

Certificate of Achievement in Industrial Drawing

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Submitter's Information

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Program Information

**Program Name** Certificate of Achievement in Industrial Drawing

**Projected Start Date** 2018-06-01

**Program Type(s)** Certificate of Achievement 18+ Semester (27+ Quarter) Units

**Certificate Required Units** 21

**Units of Major Degree** n/a

**Total Units for Degree** n/a

**TOPs Code** Drafting Technology (095300)

**Program Goals** This proposed Certificate of Achievement in Industrial Drawing will prepare students for employment in the various specialized fields where CAD technicians are employed. Students fulfilling the requirements of this certificate will acquire knowledge that goes beyond the basic operation of Computer-Aided Drafting & Design software that the current Industrial Drawing AutoCAD Job Skills Certificate provides. By giving students specific and directed experience in the creation of technical documents and drawings required in the sub-fields of Civil, Electrical, Industrial, and Process Piping drafting, students will be more desirable hires to local employers. An additional benefit related to the creation of this new Certificate is that it will serve as a much-needed "stepping-stone" to assist students in advancing through our program and transitioning from our current AutoCAD Job Skills Certificate (8 units) to a full Associate of Science Degree in Industrial Drawing (60 units).

**Program Description**

The Industrial Drawing Certificate of Achievement prepares students for entry-level employment in the various specialized fields of Industrial Drawing. Students will grow in their use of use Computer-Aided Drafting (CAD) skills in addition to acquiring the industry specific knowledge used across the spectrum of major industries employing CAD technicians and designers. Career options include: drafter, CAD detailer, CAD modeler, industrial designer, engineering technician, and CAD manager. These options cross the spectrum of fields requiring CAD technicians, including: Architecture and Construction, Civil Engineering and Surveying, Cadastral and Mapping, Electrical and Electronics, Mechanical and Process Piping, Manufacturing and Fabrication.

<b>Program Requirements</b>	<table border="0"> <tr> <td>Core Courses</td> <td>Title</td> <td>Units</td> </tr> <tr> <td>INDR B12</td> <td>Introduction to Drafting and CAD</td> <td>3 units</td> </tr> <tr> <td>INDR B20A</td> <td>Computer Aided Drafting and Design (CAD)</td> <td>3 units</td> </tr> <tr> <td>INDR B20B</td> <td>Computer Aided Drafting and Design (CAD)</td> <td>3 units</td> </tr> <tr> <td>INDR B40</td> <td>Parametric Modeling Fundamentals</td> <td>3 units</td> </tr> <tr> <td>INDR B50</td> <td>Process Piping</td> <td>3 units</td> </tr> <tr> <td>INDR B51</td> <td>Electrical Design</td> <td>3 units</td> </tr> <tr> <td>INDR B52</td> <td>Geographic Information Systems (GIS)</td> <td>3 units</td> </tr> <tr> <td colspan="3">First Semester: INDR B12 3 units</td> </tr> <tr> <td colspan="3">Second Semester: INDR B20A &amp; INDR B50 6 units</td> </tr> <tr> <td colspan="3">Third Semester: INDR B20B &amp; INDR B51 6 units</td> </tr> <tr> <td colspan="3">Fourth Semester: INDR B52 &amp; INDR B40 6 units</td> </tr> <tr> <td colspan="3">Total Core Courses 21</td> </tr> </table>	Core Courses	Title	Units	INDR B12	Introduction to Drafting and CAD	3 units	INDR B20A	Computer Aided Drafting and Design (CAD)	3 units	INDR B20B	Computer Aided Drafting and Design (CAD)	3 units	INDR B40	Parametric Modeling Fundamentals	3 units	INDR B50	Process Piping	3 units	INDR B51	Electrical Design	3 units	INDR B52	Geographic Information Systems (GIS)	3 units	First Semester: INDR B12 3 units			Second Semester: INDR B20A & INDR B50 6 units			Third Semester: INDR B20B & INDR B51 6 units			Fourth Semester: INDR B52 & INDR B40 6 units			Total Core Courses 21		
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**Program Projections** We believe that there will be a group of approximately 15-20 students a year who take advantage of this new certificate. Initially we also predict a good-sized group of former students applying for this certificate who have already completed the AutoCAD Job Skills Certificate and are in process in the completion of their Associate's Degree.

