Avoiding the Road to Nowhere
Lessons Learned from Mapping Intersegmental Pathways

2019 Strengthening Student Success Conference

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bit.ly/sssc19-pathways
Workshop Objective

Provide ideas for how you can support students in identifying and attaining their career goals, and address persistent equity gaps, by clarifying and improving pathways between educational segments.
Helping Students Get Where They Want to Go

• Most students don’t attend only one educational segment – they transition from K12, adult schools, and the workforce system into community colleges
• Most students enroll in post-secondary education for career purposes, and many are explicitly pursuing greater economic stability
• More than half of community college students declare an educational goal of earning a bachelor’s degree
Building Awareness of Bias That Is Baked Into Our Systems

- Early in their educational journeys, students get sorted into pathways based on characteristics like race, gender, and immigration status.
- Many students, especially those who are first-generation, are not aware of a full range of educational and career options.
- Low-income students may abandon long-term education and career goals to meet immediate economic needs.
- In order to close equity gaps, educators need to pay close attention to the relationship between the competencies embedded in programs, length of time in school, and occupational opportunities.
Educational Attainment Can Support Economic Mobility and Civic Engagement

- Wages correlate directly to education level
- Economic stability is strongly correlated with health, longevity, and civic engagement*

<table>
<thead>
<tr>
<th>Educational Attainment</th>
<th>Median Wage</th>
<th>Median Entry Level Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral or professional degree</td>
<td>$22.64</td>
<td>$48.21</td>
</tr>
<tr>
<td>Master's degree</td>
<td>$24.72</td>
<td>$46.20</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>$20.52</td>
<td>$36.43</td>
</tr>
<tr>
<td>Associate's degree</td>
<td>$15.98</td>
<td>$27.37</td>
</tr>
<tr>
<td>Postsecondary nondegree award</td>
<td>$17.22</td>
<td>$27.23</td>
</tr>
<tr>
<td>High school diploma or equivalent</td>
<td>$13.87</td>
<td>$22.29</td>
</tr>
<tr>
<td>Some college, no degree</td>
<td>$13.66</td>
<td>$20.79</td>
</tr>
<tr>
<td>No formal educational credential</td>
<td>$12.53</td>
<td>$18.75</td>
</tr>
</tbody>
</table>

Figures are for the Central Valley

*Ed Insights Paper
What’s Your Experience?

- Have you been involved in efforts to trace pathways across educational segments and into the workforce?
- How did you track these pathways?
- How did you address equity gaps as part of this pathway mapping?
- What did you learn?
K₁₄ Pathways Mapping

Hint: This works for adult education and workforce development mapping too
The alignment of
• K12 programs
• college programs
• occupations

is complicated by the fact that they are not one-to-one relationships
One-to-Many Relationships

K12 Business Pathways
(11 course sections)
Advanced Accounting
Business
Business & Financial Markets
Business Management
Business Law

Community College Awards
(30 awards; 914 course sections)

Associates Degrees
Accounting, Business Administration (ADT), Business Management, Computer Business Technology, Entrepreneurship, Financial Services, Legal Admin Assistant, Marketing, Real Estate, Retail Management, Small Business Accounting, Small Business

Certificates
Accounting, Accountancy, Accountancy for Enrolled Agents, Business Administration, Business Management, Entrepreneurship, Financial Services, Legal Administrative Assistant, Marketing, Real Estate Broker, Retail Management, Small Business Management

Noncredit Certificates
Account Clerk, Accounting, Business Management, Project Management, Small Business Growth, Small Business Planning
Framing Concepts

- K12, higher education, and labor markets are large complex systems and there is no single source of truth regarding how they are related.
- WestEd is conducting a comparison of proportions rather than a traditional supply and demand analysis.
- The analysis is designed to clarify general relationships between education systems and their regional labor markets.
- The comparisons can inform future conversations and more in-depth research about system and pathway alignment and integration.
K14 Pathway Mapping

Goal: To map and inventory every high school and community college career education program against regional labor market information

1. Understand the relationship between existing high school and college offerings and the regional labor market

2. Inform pathway planning between high schools and colleges on ways to fill in gaps, develop new programs, and improve existing pathways

3. Help counselors direct students to community college programs and to support college and career exploration and to prevent tracking
Methodology: Data Sources

