Baccalaureate of Applied Science (BAS) Industrial Automation

Building upon more than 100 years of excellence, Bakersfield College continues to contribute to the intellectual, cultural, and economic vitality of the communities it serves.

Presentation to the Board of Trustees
November 13, 2014

Presenters:
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...It was the first time in the history of any state in the United States, or any nation in the world, where such a commitment was made -- that a state or a nation would promise there would be a place ready for every high school graduate or person otherwise qualified.”

– Clark Kerr 1999
Governor Signs Bill Enabling 15 California Community Colleges to Award Four-Year Degrees

California joins 21 other states that offer community college baccalaureates in workforce and technical fields

Governor Jerry Brown today signed into law a historic measure that for the first time enables a limited number of California community colleges to offer four-year degrees.

Senate Bill (SB) 850, authored by State Senator Marty Block (D-San Diego), drew overwhelming bipartisan and business support because it addresses a growing need for the state to become more competitive in areas of high workforce demand.

The pilot program authorized under SB 850 allows up to 15 different community college districts to offer one baccalaureate degree each in select workforce majors starting on Jan. 1, 2015 and ending on July 1, 2023.
## Baccalaureate attainment

**by counties in California**

<table>
<thead>
<tr>
<th>County</th>
<th>Population 25 years and over</th>
<th>Percent bachelor's degree or higher</th>
<th>Rank</th>
<th>County</th>
<th>Population 25 years and over</th>
<th>Percent bachelor's degree or higher</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marin</td>
<td>187,610</td>
<td>55.8%</td>
<td>1</td>
<td>Humboldt</td>
<td>91,893</td>
<td>26.7%</td>
<td>21</td>
</tr>
<tr>
<td>San Francisco</td>
<td>644,836</td>
<td>53.6%</td>
<td>2</td>
<td>Butte</td>
<td>142,262</td>
<td>24.1%</td>
<td>22</td>
</tr>
<tr>
<td>Santa Clara</td>
<td>1,240,851</td>
<td>47.1%</td>
<td>3</td>
<td>Solano</td>
<td>279,393</td>
<td>24.1%</td>
<td>23</td>
</tr>
<tr>
<td>San Mateo</td>
<td>522,151</td>
<td>43.8%</td>
<td>4</td>
<td>Monterey</td>
<td>265,340</td>
<td>24.0%</td>
<td>24</td>
</tr>
<tr>
<td>Alameda</td>
<td>1,060,024</td>
<td>42.4%</td>
<td>5</td>
<td>Mendocino</td>
<td>60,606</td>
<td>23.4%</td>
<td>25</td>
</tr>
<tr>
<td>Contra Costa</td>
<td>728,065</td>
<td>39.4%</td>
<td>6</td>
<td>Riverside</td>
<td>1,405,232</td>
<td>20.5%</td>
<td>26</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>172,067</td>
<td>38.3%</td>
<td>7</td>
<td>San Joaquin</td>
<td>427,418</td>
<td>18.9%</td>
<td>27</td>
</tr>
<tr>
<td>Orange</td>
<td>2,037,907</td>
<td>37.3%</td>
<td>8</td>
<td>Fresno</td>
<td>560,633</td>
<td>18.5%</td>
<td>28</td>
</tr>
<tr>
<td>Yolo</td>
<td>119,945</td>
<td>37.3%</td>
<td>9</td>
<td>San Bernardino</td>
<td>1,254,340</td>
<td>18.5%</td>
<td>29</td>
</tr>
<tr>
<td>Placer</td>
<td>247,723</td>
<td>34.8%</td>
<td>10</td>
<td>Shasta</td>
<td>124,220</td>
<td>18.2%</td>
<td>30</td>
</tr>
<tr>
<td>San Diego</td>
<td>2,079,795</td>
<td>34.8%</td>
<td>11</td>
<td>Sutter</td>
<td>59,373</td>
<td>17.7%</td>
<td>31</td>
</tr>
<tr>
<td>San Luis Obispo</td>
<td>180,650</td>
<td>33.5%</td>
<td>12</td>
<td>Lake</td>
<td>46,706</td>
<td>17.1%</td>
<td>32</td>
</tr>
<tr>
<td>Nevada</td>
<td>73,598</td>
<td>32.4%</td>
<td>13</td>
<td>Stanislaus</td>
<td>321,347</td>
<td>16.1%</td>
<td>33</td>
</tr>
<tr>
<td>El Dorado</td>
<td>126,734</td>
<td>32.0%</td>
<td>14</td>
<td>Yuba</td>
<td>44,292</td>
<td>15.8%</td>
<td>34</td>
</tr>
<tr>
<td>Sonoma</td>
<td>339,841</td>
<td>31.8%</td>
<td>15</td>
<td>Kern</td>
<td>503,688</td>
<td>15.3%</td>
<td>35</td>
</tr>
<tr>
<td>Ventura</td>
<td>542,924</td>
<td>31.6%</td>
<td>16</td>
<td>Tulare</td>
<td>257,393</td>
<td>14.7%</td>
<td>36</td>
</tr>
<tr>
<td>Napa</td>
<td>94,818</td>
<td>30.3%</td>
<td>17</td>
<td>Imperial</td>
<td>106,011</td>
<td>13.0%</td>
<td>37</td>
</tr>
<tr>
<td>Santa Barbara</td>
<td>266,202</td>
<td>30.2%</td>
<td>18</td>
<td>Merced</td>
<td>149,009</td>
<td>12.8%</td>
<td>38</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>6,525,066</td>
<td>30.0%</td>
<td>19</td>
<td>Madera</td>
<td>93,341</td>
<td>12.5%</td>
<td>39</td>
</tr>
<tr>
<td>Sacramento</td>
<td>943,594</td>
<td>28.0%</td>
<td>20</td>
<td>Kings</td>
<td>93,536</td>
<td>12.1%</td>
<td>40</td>
</tr>
</tbody>
</table>