**Labor Market Information**  [Download INDR LMI Numbers.docx \(/storage/lmi/98-75-INDR LMI Numbers.docx\)](/storage/lmi/98-75-INDR LMI Numbers.docx)

**Created At** 11/13/17 - 10:11 PM

**Status** Recommended

Central/Mother Lode Region Specific Questions

**Advisory Minutes**  [Download Advisory Minutes 11-16-15.docx \(/storage/Central/Mother Lode/98-75-115-Advisory Minutes 11-16-15.docx\)](/storage/Central/Mother Lode/98-75-115-Advisory Minutes 11-16-15.docx)

Bakersfield College  
Certificate of Achievement in Industrial Drawing

Current Supply numbers:

TOP6 - Program Title	2012-13	2013-14	2014-15	2015-16	Latest 3 Yr Avg
⊕ 095300 - Drafting Technology		3	4	13	7
<b>Grand Total</b>		3	4	13	7

Current Demand in Industrial Drawing & Related fields:

SOC Code	Occupational Title	Typical Entry Level	2015 Jobs	2018 Jobs	2015-18 Change	% Change 2015-18	Openings (New + Replacements)	Annual Openings	10% Hourly Earnings	Median Hourly Earnings
17-3011	Architectural and Civil Drafters	Associate degree	232	242	10	4.4%	19	6	\$11.96	\$22.82
17-3012	Electrical and Electronics Drafters	Associate degree	55	58	3	5.2%	6	2	\$19.34	\$32.44
17-3013	Mechanical Drafters	Associate degree	64	66	2	2.9%	6	2	\$18.77	\$27.40
17-3019	Drafters, All Other	Associate degree	24	25	1	2.7%	2	1	\$19.78	\$30.17
17-3026	Industrial Engineering Technicians	Associate degree	62	63	1	2.0%	8	3	\$23.60	\$41.32
17-3027	Mechanical Engineering Technicians	Associate degree	88	91	3	3.3%	11	4	\$19.35	\$32.24
17-3031	Surveying and Mapping Technicians	HS diploma or equivalent	118	121	4	3.1%	10	3	\$15.99	\$26.36
<b>Grand Total</b>			<b>643</b>	<b>666</b>	<b>23</b>	<b>3.6%</b>	<b>62</b>	<b>21</b>	<b>\$16.43</b>	<b>\$28.09</b>

**Drafting / CAD / Architecture  
Advisory Committee Meeting  
11/16/15**

**Architecture & Industrial Drawing Advisory Board Members:**

Bob Blair , Danny Ordiz , Richard Meyer, Pierre Peasha, Mark Stoner, Matthew Lanzer, John Cohrs, Samuel Wilson, Daniel Cronquist, Dorothy Brelih, Kyle Gallenmore, Kelley Honore, Jay Corona, Matt Rowland, Matt Stevenson, Chad Hammond, Braulio Juarez, Brian Atwater

**Architecture curriculum:** Duane asked the advisory board their thoughts on traditional skills, such as model-building, perspective drawing, and hand-rendering. The advisory members present who represent Architecture said these are not in demand for new hires in this field. The point was made, though, that these skills **ARE** required for students transferring to a 4-year institution. Since students are not going to work as architects directly out of community college, and must go on to continue their education, consensus was achieved that these skills should continue to be taught as part of the Architecture curriculum

ARCH B11:

Keep all Hand sketching, perspective theory and shade/shadow instruction.

Eliminate Presentation Hand Lettering assignments, not necessary.

ARCH B12:

Every architect said this skill set (color illustration) is not necessary for use in an office, however, they DID say that along with model building, as this IS used and required for upper level university/college programs, we should continue to offer the course.

None of them produce any hand generated color renderings, it is all digital in-house.

General questions:

Over the past 5-10 years Ordiz-Melbey has hired approximately 10-12 of our students, Inland Architects (Sam Wilson) has hired about the same number and Klassen has hired about 3-5.

When asked about the importance of certificates relative to degrees they ALL agreed that certificates are NOT important to them for hires. They said having a degree is most important for any potential employment. They all agreed Gen. Ed. is very important. (Including basic Math & Communication skills)

Sam said and they all agreed: with a two-year degree from BC, they consider the students for CAD production work only with it taking many years before they would be prepared to be doing any design or management work. They all said people with a bachelor's degree would move into licensing, design and management much faster.

As to what software they use; BIM is very important to the larger firms. Sam said they only do 2D drafting so, they use a generic CAD software.

They all seemed to agree that offering the Codes course is very important!

As for ARCH B6, they said that though the residential framing model is good, none of them do any residential work (residential work is not normally done by architects in our area except for the occasional custom home).