• **K12 career education course data** for every CTE course offered within a sector and pathway

• **Community college program data** for every certificate or degree offered within a sector or pathway

• **Labor market information** from EMSI, focused on employment, growth, annual openings, and wages
Methodology: Conversations

- Begin by grounding the conversation of students’ experiences, using student personas
- Present data in small chunks
- Give participants a chance to reflect on existing pathways, with a student persona in mind
- Provide space for participants to apply mapping exercises to work products required for current funding streams
Student Persona: Janice Zamora

• Janice’s family came from Democratic Republic of the Congo to seek asylum six years ago. Her parents speak French and she spends a lot of time translating for them. She speaks with an accent, but is fluent in English.

• She was always an exceptional student and wants to own her own business. In high school, she took the most challenging classes she could and participated in an entrepreneurship club.

• While she was accepted to UC, she could not afford to go and enrolled in the local community college with a goal of transferring as a business major. In addition to going to college, she is works as a cashier at a grocery store.

• At community college, she needs to take business calculus, but she keeps being put on the waitlist. Her counselor encouraged her to take accounting, but the class is boring. She feels like she’s not learning the leadership and people skills she needs to be a CEO and is worried she’s not taking the right classes to transfer.
### Top 5 Regional Jobs that Require College

<table>
<thead>
<tr>
<th>Top 5 Regional Jobs that Require College</th>
<th>Number of Job Openings</th>
<th>Job Growth 2017 to 2022</th>
<th>Median Wages</th>
<th>Who is Supported by Median Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>General and Operations Managers</td>
<td>7,136</td>
<td>+12%</td>
<td>$43.93</td>
<td>• Two Adults</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• One Infant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• One School Aged Child</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• One Teenager</td>
</tr>
<tr>
<td>Heavy and Tractor-Trailer Truck Drivers</td>
<td>3,326</td>
<td>+9%</td>
<td>$20.50</td>
<td>• One Adult</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• One School Aged Child</td>
</tr>
<tr>
<td>Cost Estimators</td>
<td>2,178</td>
<td>+12%</td>
<td>$32.55</td>
<td>• Two Adults (One Working)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• One Teenager</td>
</tr>
<tr>
<td>Registered Nurses</td>
<td>2,042</td>
<td>+11%</td>
<td>$45.40</td>
<td>• Two Adults</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• One Infant</td>
</tr>
<tr>
<td>• One School Aged Child</td>
<td></td>
<td></td>
<td></td>
<td>• One Teenager</td>
</tr>
<tr>
<td>Heating, Air Conditioning, and Refrigeration Mechanics</td>
<td>1,885</td>
<td>+18%</td>
<td>$24.14</td>
<td>• One Adult</td>
</tr>
<tr>
<td>and Installers</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**Shout Out:** Is business a job choice that has economic potential?
K12 CTE Offerings

The top four clusters offered by Central Valley high schools account for over half of all CTE offerings.
College Awards Offered by Cluster

Five areas account for almost half of all college awards offered – Health & Ag were the most aligned pathways with K12.
Jobs Requiring Postsecondary Ed

2018 Employment within K12 Sector

- Health Science and Medical Technology: 18%
- Education, Child Development, and Family Services: 16%
- Transportation: 14%
- Marketing, Sales, and Services: 15%
- Business and Finance: 12%
- Information and Communication Technologies: 12%
- Energy, Environment, and Utilities: 11%
- Engineering and Architecture: 11%
- Agriculture and Natural Resources: 9%
- Public Services: 8%
- Manufacturing and Product Development: 8%
- Building and Construction Trades: 8%
- Hospitality, Tourism, and Recreation: 8%
- Arts, Media, and Entertainment: 4%
- Fashion and Interior Design: 4%

75% of Jobs Requiring Postsecondary Education are in 5 Clusters
Comparison of K12 and CC CTE Offerings with Jobs Requiring Postsecondary Education in the California Central Valley

What leaps out at you?

When you look at educational pathways with the labor market in mind, it may alter how you see the comparisons.
Based on Skills, Is a Business Major the Only Pathway to Owning a Business?

High School
Skills
• Lead a team project
• Practice selling techniques
• Expository writing

What kind of foundational skills would students need to learn in to prepare them for this job?

