

Bachelor of Science in Industrial Automation Degree Program Application Guidelines



INTRODUCTION

The Baccalaureate Degree in Industrial Automation Degree Program focuses on the application of electronics and computer technology to industrial automation systems, including instrumentation and control, industrial robotics, and process control systems. The program prepares students for careers in the design, operation, and management of industrial automation systems focusing on the local industries that utilize these technologies, such as petroleum production, food production, fabrication, and logistics. Significant emphasis is placed on project-based learning facilitated by significant laboratory work.

MISSION

The Baccalaureate Program in Industrial Automation is designed to prepare individuals for technical management careers in industries that utilize automation, including the petroleum, manufacturing, logistics and agriculture industry sectors, in order to improve the regional economy.

PROGRAM LEARNING OUTCOMES

Upon completion of this program, a student will be able to:

- Apply critical and analytical thinking skills to industry related problems, related to safety, quality assurance and design of systems.
- Display effective communication skills, including presentation and technical writing skills.
- Demonstrate a broad understanding of the mathematical and scientific principles utilized in industrial automation and manufacturing.
- Demonstrate competency in industrial automation and instrumentation, including relevant hardware and software utilized in industry.
- Manage automation and manufacturing projects applying knowledge of budgetary and scheduling principles in an ethical environment.

PROGRAM ADMITTANCE

Applications for admittance to the Baccalaureate Degree Program will have two tiers of acceptance:

- **Tier One Cohort (2-year):** Scholastically qualified students prepared for official admission to the Baccalaureate Degree program.

Students will be selected for conditional admission to the Baccalaureate Degree Program based on their scholastic eligibility determined by the following:

- Accumulated 60 units of college credit with a "C" or higher, prior to the start of the fall semester.
- Completion of the Golden Four in the CSU GE Pattern (Area A2 – Written Communication (English B1a), Area B4 – Mathematical Reasoning (Math B1a, Math B2, Math B6a or higher), Area A1 – Oral Communication, and Area A3 – Critical Thinking) with at least a "C" grade, prior to the start of the fall semester.
- Completion of Area B1 & B3 – Physical Science (Physics B2a or higher) with at least a "C" grade, prior to the start of the fall semester.
- Completion of at least 35 of the 41 lower division CSU GE requirements with a "C" or higher, prior to the start of the fall semester.

- Completion of at least 5 of the 6 lower division technical core courses with a “C” or higher, prior to the start of the fall semester. Demonstrated competency in lower division core courses may satisfy this requirement subject to evaluation by program faculty.
- Earned overall GPA of at least 2.00 and an earned GPA of at least 2.50 in the lower division technical core, prior to the start of the fall semester.
- **Tier Two Pathway Cohort (3 to 4 year):** Incoming freshmen and continuing sophomore students will be admitted to a Baccalaureate Degree Program pathway cohort until they are scholastically qualified for admission to the upper division program.

Students will be selected for inclusion in the Baccalaureate Degree Program Pathway Cohort determined by the following:

- 1) Completion of Bakersfield College Orientation, Assessment, Counseling, and Abbreviated Educational Plan.
- 2) Eligible for English B1a via placement testing results or multiple measures.
- 3) Eligible for Math B1a via placement testing results or multiple measures.

Admittance to the Baccalaureate Degree Program Pathway Cohort requires that students meet regularly with the Baccalaureate Degree Program counselor to develop and update a detailed educational plan, attend information sessions and orientations, and participate in supplemental learning activities, if needed.

APPLICATION PERIOD

All application materials must be submitted during the filing periods described below. Please refer to **Application Procedures** for complete instructions.

Applications for admittance to the Baccalaureate Degree Program will have two tiers of acceptance:

- **Tier One:** Scholastically qualified students prepared for official admission to the upper division program.
 - **Tier One** applications submission priority deadline is **July 1, 2016**.
- **Tier Two:** Incoming freshmen and continuing sophomore students will be admitted to the Baccalaureate Degree Program pathway cohort until they are scholastically qualified for admission to the upper division program.
 - **Tier Two** applications submission deadline is **August 18, 2016**.

APPLICATION PROCEDURES

It is the student’s responsibility to do the following procedures listed below:

- Submit a BC Admission form to be officially recorded as a student at Bakersfield College.
- Submit an application form to the Baccalaureate Degree Program office during the appropriate application period – please note, applications must be filled out completely, all information requested must be provided.
- Submit either your unofficial or official **Bakersfield College** transcript showing all pre- requisite courses posted.
- Bakersfield College transcripts must be received by the Baccalaureate Degree Program office prior to the last *day of the appropriate application period*.

Failure to meet all application requirements/procedures will result in an incomplete application and will not be considered for selection.

