, and customer service. Tell about a time when you demonstrated one or more of these abilities in your work or education.
- A resume that describes relevant work and skills, and includes internships, work-study, and volunteering activities.

Selection Process

Suppose the number of qualified applicants exceeds space availability. In that case, the selection committee will evaluate the individual applicants on specific criteria to determine acceptance into the BAS Program, a draft process listed below. Completed applications meeting a minimum requirement submitted by the priority deadline will receive first consideration. The selection committee will consist of the BAS Manager, two faculty members, a representative from enrollment services, and the division dean.

Prior to the selection of the first cohort, the selection committee will develop specific criteria for use in a scoring rubric that will quantify a final numeric score for each candidate. These criteria will be consistent with the BAS ROBAI program's intentions, with consideration of professional career goals, the strength of transcripts, the relevance of work experience, and the substance of the statement of purpose. Edmonds College has a strong commitment to increasing equity and inclusion competencies across campus. With this in mind, all members of the selection committee will complete an Edmonds College equity and inclusion training. Topics to be covered in training include Equity Mindedness, Implicit Bias, Cognitive Errors, and Microaggressions. The training will be held no more than three weeks before reviewing student applications, ensuring that concepts are fresh in committee members' minds.

The drafted selection process is as follows:

1. Review of each application and application materials.
2. Committee members will rate each applicant based on the scoring rubric.
3. Review and discussion of each applicant by the committee. Should disagreement regarding ratings for an applicant occur, the committee will review the application in question and reach a consensus on the rating.

4. Identification of the top candidates, based on ratings, to fill the available spaces. A waiting list will be developed, should not all of the selected candidates subsequently become enrolled in the program.

Standard 4: Appropriate Student Services Plan

In spring 2016, a BAS Implementation Team (I-Team) convened to ensure that the college hit all the milestones and was well-prepared to offer the newly approved BAS programs. This team consists of:

- VP of Workforce Development and Training (lead)
- Faculty Representatives from Relevant Instruction Departments
- VP of Finance and Operations
- Exec. VP for Instruction
- VP for Student Services
- Dean of Health and Human Services
- Dean of Student Success - Entry and Enrollment
- Dean of Student Success - Retention and Completion
- Director of Reporting and Records Management
- Director of Financial Aid
- Director of Advising
- Dean of Library Services
- Director of Institutional Research
- Public Information Officer
- Exec. Director of Grants
- BAS Manager(s)
- Staff from the Workforce Development and Training, Instruction, Credentials, and Divisional Offices

This team was charged with sorting out all the details of onboarding bachelor's students and how to serve them best when they arrived. The I-Team continued to meet after Edmonds College's first BAS cohort began classes solidifying all the policies and procedures related to this new population. In November of 2019, the team reconvened in preparation for the new BAS degrees in development at Edmonds College in Information Technology Applications Development and Advanced Manufacturing and Materials Engineering Technology. This team will continue to meet twice per year (and as needed) to review and add support services for the new and continuing BAS programs.

To help the faculty manage the program, Edmonds College will leverage the STEM BAS Manager hired as part of the Advanced Manufacturing and Materials (AMMET) BAS program. The STEM BAS Manager will help form the first cohort and support both AMMET BAS and BAS ROBAI programs. The STEM BAS Manager will also provide pre-advising for students interested in the program, advise students who have completed an associate degree, and do a preliminary review of their transcript(s) to ensure the most seamless transition for each student. Included in Appendix 4 is a draft job description for the STEM BAS Manager position.

The STEM BAS Manager will be in charge of marketing the program, recruiting students, and facilitating agreements with master's degree programs. Additional responsibilities of the STEM BAS Manager include meeting with prospective, new, and ongoing BAS students for academic planning, helping with financial aid and scholarship opportunities, assisting with the registration procedures, and serving as a resource liaison to Edmonds College student services team. The STEM BAS Manager will collaborate primarily with the Engineering Technology and Computer Science faculty to maintain consistency of

quality and relevance of the career pathway in this BAS degree. The STEM BAS Manager is not a faculty member.

In addition to the STEM BAS Manager, students in the BAS ROBAI program will have access to all Edmonds College student services, resources, and activities. Described below are examples of student services and resources available on campus.

Advising

Advising is available in partnership with the students at each step of their academic experience. Pre-advising and orientation to college procedures and support services are carried out by the STEM BAS Manager. Enrolled students will meet regularly for advising and career planning with faculty advisors in the BAS program, which is part of their faculty load. This model maintains individualized support and guidance for furthering professional goals and opportunities in the field. As a matter of best practice, advising is an ongoing process in all programs at Edmonds College.

Enrollment Services

In addition to the individualized support of the STEM BAS Manager, the Enrollment Services staff members assist students with information about college resources and procedures in Registration, Assessment, and Enrollment processes. In response to the COVID-19 pandemic, all of these services are available now remotely.

Financial Aid

Specific opportunities for support of the bachelor's degree will be explored in an individualized manner by the STEM BAS Manager. The BAS revenue will support part of a Financial Aid Specialist position (.25 FTE). Students have access to Financial Aid in the form of scholarships, Worker Retraining funds, grants, and loans. Each new BAS budget supports a quarter of a full-time position. With the addition of the BAS ROBAI, one dedicated staff person will be allocated for BAS students.

Learning Support Center

The Learning Support Center provides additional academic support to students in strengthening their college-wide abilities in math, natural sciences, humanities, and social sciences. Assistance is available in three ways: drop-in at the Learning Support Center, enrollment in WRITE, a learning support class, and through e-tutoring, available 24/7. Tutors will be hired to help students in the BAS pathway. Tutoring will be offered either before or after classes or as part of the e-tutoring services, depending on student needs.

Library

The library has multiple resources that include: books, eBooks, academic searches, and extensive databases that provide access to articles and periodicals in a broad range of subjects that would be appropriate for the BAS students' research and learning process. BAS funds will be used to enhance the collection on an ongoing basis and help pay a librarian (.25 FTE). The designated library faculty member will be available for student support throughout the bachelor's program. They will also serve as a research guide for the capstone project. The library also provides desktop computers on-site, and students can check out laptop computers for off-campus use. All students have access to the wireless network in the library and throughout the campus. Rooms are available in the library for group projects, video-taping, and study sessions.

STEM Study Room

The STEM Division has a dedicated STEM study space (STEM Study Room) where Edmonds College students can get free drop-in academic support from tutors and STEM faculty. The area is open five days a week and staffed at all times with any of the following: STEM faculty, staff, and student tutors. The tutors are current Edmonds College students who have taken advanced coursework in Math, Biology, Chemistry, Physics, Computer Science, and Engineering. The study room is an excellent place for students to connect and collaborate with STEM faculty and staff. In addition to the free tutoring, the STEM Study Room is equipped with whiteboard tables, LCD screens, textbooks, headphones, Engineering laptops, and Chromebooks for in-room use. Complimentary snacks and drinks are provided for students.

Credentials and Evaluation

The STEM BAS Manager and BAS ROBAI faculty will work with the credentials evaluators to determine appropriate course equivalencies for students coming from other institutions. The Registrar's Office staff will conduct degree evaluations for incoming students where needed.

Other Student Service Offices

Several other service areas will be available to BAS students. These offices include the Diversity Student Center, the Services for Students with Disabilities office (SSD), the Center for Student Engagement & Leadership, the Veterans Resource Center, the Counseling Center, and Academic Computer Services. Each of these offices is robust enough to offer their services to this new population of students without needing additional support, and their service offerings are appropriate for baccalaureate students. As the program proceeds, the college is committed to increasing services to meet the needs and provide better support baccalaureate-level student's learning.

Standard 5: Commitment to Build and Sustain a High-Quality Program

The college is committed to resourcing this degree appropriately so that the program will be successful. This commitment includes significant investment to date and continuing through until the program becomes self-sustaining. The expected demand for this program, and program graduates, is high, and the estimated revenue shows that it could reach sustainability in Year Two.

To estimate revenues, we started by defining how many we expect in each cohort, and when we expect them to finish:

Table 7: Estimated Number of Students per Cohort

Estimated Number of Students per Cohort					
	Year 1	Year 2	Year 3	Year 4	Year 5
	2022-23	2023-24	2024-25	2025-26	2026-27
Cohort 1 - 2022	20	*16	**4		
Cohort 2 - 2023		30	24	6	
Cohort 3 - 2024			30	24	6
Cohort 4 - 2025				30	24
Cohort 5 - 2026					30
	20	46	58	60	60
* Assumes 80% retention rate					
** Assumes some students will take into the 3rd year to complete their degree					

Next, we estimated how many students will take a full load of 15 credits, how many might be part-time, and how many international students might enroll in the program:

Table 8: Estimated Number of Students at Each Credit Load

Estimated Number of Students at Each Credit Load (annual average)					
	Year 1	Year 2	Year 3	Year 4	Year 5
	2022-23	2023-24	2024-25	2025-26	2026-27
# of students taking 10-15 credits/qtr	18	42	47	50	50
# of students at FT non-resident tuition		2	2	5	5
# of students at 5 upper-division credits/qtr	2	2	2	5	5

The Tuition Calculator on the State Board's website was used to record annual tuition revenue for each type of student. Students pay for upper-division credits 1-10, but after that, the credits are free. So, students taking 10 or more credits pay the same. Table 9 assumes that tuition will increase once, by 3%, in the next five years.