Work Experience
Skills
• Service orientation
• Active listening

What skills would be important for students to learn through the jobs they already have?

College
Skills
• Describe functions of planning, organizing, and leading
• Solve communication problems

General & Operational Managers
(Job Title: General & Operational Managers (often requires a bachelor’s degree))

Skills
• Customer and personal service
• Personnel and human resources
• Written comprehension
• Social perceptiveness

What are the essential skills students need to learn to become employed in this job?

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Pathway Design Elements

- At your feeder high schools, how would a student like Janice find out about what it means to own a business?
- What advice is she likely to receive at your feeder high schools about courses to take in high school, majors to pursue in college, and the type of degree she would need to attain her dream?
- Once at your college, what advising might Janice receive to ensure she enrolls in the right courses, declares an appropriate major, and meets transfer requirements? What if the business major is impacted at the local CSU and UC?
- What opportunities would she have to actively apply key business skills either in class or in college-sponsored activities? How would she find out about these opportunities?
- At your college, what support would Janice receive if she decided to switch to a psychology major? Who would help her evaluate the impact of this choice on her completion, transfer, and career options?
Application: How could you design a better pathway for Janice?

• If you want to take this next step in the process, join Randy’s small group activity on using the CTE quality rubric as a planning tool.
Facilitating Faculty Discussions of How Programs Lead to Career Outcomes

Jenni Abbott, Modesto Junior College
Leading Campus Conversations

- Moving the discussion from course success to program completion and occupational outcomes
- Learning how to understand and use labor market and student data to improve how we educate
- Helping students connect to effective work-based learning
Completion and Outcomes

What data do we use in institutional planning?

- Program Review
- Hiring processes
- Resource allocation
- Goal setting
Enrollment by Demographic

CTE
- Hispanic: 17%
- African American: 0%
- White: 41%
- Other: 41%

ARTS
- Hispanic: 10%
- African American: 4%
- White: 46%
- Other: 4%

SCIENCES
- Hispanic: 11%
- African American: 2%
- White: 53%
- Other: 3%

LIB ARTS
- Hispanic: 10%
- African American: 3%
- White: 53%
- Other: 3%

Percent of Total Population
- Hispanic: 49%
- African American: 4%
- White: 37%
- Other: 10%

CCCO Pipeline 2016-17
Similar Program Enrollment by Demographic

- **Associate**
  - Hispanic: 41%
  - African American: 7%
  - White: 44%
  - Other: 9%

- **Transfer**
  - Hispanic: 35%
  - African American: 4%
  - White: 52%
  - Other: 9%

- **CTE**
  - Hispanic: 17%
  - African American: 0%
  - White: 41%
  - Other: 0%

- **Transfer**
  - Hispanic: 23%
  - African American: 0%
  - White: 43%
  - Other: 33%

CCCCO Pipeline 2016-17
Work-based Learning

How do we help students connect to experiential learning?

- Internships
- Service Learning
- Connecting skills learned in current jobs
Faculty Experience – How Did You Get Here?

- Consider all the jobs you have held in your life
- Can you connect specific skills or competencies to jobs?
- Who influenced your skills?
- What work-based learning did you have?
Faculty Exercise – Mapping Programs to Jobs

Transfer to Four-Year University
Transfer Universities:
- XXX
- XXX
Tuition Costs:
- $XXX

Two Year Degree – ___ credits
Students who have already completed the _______________ certificate will only need ___ credits to earn this degree.

Program Skills and/or Competencies:

Source(s):

Certificate – xx credits
Students can earn the _______________ certificate in 12-15 months.

Continued Education
Tuition Costs: $XXX

Upper-Level Employment
Example Job Titles
- XXX
- XXX
- XXX
Average Industry Salary:
- $XX - $XX

Mid-Level Employment
Example Job Titles

Average Industry Wages:
- $XX - $XX per hour

Source(s):

Entry-Level Employment
Example Job Titles

Average Industry Wages:
- $XX - $XX per hour

Source:
Program to Career Map

1. What jobs are likely after a certificate, associate degree, bachelor degree, graduate degree?

2. What is the salary range at each off-ramp?

3. In which geographic locations can students find these jobs?

4. What universities do faculty recommend to students?

5. What are the transferrable competencies/skills?

6. Cite the sources for this information.
What information should students know before choosing a program of study?
Creating Buy-In for Intersegmental Mapping

Maeve Katherine Bergman
Guided Pathways Regional Coordinator
Pathways from K12 to CC & Beyond: Rooted in Data

Mapping pathways with K12/CC/4-year faculty and staff has emerged in three areas of design work:

• Pre-mapping
• Asset mapping
• Post-mapping

Each with a chance to harness data for collaborative re/design which leads to increased socioeconomic equity for our students!