<i>No application fee will be required.</i>
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If you have taken courses from any college other than Bakersfield College:

- 1) Apply for Admission to Bakersfield College either in person at the Admissions and Records office or by going on-line www.bakersfieldcollege.edu, click on Admissions and Records/New Students and follow the Matriculation Steps.
- 2) Have your college transcript(s) evaluated by:
 - Ordering an Official copy of your transcripts from your previous college(s);
 - Submit the Official copy of your transcripts along with a form “Request for Evaluation”. You can obtain this form from the Admissions and Records office or from the Admissions and Records web-page (see above) under Forms.
 - Once your transcripts have been evaluated and posted to your Bakersfield College transcripts, either order an official copy to be sent from the Admission and Records office or print your unofficial transcript and submit along with Application Form to the Baccalaureate Degree Program during the appropriate application periods.

Please note – transcript evaluation can take anywhere from 12-16 weeks and must be completed prior to the end of the application period.

BACHELOR OF SCIENCE, INDUSTRIAL AUTOMATION DEGREE UPPER DIVISION PREREQUISITE REQUIREMENTS (Tier One)

- All prerequisite coursework must be completed with a “C” grade or higher.
- Specified prerequisite coursework must be completed by the start of the FALL SEMESTER.
- Accumulated 60 units of college credit.
- Completion of at least 35 of the 41 lower division GE requirements in the CSU GE Pattern. All 41 lower division GE requirements must be completed prior to graduation.
- Completion of at least 5 of the 6 lower division technical core courses. All six lower division technical core courses must be completed prior to graduation. Demonstrated competency in lower division core courses may satisfy this requirement subject to evaluation by program faculty.
- Earned overall GPA of at least 2.00 and an earned GPA of at least 2.50 in the lower division technical core.

BACHELOR OF SCIENCE, INDUSTRIAL AUTOMATION DEGREE LOWER DIVISION PATHWAY REQUIREMENTS (Tier Two)

- Eligibility for English B1a
- Eligibility for Math B1a or higher

PREREQUISITE COURSEWORK

- **ENGL B1a** (Expository Composition); 3 units at Bakersfield College or equivalent course at another accredited college.
- **MATH B1a** (Precalculus I), **MATH B2** (Basic Functions and Calculus for Business), **OR MATH B6a** (Analytic Geometry/Calculus I); 4 units at Bakersfield College or equivalent course at another accredited college.
- **PHYSICS B2a** (General Physics-Mechanics and Heat) **OR PHYSICS B4a** (Mechanics and Wave Motion); 4 units at Bakersfield College or equivalent course at another accredited college.
- **Critical Thinking (CSU GE Area A3)** - PHIL B7, or B9, or ENGL B1b, or B2, or B3, or COMM B5; 3 units at Bakersfield College or equivalent course at another accredited college.
- **Communication (CSU GE Area A1)** - COMM B1, or B4 or B8; 3 units at Bakersfield College or equivalent course at another accredited college.

- Any five of the following six courses must be completed for admittance to the Baccalaureate Degree Program. However, all six lower division technical core courses must be completed prior to graduation. Demonstrated competency in lower division core courses may satisfy this requirement subject to evaluation by program faculty.
 1. **ELET B1** (Basic Electronics) 4 units
 2. **ELET B4** (Computer Integrated Manufacturing) 3 units
 3. **ELET B5** (Programmable Logic Controllers) 3 units
 4. **ELET B55A** (Electric Motors - Controls) 3 units
 5. **ELET B56** (Instrumentation and Process Control) 3 units
 6. **ELET B70** (Mechanical Systems) 3 units

CSU GENERAL EDUCATION PATTERN (35 of the 41 CSU GE units must be completed for admittance to the Baccalaureate Degree Program. However, all 41 lower division GE units must be completed prior to graduation.)