We learned there are only two area high schools (North & Centennial) that offer any architecturally related courses. Pierre said anything we can do to spread the word should help.

The overall impression from the group is that the field of architecture is pretty flat at least until after the election next year. We discussed the issues that have historically impacted the number of students who are interested in and stay in the field, (ie. low relative pay, length of time and difficulty it takes to get licensed, etc. There are several local architects who will be retiring in the next few years. That will either create a vacuum for the field or a perfect environment/opportunity for new, younger people entering the field.

**Job Skills Certificate (JSC) and Certificate of Achievement (COA) in Architecture:** Questions were posed to advisory members about Certificates. The current plan is to eliminate the JSC from Architecture, replacing it with a COA. Board members responded that in Architecture the current JSC has little value. Students hired from Bakersfield College are not any more or less likely to get an interview based on whether or not they have a Certificate; faculty recommendations carry the most weight, actually. Discussion was considered about a certificate's value as a stepping-stone to completing an AS degree, or even continuing on at a 4-year institution. Advisory members agreed that a more-educated workforce is preferred to a minimally educated workforce, so this would be a positive step, even if it had little effect on hiring practices.

**ARCHITECTURE Certificate of Achievement (26 units)**

Course ID	Course Title	Units
<b>Required Courses</b>		
ARCH B6	Materials of Construction	3
ARCH B11	Design and Perspective Drawing	4
ARCH B12	Design Drawing and Color	4
ARCH B16	Digital Tools for Graphics Communication	3
ARCH B30	Residential Building Information Modeling	4
ARCH B33	Architectural Computer Practice	3

INDR B12	Introduction to Drafting and CAD	2
INDR B20a	Computer Aided Drafting and Design (Intermediate)	3
	TOTAL:	26

**Certificate of Achievement in Industrial Drawing:** Plans to add a COA for Industrial Drawing have been made. The current AutoCAD JSC is attractive to many students, since it requires only three semester to complete. The addition of a COA (the requirements being identical to the major requirements for the old AA degree, minus Gen Ed) give students an intermediate stepping stone to continue on in the program towards the AS degree. Again, consensus was that a more highly educated workforce is preferred to a less-educated workforce. Likewise, CAD students who have had experience using AutoCAD and other CAD software a variety of contexts (Piping, Civil, Electrical, etc.) are move valuable than students who are good at using the tool, but do not have the knowledge to apply it to the variety of contexts it is used with.

### **INDUSTRIAL DRAWING Certificate of Achievement (20 units)**

<b>Course ID</b>	<b>Course Title</b>	<b>Units</b>
<b>Required Courses</b>		
INDR B12	Introduction to Drafting and CAD	2
INDR B20a	Computer Aided Drafting and Design (Intermediate)	3
INDR B20b	Computer Aided Drafting and Design (Advanced)	3
INDR B50	Process Pipe Drafting and Design	3
INDR B51	Electrical Design	3
INDR B52	Civil Drafting / Geographic Information Systems (GIS)	3
INDR B40	Parametric Modeling Fundamentals	3
	TOTAL:	20

**Geographic Information Systems:** The current Civil Drafting & GIS course (INDR B52) briefly touches on Geographic Information Systems and is not doing the field any justice. GIS is a career pathway that can be pursued as far as the PhD level... the idea that a few weeks instruction is sufficient to put students to work in this field is unrealistic. The GIS course taught by the business department in the past was closed when the responsible faculty member retired. The need for a GIS course that can teach students the basics of the ArcGIS software is a real need. GIS is utilized in practically every industry to one degree or another. The INDR faculty are willing to begin the process to add this course to our current offerings.

**Expansion of Programs:** Introductory classes need to lead to advanced classes in specializations. Our Introduction to Process Pipe Drafting & Design (INDR B52) class should lead to a 3D Piping class with a product like CADWorx or PDMS. Our Civil Drafting & Design class should lead to a Civil 3D class, which is the industry standard for civil engineering and surveying. Knowing the basic functionality of a CAD package is not sufficient... students looking to get hired need to have something to offer that is in demand. Specialization is the key to this. For example, an Introduction to Solidworks class could lead to an industry-certification level class, and/or 2-unit classes devoted to sheet-metal, weldments, surfacing, routing, etc.

**Other Certificates being proposed: Advanced Civil (3D), Advanced Process Piping (3D), Mechanical Design, Industrial Arts & Design**