* The US Census website did not have data to report for 18 of the 58 counties in California. Inyo and Mono are among the 18 with no data.
Baccalaureate attainment by Poverty Level

Baccalaureate Attainment for Individuals Above the Poverty Level

Baccalaureate Attainment for Individuals Below the Poverty Level
Baccalaureate attainment by ethnicity

Baccalaureate Attainment for Black/African American

Baccalaureate Attainment for Hispanic/Latino
Baccalaureate attainment by ethnicity
USA-CA-Kern

Baccalaureate Attainment for Asian

Baccalaureate Attainment for White
BAS Constituency Support

- Bakersfield College Academic Senate
- Bakersfield College Business & Industry Advisory Committees
- Curriculum Committee
- Program Review Committee
- President’s Cabinet
Verbal Commitments

Industry partners:
- AERA
- Chevron

Chambers:
- Bakersfield Chamber of Commerce
- Delano Chamber of Commerce
- Kern County Black Chamber of Commerce
- Kern County Hispanic Chamber of Commerce
- Kern Economic Development Corporation
Verbal Commitments

Political partners:
- Kevin McCarthy
- Jean Fuller
- Leticia Perez

Others:
- Garden Pathways
- Kern Valley Prison
Financial Analysis
Scenario 1 (Worst Case)

Start up cost

<$1.4> Million

→ Sources of Funding:
Industry, Grants
BC Reserves,
Potential 2016Bond

Ongoing Net (Cost)/Contribution.

<$34,000>

→ Stabilizes after year 3

Assumptions:
1. Not including the potential additional revenue from FTES growth based on new state apportionment model
2. Includes $84 tuition rate for Baccalaureate Program
3. Assumes zero apportionment for Freshman, Sophomore, Junior, and Senior FTES
Financial Analysis
Scenario 2 (Realistic Case)

Start up cost

<$1.4> Million

Sources of Funding:
Industry, Grants
BC Reserves,
Potential 2016 Bond

Assumptions:
1. Including the potential additional revenue from FTES growth
   based on new state apportionment model for Freshman,
   Sophomore, Junior, and Senior FTES
2. Includes $84 tuition rate for Baccalaureate Program

Ongoing Net (Cost)/ Contribution.

$902,000

Stabilizes after year 3
Pilot Program Timeline

- Senate Bill (SB850)/State Chancellor’s Office Tentative Timeline
INDUSTRIAL AUTOMATION

Liz Rozell
Dean, STEM
Why a BAS in Industrial Automation?

Technician

Technologist

Engineer
Defining Industrial Automation

What is “AUTOMATION”?

“The technique of making an apparatus, a process, or a system operate automatically.” – Merriam-Webster Dictionary

“The creation and application of technology to monitor and control the production and delivery of products and services... ...

