University of California at Berkeley

Course Sequences

for Career Academies

CASN
CAREER ACADEMY SUPPORT NETWORK

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The on-line version provides live links to all listed web sites.

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Introduction

At the core of a successful career academy is a well-designed curriculum that provides a logical, linked sequence of courses for high school students over a period of two to four years that includes both academic and Career Technical Education (CTE) courses. The courses should focus on the career theme and offer students a comprehensive, rigorous curriculum that prepares them for both college and career. A quality course sequence scaffolds the courses preparing students for advanced work as they progress from year to year. Often, choices will be available to students as they progress through the sequence and develop a particular career focus. A well-developed course sequence helps students succeed in high school, think about their career goals, while preparing for post-secondary education and careers. The course sequence is also valuable to teachers, especially teacher teams, for planning and delivering integrated instruction across disciplines and grade levels.

The purpose of this Career Academy Support Network (CASN) guide is to give teachers, counselors, administrators and other educators a quick overview of course sequences from well-known academy and career pathway programs across the country. You will find a variety of sample course sequences collected since around 2000 from schools around the nation (schools may have changed some of these sequences since we collected them). These are grouped within the 15 industry sectors acknowledged by the California Department of Education. Each of the industry sectors includes several pathways. Detailed information on the pathways and industry sectors can be found in the California Career Technical Education Framework for California Public Schools and the CTE Model Curriculum Standards for grades seven through twelve. (An electronic version of these resources can be accessed by clicking on the underlined phrases).

The industry sectors used in this guide and in California are drawn from a national effort to define 16 career clusters into which the economy can be divided for purposes of career planning and preparation; a project coordinated by the National Association of State Directors of Career Technical Education Consortium (hereinafter referred to as the States' Career Clusters Initiative). More information about this project is available at www.careerclusters.org. A crosswalk between the 15 California industry sectors and the 16 States' Career Clusters can be found in the appendix. The majority of the States' Career Clusters and California industry sectors are very similar, and sometimes identical, but regional influences do play a role. Be sure to investigate

whether your state or region has developed its own system for defining career preparation pathways. Course sequences should be designed to meet regional needs and circumstances and thus may include an amalgam of several industry sector pathways. For example, a small high school may have just one agriculture teacher, and that one teacher must address a number of different elements from more than one industry sector, including standards and concepts from both agricultural science and manufacturing to provide appropriate preparation for postsecondary study, training, or employment. The resulting sequence of courses would then include a combination of several industry sector pathways. An academy in the emerging field of green technology is another example where a blend of industry sector coursework is appropriate. A student interested in the field of green technology will require a solid background not only in math and science but also must have a firm understanding of natural resource management, manufacturing, engineering or design.

Workforce development agencies, industry leaders, post-secondary institutions, the chamber of commerce, and others can help you and your students understand the future needs and challenges students will face as they leave high school and embark into college and careers. Development of an advisory board to gain this type of information and feedback will be beneficial. For more information on the topic of advisory boards/steering committees visit the RESOURCES section of the CASN website, http://casn.berkeley.edu, to review or download a guide and find other helpful forms in the TOOLKIT section of the site.

Every career academy should include a large umbrella for broad student interests and options for their future. In order to avoid narrow tracking and stereotyping it is crucial that the sequence of courses appeal to a broad cross-section of students. For example, planning a Health Academy must take into account that not all students may want to have direct contact with patients. Students may be interested in the medical field but they don't like the sight of blood or their skills and interests point them toward other health occupations such as hospital administration, lab work, or research. A sequence of courses focused solely on patient care would not serve these students. When designing a sequence of courses for a career academy it is important to consider all of the various positions students may serve in the industry. Many students desire to become doctors or nurses; others might be more drawn to medical imaging technology; while still others may be more curious about the work of nutritionists, cancer

researchers, or home health aides. A well-designed course of study in a Health Academy will serve all of these students and allow for full exploration within a field of study.

Another consideration in designing a sequence of courses for career academies is including a representative cross-section of students along dimensions including gender, learning style, race, and past academic performance, among others. For example, female students are often under-represented in science, technology & engineering academies. Male students may be under-represented in an education and child development academy. Considering, at the outset, how the course sequence will serve under-represented populations is paramount. Academies can quickly become stereotyped as "the one for guys" or the "hard academy." Once this stereotype is established among students and begins to filter into the community it will be very difficult to change. These issues can be avoided through course sequence design as well as other strategies such as student recruitment practices, the types of field trips or guest speakers that are hosted, the types of projects conducted in the academy, and student demonstrations of learning, to name a few. If the course sequence is inclusive it can provide opportunities for students with a range of learning styles and backgrounds.