Table 9: Annual Tuition at Differing Credit Load

Tuition at Differing Credit Loads (excluding fees; based on SBCTC 2019-2020 tuition table)					
	Year 1	Year 2	Year 3	Year 4	Year 5
	2022-23	2023-24	2024-25	2025-26	2026-27
Annual Tuition -Student taking 10-15 credits/qtr	\$6,056	\$6,056	\$6,056	\$6,238	\$6,238
Annual Tuition - FT non-resident (15 cr/qtr)	\$18,168	\$18,168	\$18,168	\$18,713	\$19,713
Annual Tuition - PT student (5 cr/qtr)	\$3,054	\$3,054	\$3,054	\$3,146	\$3,146

Finally, we can take the number of expected students of each type and multiply that by the expected annual tuition rate to estimate the tuition revenue for the program each year:

Table 10: Total Revenue Estimate

Total Revenue Estimate					
Calculation (#students * tuition rate)	Year 1	Year 2	Year 3	Year 4	Year 5
	2022-23	2023-24	2024-25	2025-26	2026-27
10-15 credits resident	\$109,008	\$254,352	\$284,632	\$311,900	\$311,900
FT non-resident	\$ 0	\$36,336	\$36,336	\$93,565	\$93,565
resident 5 credits	\$6,108	\$6,108	\$6,108	\$15,730	\$15,730
TOTALS	\$115,116	\$296,796	\$327,076	\$421,195	\$421,195

Note that this revenue projection is only including tuition revenue. While it is likely that the college will receive state funding for the enhanced FTEs (Full Time Equivalent Students), the college's operating budget will absorb the additional revenue. Estimating revenues in this manner allows the college to compare the additional revenue associated with the program to incremental expenses that will come to the college. The chart below is a reasonable estimate of the other expenses the college is prepared to bear related to this program:

Table 11: Projected Expenses

Projected Expenses						
Expense	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
FT Faculty (Instruction - 1.0 FTE after Year1)	\$ -	\$31,930	\$63,860	\$65,776	\$67,749	\$69,781
PT Faculty (Instruction - .66 FTE after Year1)	\$ -	\$4,432	\$24,554	\$25,291	\$26,050	\$26,831
Curriculum/ Program Development	\$20,000	\$ 10,000	\$10,000	\$ -	\$ -	\$ -
BAS Manager (.5 FTE)		\$ 14,750	\$29,500	\$30,370	\$31,281	\$32,219
Librarian (.25 FTE)		\$15,965	\$15,965	\$16,444	\$17,445	\$17,968

Financial Aid (.25 FTE)		\$5,000	\$10,300	\$10,609	\$10,926	\$11,255
Credentials (.25)		\$10,000	\$10,300	\$10,609	\$10,926	\$11,255
Personnel (wages)		\$92,077	\$164,479	\$159,099	\$164,377	\$169,309
Benefits (30%)		\$27,623	\$49,343	\$47,729	\$49,313	\$50,792
Total personnel		\$119,700	\$213,822	\$206,828	\$213,690	\$220,101
Library Resources	\$ -	\$20,000	\$20,000	\$15,000	\$15,000	\$15,000
Goods and Services*		\$6,000	\$6,000	\$6,000	\$6,000	\$6,000
Professional Development, Research, and Travel		\$ 3,000	\$3,000	\$4,000	\$4,000	\$4,000
Projected Expenses	\$20,000	\$148,700	\$242,822	\$231,828	\$238,690	\$245,101
*Marketing dollars will be allocated from Workforce funds at \$4,000 per year for this program.						
Salaries are assumed to increase by 3% in years 3, 4, and 5						

Table 12: Projects Revenue vs. Projected Expenses

Projected Revenue vs. Projected Expenses						
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Projected Revenue	\$0	\$115,116	\$296,796	\$327,076	\$421,195	\$421,195
Projected Expenses	\$20,000	\$148,700	\$242,822	\$231,828	\$238,690	\$245,101
Total	(\$20,000)	(\$33,584)	\$53,974	\$95,248	\$182,505	\$176,094

The college will hire new personnel for the program, starting with one full-time tenure-track faculty position to be funded at least one quarter before starting the program. Depending upon the expertise of the full-time faculty member, part-time faculty will fill gaps as needed, but for sure by Year 2, when the second cohort comes on board. In addition, as stated previously, the new program will leverage the STEM BAS Manager position. This position will be funded by 50% from the new ROBAI division and 50% from the AMMET division. Extra funds will be available to hire more personnel to other areas (financial aid, the library, and the credentials office) heavily impacted by the additional program. The college will leverage funds and staffing in other departments, such as in the Career Action Center, where the Internship Coordinator will help with the ROBAI students' practicums.

The College is prepared to continue to operate this program for the first three years, even if the enrollment is not as high as anticipated. Strong employer demand and Edmonds established employer relationships will be leveraged to develop partnerships that will help support the program and boost enrollment. If, after three years, the program is not yet self-supporting, the College will review the plan in an attempt to align expenses with the revenues or reach out to industry partners for program support.

Standard 6: Program Specific Accreditation

In January 2019, Edmonds College was accredited to offer bachelor level programming by the Northwest Commission on Colleges and Universities (NWCCU) accreditation board. The BAS ROBAI will be the fourth applied baccalaureate degree offered at Edmonds College.

At this time, Edmonds College will not be pursuing a specific industry -recognized accreditation. Suppose in the future; an industry -recognized accreditation is identified and recommended by our employers and Advisory Committee. In that case, the faculty will work with the appropriate accrediting body to acquire the needed approval.

Standard 7: Pathways Options Beyond Baccalaureate Degree

Edmonds College faculty and staff discussed the best career advancement opportunities for students completing the BAS ROBAI degree. The group looked at local universities offering Master's level computer science programs specializing in data analytics, artificial intelligence, and software engineering. The search identified three universities with potential options:

- Seattle University -
 - M.S. Computer Science
 - M.S. Computer Science: Data Analytics Specialization
 - M.S. Computer Science: Software Engineering Specialization
- UW Bothell -
 - M.S. Computer Science & Software Engineering
- Northeastern University Seattle -
 - M.S. Computer Science: AI Specialization

Edmonds College administrators sent information about the proposed degree to directors/deans of the master's programs listed above to open up a discussion about possible articulation agreements. At the time of writing this document, universities have not responded. However, staff and faculty look forward to hearing back from these graduate programs to discuss possible pathways for our graduates.

Finally, Washington State CTC's have a statewide articulation with WGU, which allows all BAS degrees to articulate to their Master's programs. Their Master's degree in Business Administration, Management & Leadership, or Data Analytics would be an excellent option for our place-bound students. Additionally, the college will continue to look for opportunities based on student interest and career goals.

Standard 8: External Expert Evaluation of the Program

Two representatives from two universities provided expert evaluations; faculty biographies are in Table 13. Both reviewers agreed that Edmonds College should move forward with developing the BAS ROBAI

degree. Each reviewer stated the field of robotics and artificial intelligence is growing rapidly, and the need for employees with these skills is needed. They both noted that the college needs to focus on refining topics and outcomes upon hiring a full-time faculty with expertise in robotics and artificial intelligence. Each reviewer provided valuable feedback on program design and content to help with further development of the program. Dr. Ahsan suggested adding courses covering Python programming language, statistics, linear algebra, and calculus. Dr. Ahsan also provided a couple of book suggestions covering ethics and artificial intelligence. Dr. Erdly suggested reviewing the sequencing of classes, exposing students to ROBAI topics earlier in their education. These are a great suggestion to consider as the college moves forward with curriculum development. Additionally, both reviewers agreed that the skillset presented in the program proposal is in demand across multiple sectors and would provide students with opportunities in the workforce.

Appendix 1 contains full evaluations and comments from reviewers. Two external reviewers provided Edmonds College feedback on this BAS ROBAI proposal. Edmonds College received the feedback and provided responses in the appendices.

Table 13: Biography of External Reviewers

Reviewer	Biography
<p data-bbox="99 873 469 947">University of Washington, Bothell</p> <p data-bbox="99 982 469 1192">William Walter Erdly, Ph.D. Chair, Division of Computing & Software Systems School of Science, Technology, Engineering, and mathematics (STEM)</p>	<p data-bbox="472 873 1523 1486">Dr. William Erdly is a graduate of the University of Washington Seattle, where he received his Ph.D. in social/organizational psychology. He is the Chair and Founder of the Division of Computing and Software Systems in the School of STEM and has been a member of the UW Bothell faculty since 1991. He has held research and leadership positions in a variety of industry and government technology organizations such as The Boeing Company (Defense and Space Group), Internap Network Services, various hospitals (Seattle VA Medical Center, Overlake Hospital Medical Center, and the University of Washington Medical Center), The Tulalip Tribes, and continues his involvement in entrepreneurship and software innovation. His on-going connection between academia and industry/government/community serves as a baseline for his research interests in social computing/analytics, knowledge management systems, human-computer interaction, game design/mechanics, wide area network (WAN) design/broadband access, computer science research methods, health care informatics, VR/AR simulation tools, and software engineering/project management. He is also the Director of the EYE Center for Children’s Vision, Learning and Technologies at UW B.</p>
<p data-bbox="99 1491 469 1528">San Jose State University</p> <p data-bbox="99 1591 469 1696">Salman Ahsan, Ph.D. Faculty, Mechanical Engineering</p>	<p data-bbox="472 1491 1523 1887">At present, most of my time is spent doing two things. First, I am a co-founder of an AI consultancy, where we work with domain experts to chart a strategic path for our clients regarding their data/AI/ML strategy. Second, I teach a course or two every term at San Jose State University or a local community college dealing with subjects as varied as Intro to Engineering, Python programming, Mechatronics, and Entrepreneurship. In a previous life, I was an engineer, manager, and executive in the semiconductor industry, working on the process and device integration. I studied at the University of Pennsylvania (B.S.E), Princeton University (Ph.D.), and the University of California at Berkeley (M.B.A).</p>

Conclusion

Edmonds College's commitment to building a rigorous, sustainable program can be seen throughout the program proposal. The skills and knowledge needed to meet this demand were described in the Statement of Need and supported by traditional labor market research. This program proposal was built with this knowledge in mind and was fully supported by the CoE ICT and by two external university-level reviewers.