- **A. English Language Communication and Critical Thinking** (9 units)
 - A.1 Oral Communication** (3 units)
COMM B1, or B4 or B8 (*COMM B8 recommended*)
 - A.2 Written Communication** (3 units)
ENGL B1A
 - A.3 Critical Thinking** (3 units)
PHIL B7, or B9, or ENGL B1b, or B2, or B3, or COMM B5 (*COMM B5 recommended*)
- **B. Scientific Inquiry and Quantitative Reasoning** (9 units)
 - B.1 Physical Universe** (4 units)
PHYSICS B2a or higher (prerequisite course)
 - B.2 Life Science**
Any course listed in Area B.2 of the of the CSU General Education Pattern in the Bakersfield College Catalog (*Crop Science B10 recommended*)
 - B.3 Laboratory Activity**
PHYSICS B2a Lab or higher (prerequisite course)
 - B.4 Mathematics/ Quantitative Reasoning** (4 units)
MATH B1a or higher (prerequisite course)
- **C. Arts and Humanities** (9 units)
Any course as listed in Area C of the CSU General Education Pattern in the Bakersfield catalog. *Note: At least one course must be taken from Arts and one from Humanities*
 - C.1 – Arts** - one course (*ART B4 recommended*)
 - C.2 – Humanities** - one course; (*PHIL B10 recommended*)
 - C.1 or C.2** – Any one course (*SPAN B1 recommended*)
- **D. Social Science** (9 units)
Any three courses listed in Area D.1 – D.10 of the CSU General Education Pattern in the Bakersfield College Catalog. (*ECON B1 or B2, HIST B17a or B17b, or POLS B1 recommended*)
- **E. Lifelong Understanding and Self-Development** (3 unit)
Any one, three unit course as listed in Area E of the CSU General Education Pattern in the Bakersfield College Catalog (*PSYC B1a recommended*)

APPLICATION SELECTION PROCESS

Tier One Cohort: Students applying for the upper division Baccalaureate Degree Program must submit:

- 1) Completed BC Admission form.
- 2) Completed Tier One application form. Application forms are available on the Bakersfield College website and in Industrial Technology Room 1.
- 3) All official college transcripts.

All Tier One qualified applicants will be placed in a random selection process which will result in the conditional filling of the 30 program enrollment seats plus selection of 10 alternates. All conditionally enrolled students will be fully accepted into the upper division program upon full satisfaction of the scholastic eligibility requirements. Conditionally enrolled students who do not fully satisfy the scholastic eligibility requirements by the start of the fall semester will be replaced with scholastically eligible alternates.

Tier Two Pathway Cohort: Incoming freshmen and continuing sophomore students applying for the Baccalaureate Degree Program pathway cohort must submit:

- 1) Completed BC Admission form. Select Electronics Technology as the major.
- 2) Completed Tier Two application form. Application forms are available on the Bakersfield College website.
- 3) All official high school transcripts.
- 4) Bakersfield College Placement in English and Math.

Although all Tier Two qualified applicants will be admitted to the BACCALAUREATE DEGREE Pathway Cohort, these students must apply for the Tier One Cohort once scholastically eligible in order to be a potential candidate for the BACCALAUREATE DEGREE Upper Division program.

BACHELOR OF SCIENCE, INDUSTRIAL AUTOMATION CURRICULUM

The first two years of the Baccalaureate Degree Program, students will be expected to satisfy the general education requirements outlined in the California State University General Education Breadth course list in addition to the existing electronics courses that comprise the technical core to prepare for upper division coursework.

Lower Division Curriculum

CSU GE Breadth	Units
A.1 Oral Communication	3
A.2 Written Communication (ENGL B1a)	3
A.3 Critical Thinking	3
B.1 Physical Universe (Physics B2a or higher required - satisfies B.3 Lab requirement) ¹	4
B.2 Life Science	3
B.3 Laboratory Activity	
B.2 Mathematics/Quantitative Reasoning (Math B1a required) ²	4
C. Arts and Humanities	9
D. Social Sciences	9
E. Lifelong Learning and Self-Development	3
Total	41

Lower Division Technical Core	Units
ELET B1 (Basic Electronics)	4
ELET B4 (Computer Integrated Manufacturing)	3
ELET B5 (Programmable Logic Controllers)	3
ELET B55a (Electric Motors - Controls)	3
ELET B56 (Instrumentation and Process Control)	3
ELET B70 (Mechanical Systems)	3
Total	19

¹Or Physics B4a or higher

²Or Math B2, Math B6a or higher

Upper Division Curriculum

Upper Division Technical Core	Units
INDA B100 (Industrial Design Graphics I)	3
INDA B101 (Industrial Design Graphics II)	3
INDA B105 (Materials Science for the Technician)	3
INDA B110 (IA Networks)	3
INDA B112 (IA Measurement)	3
INDA B114 (Industrial Safety Principles and Management)	3
INDA B120 (IA Systems)	3
INDA B122 (Industrial Motion Control)	3
INDA B124 (Industry Sector Seminar: Applied Automation)	3
INDA B130 (Industrial Manufacturing Processes)	3
INDA B132 (Project Management and Budgeting)	3
INDA B134 (Industry Sector Seminar: Manufacturing and Production)	3
INDA B140 (Quality Management)	3
INDA B142 (Facilities Planning and Operations)	3
INDA B144 (Leadership and Entrepreneurship)	3
INDA B150 (Systems Design and Integration)	3
	3
Total	51

Upper Division General Education	Units
Technical Writing	3
Industrial Organizational Psychology	3
Industrial Ethics	3
Total	9