Diving deeper into pre-mapping shares lessons learned with faculty and staff engaged in K12/14/16 (CCPT, etc.), Adult Ed/Noncredit, and Guided Pathways mapping.

Pre-mapping: An intentional time and space (in-person, virtual, etc.) for intersegmental leads to:

• Understand community/workforce resources and needs
• Identify and invite together mapping team
• Plan for intentional mapping session
“We need thousands of healthcare providers.”

-----Adult Education Consortium Lead
Pre-Mapping Data: Understand community workforce resources & needs

Mendocino-Lake Adult Ed/Noncredit Consortium Data-driven Approach

• Facing significant community/workforce need (healthcare providers, etc.)
• Students and employers faced
  • Limited number of post-secondary options
  • Travel/relocation to educational resources
• Leads from geographically separate communities in North Far North
  • Dove deep into workforce and educational outcome data
  • Determined both circumstances required self-reliance and coordination
• Selected 4 K12/adult school/CC/career/4-year pathways (health, construction trades, business & government, & pathways for adults with disabilities)
“Until I saw the LMI for this pathway, I would have never recommended it to a student, especially a first gen, student of color like myself.”

----Community College Counseling Faculty
Pre-Mapping Data: ID & Invite mapping team stakeholders

Santa Clarita Valley CCPT Data-driven Approach

• Facing community/workforce need (gentrification, vacant positions, etc.)
• Students and employers face
  • Once rural/exurb community now seen as “affordable” LA County
  • Large advanced manufacturing and construction sectors with unmet human resource needs
• Leads from single HS district and single college district facing HS/community 4-year preference, but 60% matriculation to CC:
  • Began in data with instructional faculty and staff pre-mapping
  • Also engaged counseling faculty and staff with ed/workforce data, including CO Regional Directors
  • Utilized data & eventually maps w/K12/CC Perkins Industry advisories
“We have always taken pride in being a transfer college, less focus on educating for careers.”

----GP Faculty Lead
Pre-Mapping Data: ID & invite together mapping team

CCC Guided Pathways Program Mapping Prototyping

- Facing community/workforce need (gentrification, vacant positions, etc.)
- Students and employers face
  - Startling housing & transportation challenges (no/low affordable housing stock, traffic, limited public transit, etc.)
  - Large ICT/business sectors with unmet HR needs (local candidates, diversity, inclusion, etc.)
- College context
  - Leadership transitions, -3yr FTES, potential SCFF loss, etc.
  - Historical focus on 4-year transfer, GP and SWP K14 teams just emerging
- GP leads began all discussions in data (why?) and revisited for mapping
  - Focus on data and recent ADTs to select initial maps (top majors/transfers, LMI)
  - Counseling faculty pre-mapped and invited folks to prototype process
Let’s Get Specific

Pick One of Four Topics
Pick One of the Four Topics – Break into Small Groups

- Applying the CTE Quality Rubric to Pathway Improvement (Randy)
- Building Partnerships that Support Intersegmental Mapping (Maeve Katherine)
- Using Skills Maps to Expand Students’ Understanding of College and Career Pathways (Kathy)
- Facilitating Faculty Discussions of How Programs Lead to Career Outcomes (Jenni)
Expand Students’ Sense of Possibility

Focus on the alignment of specific competencies offered in K12 courses to a variety of jobs and related educational pathways to help students explore possible majors and careers.
Support students in understanding what their options are in community college, using meta-majors to provide room for further exploration.