The addition of a full-time tenure track faculty with specific expertise in robotics and artificial intelligence will help ensure the program is current, relevant, and students are taught by experts in the field while effectively leveraging the talent, expertise, and knowledge of the many highly qualified associate and tenured faculty within Edmonds College. To support the faculty with continuous review of the program, an advisory committee made up of local employers will be established. They will meet on an ongoing basis, more frequently at the start of the program and at least twice per year after that. The review process will help keep skills and knowledge up-to-date with industry standards ensuring graduates are competitive in the ever-changing job market.

The new faculty will work to refine the admission and recruitment process, focusing on open, equitable access for interested students. In addition, prospective and ongoing students will have the full support of the STEM BAS Program Manager who will assist in navigating the college process, available resources, financial aid, and potential pathways beyond the BAS degree. The college is focused on building a diverse cohort of students, assisting them through completion of the program and beyond. In closing, researchers believe we are on the verge of the Fourth Industrial Revolution. This revolution is described as the technological revolution and leading experts have predicted a significant growth in the computer technology sector, specifically in the area of robotics and artificial intelligence. A report by the World Economic Forum says, "that 75 million jobs will be displaced by artificial intelligence, robotics, and automation, but suggests that 133 million new jobs may be created."³ Advances in technology will change the way jobs are done, with machines learning to do the mundane, repetitive tasks, allowing humans to focus on more meaningful work. Edmonds College is ready to meet this demand by offering this innovative pathway for students, providing them the skills needed to start their career in the field of robotics and artificial intelligence.

³ The Future of Jobs 2018 <http://reports.weforum.org/future-of-jobs-2018/>

Appendix 1:

External Evaluator Review

Applied Baccalaureate External Review Rubric

College Name: Edmonds College

BAS Degree Title: Robotics and Artificial Intelligence

Reviewer Name/ Team Name: Dr. William Erdly

Institutional or Professional Affiliation: Division of Computing & Software Systems School of STEM
University of Washington Bothell

Professional License or Qualification, if any:

Relationship to Program, if any: None

Please evaluate the following Specific Elements

a) Concept and overview - Is the overall concept of the degree program relevant and appropriate to current employer demands as well as to accepted academic standards? Will the program lead to job placement?

Comment - The overall degree concept is in an area that is of growing interest and workforce needs. The knowledge areas covered in the proposed BAS-ROBAI degree are many and complex; the challenge will be to provide enough breadth to help students understand and experiment with a wide range of topics including software engineering, programming essentials, fundamentals of software and hardware architectures, mechatronics, usability, safety/security/risk management, sensors, knowledge/data systems, testing, and ethics – to name a few. The other challenge is to provide an opportunity for students to develop depth in one or more areas of relevance/interest. Also, it is important for baccalaureate students to be able to demonstrate their ability to learn on their own as they work on new and complex problems as they move into the workforce and/or advanced degrees.

The emphasis on AI is good – and appears focused on *implementation* of various AI methods and tools used in such systems. A challenge is the program may not adequately prepare students for deep-level work in designing and programming AI software, algorithms and methods – so it should be made clear to prospective students and employers what the degree does and does not do in this space. For example, we are currently considering an AI specialty/minor within our own undergraduate program within our Division at UWB, and it is difficult to assure proper prerequisite knowledge is obtained – and depth of coverage is provided in our degree. And our degree will not have the additional courses related to robotics included.

EC Response: We understand that the knowledge areas are vast at this point. Topics were chosen based on feedback from industry experts. The program will be further defined and focused once a faculty is hired and courses are developed. Continuous feedback from industry experts will be considered when developing the curriculum, and in the first few years once the program has started. This will ensure students are gaining the skills needed and the program is staying up-to-date with industry standards.

b) Degree Learning Outcomes - Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor?

Comment The degree appears to meet appropriate levels of rigor for a BAS degree. The rigor/relevance

framework identifying acquisition, application, assimilation, and adaptation provides a clear approach for content and experiential activities as they develop/focus across the four-year program. I recommend that more exposure and experience with robotics/AI/ML be provided to students at earlier stages (e.g., the sophomore level, maybe even during the first year of study ...) of the degree process. This will improve student engagement and enhance interest. The current proposal seems to provide much of “the good stuff” (from a student’s perspective ...), that is, the robotics/AI content and applied experience – during the last year of the program. Determining ways to spread this out more evenly across the curriculum will be much better for the students for many reasons (i.e., improved identity with the program, working with peers and faculty on relevant projects, student motivation, industry/research projects may start earlier, access to industry mentors for assistance as students face tougher core/fundamental courses).

The seven BAS outcomes are quite extensive – and may need to be further refined. They cover a lot of territory. Perhaps putting some methods in place for progress monitoring and outcomes data collection will be helpful in further clarifying goals and expectations of the curriculum. Realistic and specific metrics and benchmarks are essential – and are helpful in providing guidance as the curriculum is further developed.

EC Response: Thank you! This is a great suggestion. The sequence of classes will be reviewed and adjusted once the curriculum is fully developed. It is anticipated that courses will be moved and exposure and experience will be provided earlier in the program.

c) Curriculum Alignment - Does the curriculum align with the program’s Statement of Needs Document?

Comment I did not find a document entitled “Statement of Needs”; however, the job opportunities and demand discussion contained in the proposal appear to address this. I have provided my input regarding jobs in section i) below.

EC Response: Please let us know if you would like to review the Statement of Need document for more information.

d) Academic Relevance and Rigor - Do the core and elective courses align with employer needs and demands? Are the upper level courses, in particular, relevant to industry? Do the upper level courses demonstrate standard academic rigor for baccalaureate degrees?

Comment The courses provide a wide range of topics that are certainly of value to student and prospective employers. In reviewing the courses as outlined in three areas (proficiency, general education, and upper division), it appears the courses do a good job in providing alignment with employer needs for the job types as described. One observation/source of concern is that there are a considerable number of upper division courses that rely heavily on the current ITAD courses (50 %). I think it will be important to provide additional ROBAI-focused courses that provide the appropriate context and experience for your students. This is always a challenge for new, more specialized degree programs because it requires more specific faculty expertise and time to further develop such programs. One suggestion is to embed ROBAI-related projects and problems within the ITAD courses (via individual and/or group projects) that will provide opportunities for the ROBAI students (and possible industry mentors) to further explore the relevance and application of the core competencies of the ITAD courses.

Understanding the issues, challenges, and opportunities in this field is critical. I have no doubt that there will

be many opportunities in the workforce for students with this background. A challenge will be to see how well ROBAI graduates might compete with more traditional computer science and software engineering programs, as well as recent EE/ME/CS hybrid degrees that are emerging from more traditional four-year institutions. Many EE and ME programs are in the process of revamping their curricular offerings to provide more modern, interdisciplinary experiences for their students.

EC Response: This is a great suggestion and will be considered when the courses are fully developed by the faculty. The new faculty will work closely with the ITAD faculty to ensure ROBAI students are getting projects and problems related to their program. If this proves to be too difficult, a new ROBAI class may be developed to ensure students are building the knowledge needed to enter the workforce.

e) General Education Requirements - Are the general education requirements suitable for a baccalaureate level program? Do the general education courses meet breadth and depth requirements?

Comment Overall, the courses appear suitable for a baccalaureate program; however, it will be important to assure that the students have access to some 300- and 400-level general education, social science, science, and/or other courses that reflect an overall 4-year experience. This is challenging for colleges that focus on two-year programs; however, it might good to work with other programs to determine opportunities for junior- and senior-level courses. For instance, there may be some special topics in the sciences (e.g., courses in human cognition, other engineering courses, ethics, logic, advanced mathematics, or even special topics) that might be created to support this program – and would also be of interest to students (and faculty) in other majors. These could even be taught under the auspices of the ROBAI program if there is not another BA/BS program where the course might be housed.

EC Response: Currently, the BAS programs do not require upper division general education courses. However, it is something the college may consider as additional BAS degrees are developed.

f) Preparation for Graduate Program Acceptance - Do the degree concept, learning outcomes and curriculum prepare graduates to enter and undertake suitable graduate degree programs?

Comment - While this degree is not a research-focused degree, I believe that the graduates of this will provide complementary skills to researchers/designers/implementers of new technologies. With some additional coursework – such as through taking certificate programs in preparation for MS-level degrees (such as our own Graduate Certificate in Software Design and Development – GCSDD) – graduates would be well-suited for professional, master's-level degrees in areas such as computer science or business. To prepare for admissions into a doctoral program, I believe additional work will need to be done that further empathizes research and theory.

EC Response: The GCSDD would be a great path for ROBAI graduates. We will reach out once a faculty is hired to talk more about opportunities.

g) Faculty - Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?

Comment - As stated in the proposal, there is a need to hire additional faculty that specialize in the areas of

robotics/AI/ML/data science. There are current faculty (listed in Table 4) who might teach selected courses; however, they are critical to other programs. Having dedicated faculty will be important for implementing the program and working through the various curricular processes and other work that needs to be done to launch a program – as well as teach the core ROBAI-specific courses. Also, students need to be able to work with faculty that are focused on this program.

Hiring faculty in these specialty areas is challenging given the high market demand – and the faculty salary rates are typically much higher than in other disciplines. Also, faculty will likely require some level of start-up funds (for specialized equipment, tools, software, lab modifications, etc.) and be assured some opportunities for growth/salary increases. We have found that identifying industry experts (with appropriate academic credentials) who may be looking for a career change – has proven effective for several of our own hires at the University. Of course, the door from academia to industry is also always open so retention of faculty may be a challenge – particularly given the limited state funding for higher education.

EC Response: Yes, we will definitely need to hire additional faculty who specialize in these areas and we appreciate the challenges you've outlined. The college is planning to hire a new FT tenure track faculty member with Robotics/AI/ML expertise (see position description for the STEM BAS Manager position in Appendix 3). We will be leveraging existing advisory board connections, job boards, faculty connections, university connections, and national and local publications to advertise and recruit for the position. We have also had success hiring industry experts who are looking for a career change and will continue to identify and pursue those individuals. In addition, we will reach out to graduate students and researchers who may be interested in a teaching career. EC's faculty salaries are determined by the Federation contract. Unfortunately, they are not discipline specific, however, Washington state recently approved additional funding for high demand industry sectors such as Robotics/AI/M and data science. We hope the funding is not cut due to COVID-19 so we can use it to support some sort of faculty salary adjustment for all ROBAI program instructors.