Total Lower Division GE	41
Total Lower Division Technical	19
Total Upper Division Technical	51
Total Upper Division GE	9
Total Units	120

Recommended Courses

When selecting General Education Courses, it is recommended that students take the following:

COMM B8 (GE Area A1 Oral Communication)
 COMM B5 (GE Area A3 Critical Thinking)
 CRPS B10 (GE Area B2 Life Sciences)
 ART B4 (GE Area C1 Arts and Humanities)
 PHIL B10 (GE Area C2 Arts and Humanities)
 SPAN B1 (GE Area C Arts and Humanities)
 ECON B1 or B2 (GE Area D Social Sciences)
 POLS B1 (GE Area D Social Sciences)
 HIST B17a or B17b (GE Area D Social Sciences)
 PSYC B1A (GE Area E Lifelong Learning and Self-Development)

EDUCATIONAL PLANNING

Success in the Baccalaureate Degree Program is best achieved by having a well-defined educational plan. Listed below is a guide for both Tier One and Tier Two Baccalaureate Degree Program applicants.

Tier Two Cohort: Suggested Lower Division Pattern (Must satisfy CSU GE Pattern)

Freshman Fall Semester	15 Units
POLS B1 (GE Area D Social Sciences)	3
MATH B1a (GE Area B4) ¹	4
PHYS B2a (GE Areas B1/B3) ²	4
ELET B1 (Basic Electronics)	4
Freshman Spring Semester	15 Units
ENGL B1a (GE Area A2)	3
ART B4 (GE Area C Arts and Humanities)	3
ECON B1 or B2 (GE Area D Social Sciences)	3
ELET B5 (Programmable Logic Controllers)	3
ELET B70 (Mechanical Systems)	3

Sophomore Fall Semester	15 Units
CRPS B10 (GE Area B2 Life Sciences)	3
PHIL B10 (GE Area C Arts and Humanities)	3
COMM B5 (GE Area A3 Critical Thinking)	3
HIST B17a or B17b (GE Area D Social Sciences)	3
ELET B55a (Electric Motors - Controls)	3
Sophomore Spring Semester	15 Units
SPAN B1 (GE Area C Arts and Humanities)	3
PSYC B1A (GE Area E Lifelong Learning and Self-Development)	3
COMM B8 (GE Area A1 Oral Communication)	3
ELET B56 (Instrumentation and Process Control)	3
ELET B4 (Computer Integrated Manufacturing)	3

Tier One Cohort: Required Upper Division Pattern

Junior Fall Semester	15 Units
INDA B114 (Industrial Safety Principles and Management)	3
INDA B105 (Materials Science for the Technician)	3
INDA B110 (IA Networks)	3
INDA B112 (IA Measurement)	3
INDA B100 (Industrial Design Graphics I)	3
Junior Spring Semester	15 Units
GE Upper Division: Technical Writing	3
INDA B101 (Industrial Design Graphics II)	3
INDA B120 (IA Systems)	3
INDA B122 (Industrial Motion Control)	3
INDA B124 (Industry Sector Seminar: Applied Automation)	3

Senior Fall Semester	15 Units
GE Upper Division: Industrial Organization Psychology	3
INDA B132 (Project Management and Budgeting)	3
INDA B150 (Systems Design and Integration)	3
INDA B134 (Industry Sector Seminar: Manufacturing and Production)	3
INDA B130 (Industrial Manufacturing Processes)	3
Senior Spring Semester	15 Units
GE Upper Division: Industrial Ethics	3
INDA B144 (Leadership and Entrepreneurship)	3
INDA B140 (Quality Management)	3
INDA B142 (Facilities Planning and Operations)	3
INDA B151 (Systems Implementation)	3

(1) Math B2 or Math B6a may also satisfy this requirement

(2) May obtain credit via scores on AP Physics test; Physics B4a will also satisfy this requirement

COST OF PROGRAM

- Lower Division Coursework: \$46.00 per unit
- Upper Division Coursework: \$46.00 per unit, plus an additional \$84.00 per unit = \$130.00 per unit
- Additional costs will be incurred for parking, books, required course materials, and college fees.
- Financial Aid will be available for those who qualify.

AFFIRMATIVE ACTION /EQUAL OPPORTUNITY STATEMENT

In accordance with the requirements of the Civil Rights Act, Bakersfield College provides services and benefits to students regardless of race, color, national origin, ancestry, gender, age, religion, marital status, medical condition or disability. The lack of English language skills will not be a barrier to administration and participation in vocational education programs. (Title VI and VII of the Civil Rights Act of 1964, as amended; Title IX of the Education Amendments of 1972; and Section 503 and 504 of the Rehabilitation Act of 1973, as amended.)

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