## Design, Visual, and Media Arts

<table>
<thead>
<tr>
<th>Meta-Major</th>
<th>Arts &amp; Humanities</th>
<th>Business</th>
<th>Information Technology or STEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>Art History (ADT)</td>
<td>Business Administration (ADT)</td>
<td>Digital Media</td>
</tr>
<tr>
<td>Additional Education</td>
<td>Requires masters</td>
<td>Requires bachelors</td>
<td>None</td>
</tr>
<tr>
<td>Occupation</td>
<td>Archivist</td>
<td>Art Director</td>
<td>Multimedia Artist</td>
</tr>
<tr>
<td>Salary</td>
<td>$70,000</td>
<td>$40,000</td>
<td>$50,000</td>
</tr>
</tbody>
</table>

**Arts & Humanities**
- **Art History (ADT)**
- **Studio Arts (ADT)**
- **Communication Studies (ADT)**

**Business**
- **Business Administration (ADT)**
- **Marketing**
- **Advertising Manager**
- **Advertising Manager**
- **Advertising Sales Agent**
- **Multimedia Artist**

**Salary**
- $70,000
- $40,000
- $90,000
- $90,000
- $50,000
- $50,000
# K14 Pathway Quality Rubric

## Curriculum

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Effective Practice</th>
<th>Leading Indicators</th>
<th>Aligns to</th>
</tr>
</thead>
</table>
| 2 sequential CTE courses aligned with 1 or more regional post-secondary pathways | 2-3 or more sequential CTE courses aligned with multiple regional post-secondary pathways | ● Number of K14 pathways  
● Number of faculty pathway collaboration meetings and activities | ● CTE Incentive Grant  
● K12 SWP  
● Perkins V  
● CDE College & Career Readiness Indicators (CCR)  
● CDE K-14 Guiding Principles – 5. High quality Integrated curriculum & Instruction |
| K12 faculty collaboration | Collaboration within and across K12 and post-secondary faculty  
1 or more contextualized academic courses;  
CTE courses qualified A-G for UC/CSU eligibility  
Includes completion of a postsecondary credential  
Extended-day and summer pathway programming | | |

## College and Career Exploration

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Effective Practice</th>
<th>Leading Indicators</th>
<th>Framework Alignment</th>
</tr>
</thead>
</table>
| College & Career Exploration within CTE Course | Dedicated College and Career Exploration  
Curriculum framework taught as a standalone course or as units deployed across series of courses | ● Number of LEA’s adopting common CCE curriculum or dedicated coursework | ● CDE K-14 Guiding Principles - 7. Career Exploration and Student Supports |

## Postsecondary Transition and Completion

<table>
<thead>
<tr>
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<th>Effective Practice</th>
<th>Leading Indicators</th>
<th>Framework Alignment</th>
</tr>
</thead>
</table>
| Articulated or Credit by Exam Courses that offer High School students college credit.  
Participation in college visits, college fairs, or other college awareness activities  
Educational and career exploration planning prior to high school graduation  
Support for HS counselors to incorporate career goals and CTE pathways into college counseling | Dual Enrollment Courses for career education and/or senior capstone course(s)  
Development of long-term college and career plans linked to future college education planning  
Matriculation support no later than 11th grade (orientation, high school, enrollment, etc.)  
Access to college counseling & other support (ed planning, remediation, acceleration, bridge prog’s) | ● Number of articulated or Credit by Exam pathway courses offered  
● Number of Dual Enrollment pathway courses offered  
● Students receiving matriculation support or access to college counselors | ● CTE Incentive Grant  
● K12 SWP  
● Perkins V  
● CDE CCR Indicators  
6. Instruction and Educational Leadership |

## Work-Based Learning

<table>
<thead>
<tr>
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<th>Effective Practice</th>
<th>Leading Indicators</th>
<th>Framework Alignment</th>
</tr>
</thead>
</table>
| Pathway offers WBL activities that support career awareness and exploration – Industry speakers, industry site visits, participation in career fairs, etc. | Pathway offers a full continuum of WBL activities for all pathway students such as career awareness, exploration, and preparation including job shadowing, Industry Interviews, employer mentors, unpaid and paid internships | ● Number of students participating in any WBL  
● Number of students participating in paid or unpaid internship | ● CTE Incentive Grant  
● K12 SWP  
● Perkins V  
6. Instruction and Educational Leadership |
## K14 Power Pathways