As department head, the new BAS faculty member will also manage the course schedule, recruit, interview potential part-time faculty, and make staffing recommendations to the Dean to ensure ROBAI classes are staffed by knowledgeable instructors who can meet course and program outcomes. We will use the same targeted recruiting strategies to hire associate faculty. The BAS ROBAI classes will be scheduled to accommodate working individuals so we are hoping the schedule will better support associate faculty who do not want to transition to a FT teaching career but do want to support the industry and the community. In addition, the college will continue to support faculty professional development opportunities for all faculty teaching in the program. We are optimistic we will be able to hire individuals to teach part-time in the program. Labor market data indicated a strong demand for graduates with these skills and abilities. EC is the only community and technical college in the area planning to offer this program which will directly support to industry, provide living wage jobs for graduates, and give back to the community. We believe this will help us recruit associate faculty from King and/or Snohomish county.

h) Resources- Does the college demonstrate adequate resources to sustain and advance the program, including those necessary to support student and library services as well as facilities?

Comment - Labs, support from industry for equipment and space; on-site work via the capstone project is recommended for “real-world” experience. I would recommend leveraging the advisory Board (e.g., with Boeing, Philips Healthcare, other smaller manufacturing and start-up companies in the region) to develop partnerships and perhaps use of their labs/facilities where possible. It is my understanding that robotics-related

equipment and lab space is already available. Of course, new faculty hires and program management staff will be critical in determining specific needs. The ROBAI program does emphasize “hands on” and capstone projects, so having appropriate facilities and equipment will be critical.

EC Response: We agree! Providing real-world, hands-on experience is very important and the program will rely on the faculty's expertise to determine what equipment is necessary. The faculty will be in charge of developing partnerships with local employers and leverage resources/equipment as needed.

i) Membership and Advisory Committee - Has the program received approval from an Advisory Committee? Has the program responded appropriately to it Advisory Committee's recommendations?

Comment The program was discussed by five members of the Engineering Technology Advisory Committee. It appears that the committee membership consists of 9 – 10 members – plus four staff. Two guests were also in attendance. (See Appendix B.) The comments regarding computing language preparation (Java and/or C++) are appropriate. This is a common question that should be further vetted as the details of the courses and curriculum are further refined. There were also some questions noted as to what type/level of jobs would students be able to do. I agree that this needs to be further clarified – and that the degree might be better portrayed as one preparing students for a variety of entry- and mid-level technicians. The program appears to address these issues – noting the need for the full-time faculty to further refine and address specific issues.

EC Response: As stated previously, the program will be more fully developed once a faculty is hired. The program will continually be vetted with the ETEC advisory committee, and ROBAI (once established) to ensure students are gaining the skills required to successfully enter the workforce.

j) Overall assessment and recommendations - Please summarize your overall assessment of the program.

Comment Overall, I support the creation of this applied degree – and its focus on developing skill sets that will be useful for understanding robotics systems/applications and new developments in AI/ML. There is still much work to be done – and a recommended starting point is to further refine and focus the proposal on a couple of specific topic areas. For instance, there might be a course sequence/grouping that prepares students for work on autonomous vehicles, manufacturing systems, IoT-based robotics devices, etc. – pick what might be appropriate for the students and the faculty expertise – and then launch several of these as early as possible in the curriculum. Again, this will help motivate students and provide more engagement, involvement and depth of understanding/competency development as specified in the program outcomes. Such a program will be a great opportunity for students with a passion for robotics – and to learn about the many knowledge domains important for successful design, development, implementation, and maintenance of such systems.

Of course, should there be interest in collaboration between our programs, I am happy to facilitate such discussions between our schools.

EC Response: Thank you so much for all your comments. We really appreciate your feedback, which will be passed along to the faculty once hired. We look forward to collaborating with your program in the future!

Applied Baccalaureate External Review Rubric

College Name: Edmonds College

BAS Degree Title: Robotics and Artificial Intelligence

Reviewer Name/ Team Name: Salman Ahsan

Institutional or Professional Affiliation: San Jose State University (4-year college) & Sigmaud (private AI consultancy)

Professional License or Qualification, if any: Ph.D. in Electrical Engineering, Princeton University

Relationship to Program, if any: Consultant/contractor

Please evaluate the following Specific Elements

a) Concept and overview - Is the overall concept of the degree program relevant and appropriate to current employer demands as well as to accepted academic standards? Will the program lead to job placement?

Comment: While artificial intelligence (AI) has been a “thing” in academia for over 60 years, recent advances in technology (most importantly computing power) have opened the doors of AI’s application across a wide array of sectors and industries. These include not just the tech giants of today (Google, Amazon, Facebook, etc.) but all manufacturing industries (such as aircraft and auto manufacturers with their increased use of robots that are becoming smarter and hence more capable), all data-centric industries (such as general consulting, advertising, etc.), the entire field of medicine including surgery, radiology and diagnostics. Other new markets are being enabled through AI and related fields are networked consumer devices (IoT) and blockchain. Even plain vanilla retail can benefit from analysis of big data that is enabled by the AI toolbox. Wall Street is not immune to the charms of AI either. Sectors like asset management are at the cusp of revolutionary changes enabled by, you guessed it, AI. So, at this point, it appears almost certain that new jobs related to AI will be created and skills related to AI will be in high demand. Though history tells us that the road will be rocky and there are likely to be one or more “AI winters” before we see widespread use and application of this and related technologies. So, in the best interest of students we have to forecast the type of skills that will be in high demand in the short and medium term. And that is the lens through which we should gauge the utility of this program. So, the answer to the question about job placement is – yes, this program is consistent with the demands of the local, national and international labor markets, with the caveat that the program should adapt as the industry matures in order to give students the skill set that is demanded at that time. Right now, while the AI industry, as we know it, is in its infancy, most workers in AI are highly qualified engineers who understand at a fundamental level the role played by data, its analysis (requiring knowledge of probability and statistics), selecting and building AI and machine learning (ML) models (requiring expertise in computer programming, algorithms, linear algebra, calculus and general mathematics). Quite clearly the objectives of this program, though, are not to produce front line engineers who will push the knowledge envelope of AI. Rather, this program wants to build a work force that will apply the latest tools in the industry. Examples of such tools are TensorFlow and Keras which significantly simplify the task of applying AI to a host of different problems. I expect that this trend will continue and the doors of AI will open wider to admit a work force of varied ability and skillsets. So, if this program can generate operators and programmers of robots, machine vision tools (for, say, optical inspection machines), etc. data scrubbers and classifiers (those who clean-up data before feeding it to the AI system), there is little doubt that the program will lead to job placements in a variety of industries.

EC Response: Thank you for the detailed feedback. This is very good news, and in line with what was found in the labor market and through focus groups with industry experts.

b) Degree Learning Outcomes - Do the degree learning outcomes demonstrate appropriate baccalaureate degree rigor?

Comment In my opinion - yes. The team has used the Rigor/Relevance framework developed by ICLE to divide each course's content into Acquisition, Application, Assimilation and Adaptation – a sensible approach in theory, though harder to implement in practice. The checkpoints they have proposed for course and program review should help in keeping the program from fragmenting and thus derailing from its raison d'être. I would like to emphasize that AI is a rapidly evolving field at this time and the market are likely to change in coming years.

EC Response: We understand that this field is rapidly changing, and feel that our established review process and commitment to faculty professional development will help keep the program up-to-date and provide the appropriate rigor for students to obtain the skills needed in the workforce.

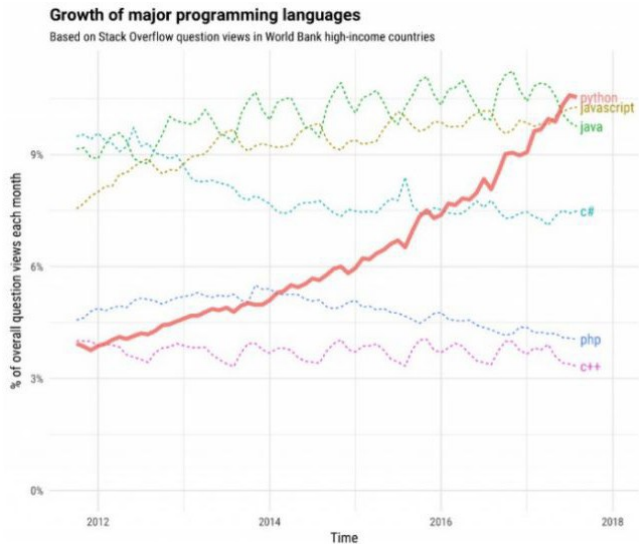
c) Curriculum Alignment - Does the curriculum align with the program's Statement of Needs Document?

Comment Yes – though a distinction should be made, despite the overlap between the two related disciplines, between pure software engineering (programming) job opportunities and those related to AI.

EC Response: Agreed. Our marketing strategy will be put in place to ensure a distinction is made between the programs. We will make sure the students understand the various job opportunities available to them upon completion.

d) Academic Relevance and Rigor - Do the core and elective courses align with employer needs and demands? Are the upper level courses, in particular, relevant to industry? Do the upper level courses demonstrate standard academic rigor for baccalaureate degrees?