Automation involves a very **broad range of technologies** including robotics and expert systems, telemetry and communications, electro-optics, Cybersecurity, process measurement and control, sensors, wireless applications, systems integration, test measurement, and many, many more.” – Automation Federation (Industrial Association)

Source:
http://www.automationfederation.org/Content/NavigationMenu/General_Information/Alliances_and_Associations/The_Automation_Federation/About1/What_is_Automation_/What_is_Automation_.htm
INDUSTRIAL AUTOMATION TECHNOLOGIES
Local Automation Employers

Paramount Farms
Pistachios & Almonds

Grimmway Farms®

Bolthouse Farms®
Since 1915

Dreyer’s®

Linn Energy

CalPortland®

Target®

GAF Materials Corporation

KSi

Chevron

FritoLay®
Good fun!

Sun World®
Why a BAS in Industrial Automation?

Workforce Needs: Local demand for technical managers and high level technicians

<table>
<thead>
<tr>
<th>SOC</th>
<th>Occupation</th>
<th>2014 Jobs</th>
<th>Annual Openings 2014-2023</th>
<th>Median Hourly Earnings*</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Operations Management</td>
<td>3,246</td>
<td>151</td>
<td>$43</td>
</tr>
<tr>
<td>17</td>
<td>Technicians and Technologist-related</td>
<td>912</td>
<td>37</td>
<td>$36</td>
</tr>
<tr>
<td>41</td>
<td>Sales Engineers</td>
<td>69</td>
<td>3</td>
<td>$43</td>
</tr>
<tr>
<td>49</td>
<td>Industrial Electronics Maintenance</td>
<td>189</td>
<td>9</td>
<td>$28</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>4,416</strong></td>
<td><strong>200</strong></td>
<td><strong>$41</strong></td>
</tr>
</tbody>
</table>

* EMSI Data – Bakersfield Service Area  
  * Weighted Average
Why a BAS in Industrial Automation?

Occupation Change Summary

<table>
<thead>
<tr>
<th>Region</th>
<th>2014 Jobs</th>
<th>2023 Jobs</th>
<th>Change</th>
<th>% Change</th>
<th>Median Hourly Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC Service Area DEMOGRAPHIC</td>
<td>4,417</td>
<td>5,323</td>
<td>906</td>
<td>21%</td>
<td>$41.14</td>
</tr>
<tr>
<td>California</td>
<td>372,759</td>
<td>416,058</td>
<td>43,299</td>
<td>12%</td>
<td>$46.60</td>
</tr>
<tr>
<td>United States</td>
<td>2,913,462</td>
<td>3,212,311</td>
<td>298,849</td>
<td>10%</td>
<td>$42.69</td>
</tr>
</tbody>
</table>

*EMSI Data – Bakersfield Service Area*  
*Weighted Average*
Why a BAS in Industrial Automation?

Existing Infrastructure
- Facilities & Equipment
- Lower Division Technical Curriculum
- Lower Division General Education
- Faculty
- Support Services
Educational Pathways in Automation

Certificates for Electronics Technician Training

A.S. Degree in Industrial Technology, Electronics Option

Automation

A.S. Degree in Engineering Technology

Baccalaureate
Identifying the Mission

To prepare individuals for technical management careers in industries which utilize automation, including the petroleum, manufacturing, logistics and agriculture industry sectors, in order to improve the regional economy.
## Identifying the Outcomes

<table>
<thead>
<tr>
<th>Institutional Learning Outcomes</th>
<th>Programming Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of a degree program at Bakersfield College, students will Think critically and evaluate sources and information for validity and usefulness.</td>
<td>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.</td>
</tr>
<tr>
<td>Upon completion of a degree program at Bakersfield College, students will Communicate effectively in both written and oral forms.</td>
<td>Upon completion of this program, a student will be able to: Display effective communication skills commonly used in industry, including presentation and technical writing skills.</td>
</tr>
<tr>
<td>Upon completion of a degree program at Bakersfield College, students will Demonstrate competency in a field of knowledge or with job-related skills.</td>
<td>Upon completion of this program, a student will be able to: 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.</td>
</tr>
<tr>
<td>Upon completion of a degree program at Bakersfield College, students will Engage productively in all levels of society—interpersonal, community, the state and nation, and the world.</td>
<td>Upon completion of this program, a student will be able to: Manage automation and manufacturing projects applying knowledge of budgetary and scheduling principles in an ethical environment.</td>
</tr>
</tbody>
</table>
1. Identify, scope, and justify automation projects.
2. Identify customer requirements and determine solutions to meet those requirements.
3. Perform a complete conceptual design of the control, information, and hardware systems.
5. Installation, checkout, and startup of systems

INTERNATIONAL SOCIETY FOR AUTOMATION
CERTIFIED AUTOMATION PROFESSIONAL CRITERIA

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OFFENDING COMMAND: ~

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