### Contra Costa College/Hercules High School – ICT STEM Academy

#### 9th Grade
- **(Fall - CCAP)** COUNS130: Career and Major Exploration for STEM  
  - **(Spring – CCAP)** COUNS103A: Personal Development for College Success  
- **(Summer - CCAP)** MATH122: Beginning and Intermediate Algebra for STEM

#### 10th Grade
- **(Fall/Spring – High School Course)** Computer Science Essentials  
- **(Fall – CCAP)** CIS135: Intro to Computers-Extended Day Course  
  - **(Spring – CCAP)** CIS101: IT Essentials-Extended Day Course  
- **(Summer - CCAP)** MATH122: Discrete Mathematics OR MATH190: Analytic Geometry and Calculus 1  
  - **(Summer – CCAP)** One Week Summer Cyber Camp

#### 11th Grade
- **(Fall/Spring – High School Course)** AP Computer Science – *Articulated with COMP251: Fundamentals of Computer Science*  
- **(Fall – CCAP)** SPCH120: Public Speaking Extended Day Course  
  - **(Spring – CCAP)** CIS125: Computer Logic Programming-Extended Day Course  
- **SUMMER INTERNSHIP**: College COOP Work Experience Course or College MATH185, MATH190, or MATH191

#### 12th Grade
- **(Fall/Spring – Project Lead the Way)** Cybersecurity  
  - **(Fall – CCAP)** MCSA & Redhat Linux Administration Extended Day Course  
  - **(Spring – CCAP)** TBD-See Below Extended Day Course  

*In Spring students choose a concentration (Networking, Cyber Security, Programming, Cloud Development or Internet of Things or Computer Science) Students will take courses in concentration.*

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### Degree/Certificates

- **Computer Science** – AS Degree
- **Computer Networking** – AS/Certification
- **Cybersecurity** – AS/Certification
- **IOT Networking and Security** – AS/Certification
- **Network Programmability** – AS/Certification
- **Cloud Development** – AS/Certification
# K14 Power Pathways

## Diablo Valley College/Mt Diablo High – Engineering & Manufacturing STEM Academy

### 9th Grade

<table>
<thead>
<tr>
<th>Fall - CCAP</th>
<th>CARER-100: College and Career Readiness I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring - CCAP</td>
<td>CARER-101: College and Career Readiness II</td>
</tr>
<tr>
<td>Summer Institute - CCAP</td>
<td>CONST-101: Exploring Construction, Architecture, Manufacturing and Engineering - 1 week summer bridge and exploration course taught at the college</td>
</tr>
</tbody>
</table>

### 10th Grade

<table>
<thead>
<tr>
<th>Fall/Spring – Project Lead the Way</th>
<th>Intro to Engineering Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall – CCAP</td>
<td>ENGIN-131: Technology &amp; Society</td>
</tr>
<tr>
<td>Spring – CCAP</td>
<td>ENGIN-131: Technology &amp; Society</td>
</tr>
<tr>
<td>Summer - CCAP</td>
<td>IDSGN-105: Assembly and Fabrication Workshop – 2 week summer workshop</td>
</tr>
</tbody>
</table>

### 11th Grade

<table>
<thead>
<tr>
<th>Fall/Spring – Project Lead the Way</th>
<th>Principles of Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall – CCAP</td>
<td>ENGTC-111: Mathematics for Technicians</td>
</tr>
<tr>
<td>Spring – CCAP</td>
<td>ENGTC-119: Introduction to Technical Drawing</td>
</tr>
</tbody>
</table>

### 12th Grade

<table>
<thead>
<tr>
<th>Fall/Spring – Project Lead the Way</th>
<th>Computer integrated Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall – CCAP</td>
<td>ENGTC-165: Machining and Manufacturing I</td>
</tr>
<tr>
<td>Spring – CCAP</td>
<td>ENGTC-166: Machining and Manufacturing II</td>
</tr>
</tbody>
</table>

*Students to complete the PTLW course sequence with at least a C or better get articulated credit for ENGIN120 at DVC.*

## Degree/Certificates

- **mTECH (Maintenance and Repair Operations) AS and certificate pathway (Apprenticeship)**
- **Machining for Manufacturing (Machinists) AS and certificate pathways (Apprenticeship)**
- **Mechanical Engineering AS and Transfer Pathway**