Comment - The upper level courses cover all topics essential to a program in AI/ML/robotics, but I can't say anything beyond that until the courses are developed and more details are available. Likewise, the core and elective courses cover relevant topics and represent a balanced education at the baccalaureate level. I would like to elaborate on one aspect of the curriculum - the ability to write and edit computer programs. I recommend that Python be used as the primary programming language. As I mentioned above, the AI industry is in the middle of standardizing its platforms and tools. At this point it looks like the Python programming language will be the most useful language to learn for a future AI worker. This does not mean that skills in C/C++ or Java are useless but the shift towards Python is real and the trends can easily be verified through multiple sources on the web (for example, see 2017 image below from stackoverflow.blog). At San Jose State University in the Bay Area where I teach as an adjunct, the mechatronics courses shifted to using Python rather than C as the principal programming language. Python has a rapidly growing library of resources – at least partly due to Google's use of this language. Python is also the best, though not the only, supported language in TensorFlow – Google's popular open source platform geared towards AI/ML applications.



EC Response: Thank you for the suggestion and the data recommending Python as a primary programming language. The college does offer an introductory programming course in Python and we will work with the new faculty and advisory committee to determine how to best incorporate Python into the ROBAI program.

e) General Education Requirements - Are the general education requirements suitable for a baccalaureate level program? Do the general education courses meet breadth and depth requirements?

Comment The theoretical edifice of artificial intelligence is built upon a few core concepts:

- 1) Probability. Planning and decision-making algorithms rely on conditional probabilities of outcomes.
- 2) Linear algebra. Most of the computation is done using the concepts of multi-dimensional vectors (i.e. tensors) that are best represented as matrices.
- 3) Statistics. AI needs large amounts of data. Data scrubbing and structuring is often the first step in an AI project.
- 4) Calculus. Any problem that requires optimization will inevitably end up using calculus (e.g. the famous gradient descent algorithm).

The fact that these courses are not part of the curriculum is probably justifiable, considering the emphasis on developing skills as users of tools and technology, but my question to the team is how they will teach advanced courses in robotics, automation, computer vision and planning without exposing the students to the basic building blocks of these subjects? Now circling back to employable skills, the rapidly growing popularity of TensorFlow and Keras (mentioned earlier) deserve a place in this program. And later on, if a different platform displaces TensorFlow, the program should have a built-in flexibility to adapt accordingly. I also want to emphasize communication skills that are of critical importance in the modern workforce. First, is the skill to collaborate or work in groups; second is to create and make presentations for a variety of audiences and third is the ability to write well (mostly emails these days). These are all mentioned in the BAS outcomes section of the document. So, I am being redundant in emphasizing that students be required to work on a group project (as a part of one or more courses), and be required to present their results/conclusions in a presentation format. The other useful topic for BAS ROBAI graduates to be familiar with is how the global economy works. They will likely be working for corporations with customers, clients and possibly colleagues around the world. It

would be beneficial to give students a primer on international markets and macroeconomics. PHIL 110 (Contemporary Moral Issues) – listed as one of the GE requirements should cover ethical concerns specific to the field of artificial intelligence. Several practitioners and thinkers in the field have raised concerns about AI's impact on human civilization and students should be made aware of these concerns. The following books are two examples of the above that I have come across:

- 1) Life 3.0: Being Human in the Age of Artificial Intelligence by Max Tegmark
- 2) The Singularity Is Near: When Humans Transcend Biology by Ray Kurzweil

EC Response: Thank you for the suggestions. We have added MATH&146 Statistics to the program as a strongly recommended general elective. We also appreciate your emphasis on effective communication skills. As you noted, communication is an essential program outcome and it will be emphasized throughout the program culminating in the capstone classes which will require creation and presentation of a project. In addition, the tools mentioned, TensorFlow and Keras, will be reviewed and considered as courses are developed and student projects are outlined. The program will be reviewed frequently in the first few years and every three years thereafter to ensure the program stays up-to-date with the latest trends and technology. The ROBAI Advisory Committee will also be tasked with meeting at least twice per year and providing feedback on program content, success of graduates, etc. to ensure program graduates have the skills and knowledge needed to be successful in this field.

f) Preparation for Graduate Program Acceptance - Do the degree concept, learning outcomes and curriculum prepare graduates to enter and undertake suitable graduate degree programs?

Comment

With the information at hand this is a hard question to answer because a lot depends on the depth at which the topics are covered in the upper level courses and whether the students are given a sufficient theoretical base (see my comments in section e). But even if the program emphasizes more pragmatic aspects of AI. That, by no means, closes the door to graduate study. There is no reason to believe that a dedicated individual, after spending a couple of years of working and learning in the industry will not be able quickly make up for any gaps in their theoretical knowledge of AI.

EC Response: This program is an applied baccalaureate degree and it is focused on the practical application of AI and robotics across multiple industries so theoretical depth will be limited compared to a traditional bachelor of science degree. The program does not require completion of calculus or linear algebra which will limit direct entry into a master's level AI, computer science or engineering program. However, the program will prepare students for direct entry into graduate programs that do not require higher level math including WGU's MBA and/or graduate level certification programs including University of Washington (Bothell Campus) Graduate Certificate in Software Design and Development. We are actively reviewing and reaching out to other Universities to identify possible pathways and program articulation agreements. In addition, we also believe dedicated program graduates could acquire the theoretical knowledge needed to pursue graduate level AI and/or robotics programs after spending a couple of years working and learning in industry.

g) Faculty - Do program faculty qualifications appear adequate to teach and continuously improve the curriculum?

Comment I do not know. The college is planning to hire a program director, who will work with existing faculty resources and use industry practitioners to support the program. That is a good plan.

EC Response: The college is planning to hire a new FT tenure track faculty member with AI and Robotics expertise (see position description for the STEM BAS Manager position in Appendix 3). The new faculty will take a leadership role in building a new program within the college and the community and will serve as department head for this degree. This instructor will teach upper division courses that integrate and build on the skills and knowledge developed from both the robotics and automation and computer science disciplines. As department head, the new BAS faculty member will also manage the course schedule, recruit, interview potential part-time faculty, and make staffing recommendations to the Dean to ensure ROBAI classes are staffed by knowledgeable instructors who can meet course and program outcomes. The new faculty member will leverage existing expertise and actively recruit faculty who have PhD credentials and/or relevant industry experience in the following departments: computer science, engineering, engineering technology, and/or mechatronics and actively recruit new associate faculty from industry and academia.

As noted, Edmonds College will leverage the STEM BAS Manager hired as part of the Advanced Manufacturing and Materials (AMMET) BAS program to help the faculty manage the program, The STEM BAS Manager will help with the forming of the first cohort and support both AMMET BAS and BAS ROBAI programs. The STEM BAS Manager will also provide pre-advising for students who might be interested in the program but are still in their associate degree program, advise students who have completed an associate degree, and do a preliminary review of their transcript(s) to ensure the most seamless transition for each student. The STEM BAS Manager is not a faculty member (see position description for the STEM BAS Manager position in Appendix 4).

h) Resources Does the college demonstrate adequate resources to sustain and advance the program, including those necessary to support student and library services as well as facilities?

Comment From what I have seen at the college and read in the proposal, the answer is yes. There appears to be sufficient resources and infrastructure to support and grow the program.

EC Response: Thank you.

i) Membership and Advisory Committee - Has the program received approval from an Advisory Committee? Has the program responded appropriately to its Advisory Committee's recommendations?

Comment My understanding is yes.

EC Response: Thank you.

j) Overall assessment and recommendations - Please summarize your overall assessment of the program.

Comment This is an exciting initiative that will serve the Edmonds College community in substantial and impactful ways. The burgeoning field of artificial intelligence promises a large number of jobs for those who are prepared – while, for those who are caught flat footed, the rise of AI could spell the end of careers and livelihoods. Thus, getting the workforce ready for the “fourth industrial revolution” would be a wise decision for policy makers. In addition, exposure to and familiarity with computer programming, robotic systems, computer vision and other automation technologies bring a certain fungibility to a worker's skillset making it possible for the labor force to be highly productive in multiple industries. The initiative at Edmonds complements cutting

edge research going on in places like the University of Washington (as well as many other universities and research centers around the world). As the researchers develop new models and platforms for AI, community colleges, like Edmonds, should train a workforce to allow industries to adapt quickly and use the new knowledge and techniques to accomplish things which until recently was the stuff of science fiction.

EC Response: Thank you for your feedback! We appreciate it!

Appendix 2: Robotics & Automation Technology AAS-T

Communication (10 credits)		
ENGL&101	English Composition	5
ENGL 235	Technical Writing	5
Quantitative/Symbolic Reasoning (5 credits)		
MATH&141	Precalculus I	5
Humanities (5 credits)		
CMST&210	Interpersonal Communication	5
Natural Sciences (10 credits)		
CS 115	Introduction to Programming	5
ENVS 101	Introduction to Environmental Science (Lab)	5
Program Requirements (60 credits)		
ENGR 100	Career and College Success: Engineering	3
CIS 250	Database Theory and Design	5
CIS 233	Systems Analysis	5
CS 131	Computer Science I: C++ I	5
CS 132	Computer Science II: C++ II	5
CIS 171	CISCO Networking I	5
ENGR 114	Engineering Graphics	5
ETEC 140	Basic Electricity and Electronics	5
ETEC 142	Automation Programming	5
ETEC 143	Introduction to PLC's and Communications	5
ETEC 230	Intermediate CAD and 3D Printing	4
ETEC 245	Robotics Automation	5
ETEC 290	Engineering Technology Capstone	5
Total Credits		92

Appendix 3:

Full Time Faculty - Robotics and Artificial Intelligence Applied Baccalaureate Degree Program (Draft Position Announcement)

Salary: ~\$62,500 Annually (Will need to be updated depending on posting date and contract negotiations)

Location: Lynnwood, WA

Job Type: Full-Time Faculty

Department: STEM (Science, Technology, Engineering, and Math)

Closing: TBD (Will be updated when posting date is determined)

Edmonds Community College is committed to diversity, equity and social justice. The college values its talented, diverse workforce and seeks to attract, hire, and support employees who consistently and actively embrace diversity and equity. We are intentional about social justice— the active engagement toward equity and inclusion that addresses issues of institutional, structural, and environmental inequity, power and privilege.

Full Time Faculty - Robotics and Artificial Intelligence Applied Baccalaureate Degree Program (Draft Position Announcement)

DESCRIPTION: Edmonds Community College is recruiting for a full-time, tenure-track faculty to teach in the interdisciplinary Bachelor of Applied Science program in Robotics and Artificial Intelligence (ROBAI). This individual will take a leadership role in building a new program within the college and the community and will serve as department head for this degree. This instructor will teach upper division courses that integrate and build on the skills and knowledge developed from both the robotics and automation and computer science disciplines.

The teaching load for this position will include coursework in the ROBAI program such as: Applications of Artificial Intelligence and Machine Learning, Autonomous Systems, Language and Speech Technology, Architectural Robots and Mechatronics Design, and Advanced Computer Vision. This instructor may also teach core courses in Engineering Technology and/or Computer Science, as required.

Candidates with an interest and/or experience in developing programs focusing on growing the robotics and applications of artificial intelligence workforce pipeline, increasing diversity and minimizing the equity gap within the aerospace and manufacturing community are especially encouraged to apply.

Full-time faculty are responsible for supporting student learning by teaching assigned classes to a diverse student body in on-campus, hybrid and lab environments; developing and revising curriculum and researching new trends in application development; assisting with program approval, articulation and accreditation processes; preparing teaching materials; developing and assessing student learning outcomes to evaluate student work; assigning grades and maintaining required records; assisting with the development of practicum sites, working with members, and providing academic and career advising to prospective and current students to support their success.

For information on how to apply, please see **Application Procedures and Required Documents**, below.

This is a full-time, tenure track position reporting to the Dean of STEM (Science, Technology, Engineering and Math).

QUALIFICATIONS:

MINIMUM QUALIFICATIONS:

- Master's degree in Artificial Intelligence, Machine Learning, Data Science, Computer Science, or a closely related field.
- One-year experience in program management, including program development, budgeting and tracking of program outcomes.
- Two years of relevant manufacturing industry experience related to artificial intelligence, machine learning, applications development, data analytics, or a closely related field.
- One year of leadership experience in a professional capacity that may include: work experience, work with professional and community organizations, grant research and writing, or applied academic research.
- One year of recent full-time or equivalent part-time college teaching experience in a related field of advanced manufacturing, composites, physical sciences, or engineering or a similar field in IT.
- Excellent writing and critical thinking skills as demonstrated in application material.

DESIRED QUALIFICATIONS:

- Doctorate degree in Artificial Intelligence, Machine Learning, Data Science, Computer Science, or a closely related field.
- Two years of administrative or supervisory experience with a leadership role in artificial intelligence, machine learning, applications development, data analytics, or a closely related field.
- Demonstrated ability to form active industry partnerships that support program development, recruitment and collaboration to provide internship and student employment opportunities.
- Demonstrated expertise through applied academic research in an area related to applications development, applications of artificial intelligence, applications of machine learning, autonomous systems or a closely related field.
- Two years of equivalent full-time teaching in a community college or university setting that demonstrate understanding and implementation of current, student-centered pedagogy focused on active learning and effective assessment of teaching methods to support student engagement and success.
- Demonstrated instructional experience with online learning management systems, such as Canvas or Blackboard, and skills that support student use of Learning technologies.
- Knowledge of and current affiliation with industry associations and/or professional organizations that support innovation, recruitment, and diversity in the IT industry sector.
- Demonstrated commitment to inclusivity and respect for a diverse community college environment composed of students, faculty, and staff of varying social, economic, cultural, ideological and ethnic backgrounds.

ADDITIONAL INFORMATION:

COMPENSATION:

The starting salary will be \$_____ annually for a 172-day appointment. The college provides an excellent benefits package which includes medical, dental, life insurance, and a retirement plan.

PHYSICAL WORK ENVIRONMENT:

Work is typically performed in a classroom and office and requires standing and/or sitting for extended periods of time. The ability to speak clearly and fully comprehend written and spoken English is essential. Instructors are required to use a computer in the work environment.

CONDITIONS OF EMPLOYMENT:

- You must document your citizenship or employment authorization within three days of hire.
- Criminal background check. *Prior to a new hire, a background check including criminal history will be conducted. Information from the background check will not necessarily preclude employment but will be considered in determining the applicant's suitability and competence to perform in the position.*
- All new positions are contingent upon funding.
- At this time, Edmonds Community College does not sponsor H1-B Visas.

APPLICATION PROCEDURES AND REQUIRED DOCUMENTS:

All applicants must apply online. No paper submissions or mailed materials will be accepted. Your online application must include the following documents in order to be complete:

1. Cover letter that addresses the required and preferred qualifications (Please provide thorough responses detailing how your experience relates to the position.)
2. Current resume.
3. Names and contact information for three references.
4. For veterans' preference, please scan and attach your DD214, Member-4 Form.
5. Response to the supplemental questions below.

If you are selected for an interview, we will ask that you bring one copy of the following with you:

- Two current letters of recommendation.
- Transcripts(s) of your collegiate courses. Examples of your instructing resources (lectures, quizzes, projects, exams, etc.) from a course that you feel best reflects your instructional style.

Important, if this posting is on an external website other than www.edcc.edu/hr or <https://www.governmentjobs.com/careers/edcc> please select one of these links to apply. Applying via an external webpage will not enter our application system.

ABOUT THE COLLEGE:

Established in 1967, Edmonds Community College is a public, two-year, state community college. It focuses on academic excellence, student success, and community engagement, which reflect the three aspects of its mission: Teaching | Learning | Community. It serves about 20,000 students annually, including more than 1,000 international students from more than 60 countries. The college offers nearly 70 associate degrees and 60 professional certificates in about 30 programs of study. Its highest enrolled programs are the Associate of Arts/Associate of Science degrees, Paralegal, Allied Health (pre-nursing degree), Business/Accounting, Construction Management, and Culinary Arts. The college is located in the center of the growing south Snohomish County communities of Edmonds, Lynnwood, Mountlake Terrace, Brier, Mill Creek, Mukilteo, and Woodway. For more information, visit www.edcc.edu.

EEO/AFFIRMATIVE ACTION STATEMENT:

Edmonds Community College is an equal opportunity employer and assures equality of treatment in educational and employment opportunities without regard to race, color, religion, national origin, sex (gender), disability, sexual orientation, age, citizenship status, marital status, veteran status, or genetic information. Applicants with disabilities who require assistance with the recruitment process may call 425-640-1470 or 425-640-1832, and accommodations will be made to the extent reasonably possible. The Human Resources Office is accessible to persons with disabilities.

Instructor- BAS ROBAI Degree Program- Supplemental Questions

1. The position will teach in an integrated, interdisciplinary program that focuses on the knowledge and acquisition of skills within the Robotics and Artificial Intelligence Program. How has your professional and academic experience prepared you to develop, build, and teach in an applied bachelor program focused on robotics and applications of artificial intelligence?
2. Describe how your background and experience reflect your commitment to equity and inclusion. How will you apply this in the classroom, in the development of curriculum, and in program development and recruitment to ensure you are creating an inclusive environment that supports Edmonds College's diverse student body, the campus community, and beyond.
3. Describe your pedagogy for supporting adult learners. Since instruction will be both online and on-campus, give specific examples of how you have engaged and assessed students in both modalities.
4. As the department head of an interdisciplinary Robotics and Artificial Intelligence BAS program at the college, please provide examples of how you will encourage and support departmental collaboration and student success within our college community and with local industry and state partners.

Appendix 4:
STEM BAS Program Manager
(Draft Position Announcement)

Salary: \$55,887- \$ 61,703 Annually (Estimated - will be updated closer to hire date)

Location: Lynnwood, WA

Job Type: Full-Time

Department: STEM(Science, Technology, Engineering, and Math)

Job Number: Exempt (Specific number will be determined when posted)

Closing: TBD (Will be updated when posting date is determined)

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DESCRIPTION: The BAS Manager works to support the college mission and goals, and to recruit and retain students into the applied baccalaureate program. As the first point of contact for students and community members, this position promotes excellence, facilitates student recruitment and success, and helps to maintain a cooperative and inclusive learning community. This position will be the liaison and primary point of contact for all students, employers, alumni, campus departments, faculty and staff for two BAS programs, Robotics and Artificial Intelligence and Advanced Manufacturing and Materials. It requires some evening and occasional weekend commitments.

For information on how to apply, please see **Application Procedures and Required Documents**, below.

Responsibilities of the BAS Manager include:

- Engaging in recruitment and outreach of students
- Coordinating student information sessions; developing and managing the application process for the program, coordinating and managing program admissions, student orientation and student intake
- Tracking program outcomes
- Developing and maintaining marketing and web site materials Working closely with faculty to advise students for registration
- Tracking budgets and enrollment reports
- Supervising work-study and program interns
- Coordinating quarterly class schedules with faculty
- Working closely with faculty to monitor practicums
- Performing outreach to the campus at large and to the general community
- Managing the BAS graduation process
- Attending local, college and state meetings
- Performing general office and program operations in support of the BAS program

This is an exempt position, reporting to the Dean of STEM (Science, Technology, Engineering and Math).

QUALIFICATIONS:

MINIMUM QUALIFICATIONS:

- At least one-year experience in a student support position that works directly with students at a community college or university.
- Bachelor's degree in a STEM field or alternative field with training experience or interest in computer science, automation, engineering, composites, and/or advanced manufacturing.
- One-year experience in program management, including program development, budgeting and tracking of program outcomes.
- Demonstrated commitment to inclusivity and respect for a diverse community college environment composed of students, faculty, and staff of varying social, economic, cultural, ideological and ethnic backgrounds.

DESIRED QUALIFICATIONS:

- Master's degree in a STEM field, higher education, or alternative field with industry or training experience related to computer science, automation, engineering, composites, or manufacturing.
- Excellent English speaking, listening, problem-solving, critical thinking, research, editing and writing skills.
- Two years' experience working within the community college environment or higher education, particularly in advising, enrollment services or instruction.
- Collaborative experience working with departments and agencies to meet program goals, and with community members in an advisory board capacity.
- Successful student recruitment and outreach experience, tracking of program outcomes, and development of appropriate marketing materials, application process, etc.; experience with employer engagement and outreach for internship and student employment.
- Familiarity with Bachelor of Applied Science program development either in Washington state or nationally.
- Knowledge of and current affiliation with industry associations and/or professional organizations that support programming and recruitment in application development, manufacturing, composites, aerospace, etc.
- Experience with budget development, tracking and management.
- Evidence of ability to use technologies, including web development, social media, word processing, spreadsheet and presentation software, email, and learning management systems, and to incorporate and assess the efficacy of new technologies in work-flow assessment and daily practice.

Additional Information

PHYSICAL WORK ENVIRONMENT:

Work is typically performed in an office setting, and requires the use of a personal computer. The ability to use a telephone, personal computer, and other electronic technology is required. The ability to make sound judgments is essential. The ability to speak, hear, and write effectively is required. The ability to effectively communicate with multiple agencies, stakeholders, and program participants is essential.

COMPENSATION:

Salary is **\$55,887- \$ 61,703** per year and is based on the Edmonds College administrative/exempt salary schedule, plus a full state benefits package, which includes tuition waivers for college classes, medical, dental,

retirement options and more. Vacation and leave packages include 12 sick days per year, 10 scheduled holidays, 1 personal holiday, and 24 vacation leavedays per year.

CONDITIONS OF EMPLOYMENT:

- You must document your citizenship or employment authorization within three days of hire.
- Criminal background check. *Prior to a new hire, a background check including criminal history will be conducted. Information from the background check will not necessarily preclude employment but will be considered in determining the applicant's suitability and competence to perform in the position.*
- All new positions are contingent upon funding.
- At this time, Edmonds Community College does not sponsor H1-B Visas.

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All applicants must apply online. No paper submissions or emailed materials will be accepted. Your online application must include the following documents in order to be complete:

1. Cover letter that addresses the required and preferred qualifications (Please provide thorough responses detailing how your experience relates to the position.)
2. Current resume.
3. Names and contact information for three references.
4. For veterans' preference, please scan and attach your DD214, Member-4 Form.

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Appendix 5: Program Review Template

Name of Program:

Program Goals

1. What were your program goals last year?
2. How were these goals met or why were they not met?
3. How do program goals align with or relate to the College Mission and/or to the college's Strategic Plan or other relevant goals?

Review and Assessment of Student Learning

1. List program learning outcomes (PLOs) and other relevant standards and indicators.
2. Describe areas where students are doing well and where improvements are needed. Please provide evidence.

Student Enrollment and Persistence

1. Review and analyze data to identify any trends or patterns in student enrollment, retention, completion, demographics, etc. that might affect your program.
2. Describe how educational and employment trends might affect the program.
3. What additional data would the program like to review to evaluate student success?

Action and Summary Plan

1. Identify changes in your program and curriculum based on assessment of student learning outcomes or other factors.
2. What are your program goals for the next year?
3. Identify next steps, set a timeline, and include resource needs. Indicate if resource needs are tied to the college's mission, strategic plans, and/or other factors.

Appendix 6:

BAS Course Descriptions and Course Level Objectives

Course Title

ROBAI 370 Advanced Computer Vision and Sensors

Catalogue Description

Robotics sensing systems give robots the ability to see, touch, hear and move and use algorithms to provide feedback to the robots and control their behavior. This course gives an overview of the current technologies and trends in robotics sensing. Students learn to analyze sensing requirements of various robotics applications, and design basic sensing systems based on these specifications.

Learning Outcomes

1. Explain and analyze the trends in robotics sensing systems.
2. Examine the sensing requirements of proposed robotics applications, and develop sensing systems specifications.
3. Compare sensing systems specifications with available technologies, discuss limitations and trade-offs, and develop design recommendations.
4. Design, develop, and test control systems for robotics applications based on an integrated robotics sensing system.
5. Research and analyze the current technology trends in computer and robot vision systems.

Prerequisites

ETEC 245

Credits

5

Course Title

ROBAI 380 Architectural Robotics and Mechatronics Design

Catalogue Description

This course focuses on robot architectures and the integration of mechanism, electronics, sensors, actuators and computer control to achieve a functional robot. Students configure, design, and implement a succession of mechatronic subsystems, leading to a complete system. Topics include: systems design and integration, integration and communication issues and strategies, and subsystem prototyping and testing.

Learning Outcomes

1. Summarize the various components of a mechatronic system and explain challenges in systems integration.
2. Analyze feasibility of complex designs based on existing constraints, and develop recommendations for systems specifications and technical solutions.
3. Develop, build models and test functionality of mechatronic subsystems.
4. Design, implement and test robotic systems based on multiple mechanic, electronic, and control elements and subsystems.
5. Compare assembly and manufacturability considerations of the integrated system.
6. Evaluate system robustness and performance, and develop recommendations for design improvements.

Prerequisites

ETEC 245

Credits

5

Course Title

ROBAI 401 Language and Speech Technology

Catalogue Description

The course offers a practical understanding of how human speech can be processed by computers and robots. Students build speech recognition, speech synthesis and spoken dialog systems. Topics include algorithms, techniques and limitations of state-of-the-art speech systems.

Learning Outcomes

1. Explore the challenges, strategies, and technologies that relate to speech and language recognition and processing.
2. Compare the different statistical methods in NLP, and discuss advantages, limitations, and applications of the different approaches.
3. Develop, build, and evaluate algorithms for natural language processing, linguistic analysis, and language generation.
4. Design, build, and evaluate speech recognition, speech synthesis, and spoken dialog systems.
5. Explain limitations of current speech and language technologies, and research and present emerging new approaches.

Prerequisites

CIS 233 and ROBAI 380

Credits

5

Course Title

ROBAI 405 Advanced AI Applications for Machine Learning

Catalogue Description

This course explores the current challenges and limitations of AI, trends and research in AI and robotics, challenges in human-robot interactions, and economic, societal, legal and ethical implications of AI and robots. Students research, present and debate issues and implications of advances in AI and robotics.

Learning Outcomes

1. Explore the current and future applications of AI and robotics.
2. Summarize the current and future trends and research in AI and robotics.
3. Research and discuss the current technical challenges and limitations of AI and robotics, and what approaches are being explored to overcome them.
4. Research and predict the challenges in human-robot interactions, and explore possible solutions to be implemented in the future.
5. Research and discover the economic, societal, legal and ethical implications of AI and robots.

Prerequisites

CS 115

Credits

5

Course Title

ROBAI 410 Autonomous Systems

Catalogue Description

This course focuses on key components of an autonomous robotic system and explores robot interaction with the environment, human-robot interactions and multi-robot cooperation. Students learn to integrate data from multiple sensor inputs to support robot navigation, and develop models to control robot behavior, decision making and autonomy.

Learning Outcomes

1. Categorize and integrate data from multiple sensors to guide robot navigation and interactions.
2. Develop, build, and evaluate control models to achieve expected robot behavior.
3. Explain the challenges of robot interactions with the environment and propose effective strategies.
4. Explain the challenges of human-robot interactions and propose effective strategies.
5. Explain the challenges of multi-robot interactions and cooperation, and propose effective strategies.
6. Create algorithms to control robot behavior, decision-making, and autonomy.

Prerequisites

ROBAI 370 and ROBAI 380

Credits

5

Course Title

ROBAI 415 Capstone

Catalogue Description

In this integrative practical experience, students engage in planning, designing, implementing, testing and presenting an AI/Robotics project based on a real-world problem. Students apply knowledge and skills acquired in classes as they work in settings relevant to their future career plans.

Learning Outcomes

1. Develop, present, and defend project proposals.
2. Evaluate, develop, and create effective methods to manage project milestones and timelines.
3. Apply advanced technical competencies in completing deliverables.
4. Analyze task results to include successes and areas for future improvement.
5. Develop the skills to work productively in a team environment.
6. Develop a professional report and presentation commensurate with the scope and complexity of the work.
7. Create and present information in a professional format and discuss issues as the lead facilitator.
8. Demonstrate an in-depth and integrated understanding of the complexity of AI and robotics systems to industry professionals through demonstration of projects.

Prerequisites

ROBAI 401 and ROBAI 410

Credits

5

Course Title

ITAD 300 Software Engineering

Catalogue Description

The course journeys through multiple facets of software engineering, including software process models, software testing, requirements engineering, and systems engineering. Additionally, analysis is given of software development including release and user testing and understanding conceptual designs.

Course Learning Outcomes

1. Explain software process models.
2. Examine agile software development, understanding its relevance in software engineering, exploring techniques and also approaches to project management.
3. Describe critical components of requirements engineering, detailing the process from defining to documenting and maintaining requirements for the software design.
4. Analyze various stages of software testing, including development, release and user testing.
5. Break down systems engineering, investigating sociotechnical systems, conceptual design, system procurement, development, operation and evolution.
6. Discuss ethical issues in software engineering

Prerequisites

CS 143 or equivalent

Credits

5

Course Title

ITAD 315 Discrete Mathematics for Developers

Catalogue Description

Students are introduced to logic and proof, structures and algorithms, and number theory. Focus is also given to induction and recursion, counting and discrete probability providing an essential foundation and framework for software development.

Course Learning Outcomes

1. Utilize propositional logic, inference, and proof.
2. Define structures, sets, functions, and matrices.
3. Make use of mathematical induction and recursion definitions on arithmetic sequences.
4. Examine counting theory and its application on a series of events, to determine all possible outcomes.
5. Define discrete probability and its purposes for determining outcomes of individual events.

Prerequisites

Math&141

Credits

5

Course Title

ITAD 330 Database Models and Design

Catalogue Description

This course examines the functional design and operation of relational databases in a computing environment. Attention to database theory and appropriate modelling is given. The class additionally looks at the inner workings of connecting software applications to the designed databases.

Course Learning Outcomes

1. Define requirements found in the information gathering process from critical stakeholders to successfully design a database.
2. Identify best practices utilized in designing relational databases, its various forms of normalization, in order to prevent redundancies and anomalies.
3. Demonstrate knowledge of the structure of database tables, its records, keys and indexing.

4. Design and implement software connections to databases using programming languages.

Prerequisites

ITAD 300, ITAD 315

Credits

5

Course Title

ITAD 360 Application and Data Integration

Catalogue Description

This course examines the principles and practices of developing solutions that manipulate data in a variety of forms and structures for the purposes of enterprise integration, data analytics or other data-intensive applications.

Course Learning Outcomes

1. Understand the uses and types of Application Programming Interface (API) Architectures.
2. Design and work with application programming interfaces (APIs).
3. Analyze application design principles for working with big data sets.
4. Create and manipulate data in Relational Database Management Systems (RDBMS) and manage multiple data sources.
5. Work with unstructured data and manage data in motion.

Prerequisites*

ITAD 330, ITAD 345

Credits

5

Course Title

ITAD 400 Mobile Application Development

Catalogue Description

The class inspects the necessary procedures required in developing software for various mobile platforms. A survey analysis includes creating imperative user designs and interfaces for software applications which run on mobile devices and utilizes a network connection or executes natively. Considerations for security in a mobile application are additionally examined.

Course Learning Outcomes

1. Define user requirements for mobile applications and develop appropriate user interface design.
2. Design mobile software applications for native and network environments.
3. Compare and contrast the requirements for mobile software application development and architectures in differing platform environments.
4. Utilize various technologies and programming languages to solve problems through the means of mobile applications.
5. Discover and implement best practices for securing mobile applications.

Prerequisites*

ITAD 360, ITAD 375

Credits

5

Course Title

CIS 430 Embedded Systems

Catalogue Description

The course introduces students to programming embedded systems. It details the underlying development of system components, namely, boot up, memory management, peripherals, and bus interfaces. Focus is also given to topics including power management, distributed computing, and the IoT.

Course Learning Outcomes

1. Analyze and create the boot up procedure, using startup code and bootloaders , allocated in memory , in order to load the image.
2. Implement memory management, utilizing the address space, creating stack and heap storage for program usage.
3. Configure and design peripheral interrupts and general purpose I/O for the embedded system.
4. Develop distributed systems and understand IoT architecture.

Prerequisites*

ITAD 400, ITAD 415

Credits

5

*Note: When hired, the ROBAI faculty will work with the ITAD faculty to update prerequisites to ensure streamline sequence of classes.

Appendix 7: BAS ROBAI Sample Curriculum Sequence

Full-Time Sequence

Year 3

Summer	Fall	Winter	Spring
	ROBAI 370 Advanced Computer Vision/Sensors	ITAD 315 Discrete Math for Developers	ROBAI 380 Architectural Robots & Mechatronic Design
	CS 143 Java I or CS 133 C++III (General Education)	ITAD 300 Software Engineering	Social Science
	MATH&146 Statistics	Humanities	ITAD 330 Database Models & Design

Year 4

Summer	Fall	Winter	Spring
PHIL 110 Contemporary Moral Issues	ITAD 400 Mobile Application Development	ROBAI 405 Advanced AI & Applications of Machine Learning	ITAD 430 Embedded Systems
	ROBAI 401 Language & Speech Technology	ROBAI 410 Autonomous Systems	ITAD 360 Application & Data Integration
	Social Science	General Education	ROBAI 415 Capstone

Part-Time Sequence

Year 3

Summer	Fall	Winter	Spring
	ROBAI 370 Advanced Computer Vision/Sensors	ITAD 315 Discrete Math for Developers	ROBAI 380 Architectural Robots & Mechatronic Design
General Education	CS 143 Java I or CS 133 C++III (General Education)	ITAD 300 Software Engineering	ITAD 330 Database Models & Design

Year 4

Summer	Fall	Winter	Spring
	ITAD 400 Mobile Application Development	ROBAI 405 Advanced AI & Applications of Machine Learning	ITAD 430 Embedded Systems
	Social Science	MATH&146 Statistics	Social Science

Year 5

Summer	Fall	Winter	Spring
	ROBAI 401 Language & Speech Technology	ROBAI 410 Autonomous Systems	ITAD 360 Application & Data Integration
	Humanities	PHIL 110 Contemporary Moral Issues	ROBAI 415 Capstone

Appendix 8:
ETEC Advisory Committee Membership

Name	Title	Company
Yonas Behbound	MP&P Technical Analyst	Boeing
Steven Duce	Manufacturing Tech II	Philips Healthcare
Zach Forland	Sales Consultant/CAD Drafter	ACS
Luan Hoang	Automation Engineer	Boeing
George Parker	Senior Chemist	Boeing
Bill Karman	Account Manager	Airtech International
Levi Blakeway	Electrical Engineering Technician	Formost Fuji
James Gunn	Electronic Equipment Maintenance Apprentice	Boeing
Will Roozen	Controls Engineer	Electroimpact
Hilary King	VP of Sensing & Power Systems	Crane Aerospace & Electronics

Appendix 9: Advisory Committee Meeting Minutes

Engineering Technology Advisory Committee Meeting
May 13, 2020 – 5:30-7:30 pm
Via ZOOM

Minutes

Attendees:

Members	Staff
<ul style="list-style-type: none">● Levi Blakeway● Zach Forland● Luan Hoang● Bill Karman● George Parker	<ul style="list-style-type: none">● Kay Latimer● Ross Monroe● Su Nelson● Carey Schroyer <p>Guests: Ted Rodriguez and Sue Bradshaw</p>

- **Absent:** James Gunn and Steven Duce sent their regrets; Yonas Behboud and Will Roozen also did not attend. Su stated that she had not fully connected with our most recently appointed committee member, Hilary King.

The meeting was called to order at 5:37 pm.

Minutes: Upon a motion made by Bill Karman, seconded and passed unanimously, **the minutes from February were approved as submitted.**

A review of the agenda led to clarification around the different degrees under discussion. There had been some confusion about the AAS-T draft that was sent out. This is not a revision of the Mechatronics and Automation Technology ATA agreed upon at the last meeting; it is a new degree that will feed into the BAS ROBAI being proposed.

Review of Robotics and Automation Technology AAS-T:

Discussion of the actual courses in the AAS-T took place. There was a question about why C++ was chosen as the required courses; Carey did say that students would have the option of taking Java I and II as alternates, but noted that C++ seemed to be the more common requirements seen during the initial research for this program. The Program Learning Outcomes (PLOs) were then reviewed; industry members noted that it seemed like there was a PLO missing – that there was no mention of troubleshooting. After discussion, it was determined that a 5th PLO should be added. Something like “system analysis and reconciliation” was suggested. Ross said he would add that in.

Potential job titles for graduates of this AAS-T were discussed. The committee agreed with 5 of the 6 titles suggested by the college (Engineering Tech, Automation Tech, Electronics Tech, Robotics Tech). However, the committee did not feel that this degree would really prepare someone to be a Maintenance Mechanic, but did suggest that a Maintenance Technician might be appropriate. Other potential job titles suggested included: Facilities Technician, Integration Technician (which is a subset of Automation Technician) or Technical Analyst (which seems to be mostly used by Boeing.)

Upon a motion made by Luan, seconded and approved unanimously, **the AAS-T degree in Robotics and Automation Technology was approved as proposed.**

BAS ROBAI discussion continued:

The PLOs for the BAS were reviewed briefly. The committee didn't have any recommended changes at this time. Potential job titles were then discussed. Skills identified included Artificial Intelligence, Machine Learning, Robotics and Smart Assembly. Some possible job titles included Integration Technician/Engineer and Automation Engineer. A graduate of this program might possibly become a Software Developer or Software Engineer (depending on the company). All committee members were asked to "look around" in their organizations to see where there might be a need for graduates from a program like this.

Upon a motion made by Luan, seconded and passed unanimously, it was agreed to **support further development of the BAS ROBAI.**

Update on hiring: Carey stated that the college would be interviewing 4 candidates for a full-time temporary mechatronics instructor on Monday.

Recruitment of new advisory members:

Staff asked industry members their thoughts on what companies we should be reaching out to, especially as it regards the ROBAI pathway. George suggested we try reaching Google; he then promised to check in with his contacts there. For aerospace, it was suggested that Blue Origin and SpaceX might be possibilities. Su knows 3 young engineers at Blue Origin and will reach out to them in this regard. Noone had contacts at SpaceX. With regard to Amazon, the college did reach out to one person we knew, but we did not get a response. It was suggested that we reach out to medical device companies such as Philips, though it was uncertain what AI or automation they might be using. Luan suggested T-Mobile and promised to reach out to his contacts there. Bill suggested Oracle and said he would reach out to a contact he has there. Other companies suggested were Labinal and K2 Sports. Labinal does a lot of electronics and wiring. Zach said he would talk to his contacts as he travels about, now that he is again traveling some for work.

Local Labor Market:

Luan said that the airlines industry is really struggling and that this affects all of aerospace and suggested that there will be 10-15% cuts in the workforce; George felt it would be closer to 25%. George also noted that online learning might be the way of the world both today and in the future. Bill noted that it was "pretty grim", especially in aerospace, noting that Hexcel recently laid off 40% of its workforce from the top on down. Zach said that some companies are doing well, noting those manufacturers who were quickly able to move to the manufacture of medical device parts or related items and that some online retail is seeing a lot of growth. Ted noted that Sno-Isle Tech students 3D printed 3,000 items needed due to the COVID crisis. He also noted that "grading is strange" in this time of online instruction.

Bill Karman then asked if the college would email the committee with the results of the hiring process for a new instructor.

The meeting adjourned at 7:07 pm.