Course sequences should include both academic and Career Technical Education (CTE) courses that are logically linked and build on the knowledge and skills gained from one course to the next, and should allow for some integration between academic and CTE courses each year. For example, biology is clearly essential to success in advanced courses such as anatomy and physiology or biotechnology in the Health Science and Medical Technology industry sector; thus biology should either precede or may be required as co-requisite course. A thoughtful course sequence will enable students to understand the connections among courses over a two to four year period, while building knowledge, skills and mastery along the way.

Along with classroom learning, the academy design also includes a sequence of work-based learning experiences. This starts with career exploration and awareness activities, followed by structured field trips and job-shadowing leading to internships and extended projects that draw on workplace experiences.

Finally, when developing a course sequence don't forget to investigate the options for high school students available through local community colleges. Opportunities for dual and/or concurrent enrollment for students are increasing. If your local community college has a Tech Prep program that would be one place to start learning about articulation agreements for students

to earn college credits while enrolled in high school. For example, students who complete a sequence of courses such as automotive technology along with a co-operative internship may be able to skip the entry-level community college automotive course if they enroll at the community college after high school. Another option is for students to concurrently enroll in a community college course and earn community college credit while still in high school. For example, students in a Hospitality Academy can enroll in a beginning course, such as knife skills or obtain their servsafe® certification at the community college while still enrolled in high school. CASN has recently published a new guide on this topic. Go to the RESOURCES section on the CASN website, http://casn.berkeley.edu, to download the free guide on dual and concurrent enrollment.

Careful planning that takes into consideration student interest, regional needs and resources, teacher expertise and training, facility requirements, and equity issues will provide a strong foundation for students to continue their journey to college and careers.

Where to find more help

In the list below you will find key sources for information on career academies. A good place to begin is the CASN web site - http://casn.berkeley.edu. Look at the directory of career academies organized by state and locality, and searchable by career field. Check for high schools near you that may have similar programs, and schedule a visit if you can. Also, use the links to educational web sites listed in the CASN Web-based Curriculum Resources Guide for lesson plans, curriculum development guides, project-based learning ideas, approaches to assessment, and many other topics, including specifics for many academic and career fields. All the CASN guides are free, downloadable and available in the RESOURCES section of the CANS website, http://casn.berkeley.edu. You may want to consult a start-up or planning guide, such as:

1. ***CASN: Planning Guide for Career Academies***. This guide outlines what a career academy is, why to start one, how to begin, who needs to do what, how to evaluate progress and where to get more help.

2. ***CASN: Career Academies: A Proven Strategy to Prepare High School Students for College and Careers.*** This paper describes the growth and evolution of career academies, reviews

the evaluation evidence, explains how career academies reflect widely accepted principles of high school reform, and considers prospects for the future.

3. ***CASN Scheduling Guide & Handouts.*** Provides background information and details for each stage of scheduling student cohort and teacher teams.

4. ***National Career Academy Coalition (NCAC): Career Academy Tool Kit.*** A 130-page softbound book that guides one through the development and operation of a career academy or small learning community. The book's subtitle aptly describes the text's format: "A Think It Through, Get It Going, Make It Happen Planning Guide for Career Academies and Other Types of High School Small Learning Communities." http://www.ncacinc.com/index.php?option=com_content&task=view&id=32&Itemid=31

5. **GMS Partners:** ***Creating and Sustaining Small Learning Communities - Strategies and Tools for Transforming High Schools****,* Grace Sammon, 2008, Corwin Press. Presenting a hands-on process that addresses data, personalization, partnerships, curriculum, and instruction, this book moves educational leaders and school reformers from an appreciation of SLC to the nuts and bolts of collaborating and doing the work of improving school culture and academic achievement. http://www.gmspartnersinc.org

6. **Capture Educational Consulting:** ***The Practitioner's Guide to Scheduling SLC's and Career Academies; Equity in Action****, Mike Neubig, 2007.* Addresses some of the difficult issues in scheduling SLCs and Career Academies such as: ensuring equality for all students, creating common planning time for SLC and Career Academy teachers, scheduling special needs populations, and creating SLC and Career Academy autonomy with flexible use of time. http://www.capture-education.com/index.cfm?Content=14&Menu=5

7. **American Youth Policy Forum:** ***High School Career Academies: A 40-Year Proven Model for Improving College and Career Readiness,*** Betsy Brand, 2009. This publication provides an overview of career academies along with policy recommendations to expand the model. http://www.aypf.org/documents/092409CareerAcademiesPolicyPaper.pdf

Information for this guide has been compiled using some key sources that you may wish to access yourself:

- **The California Partnership Academy (CPA),** www.cde.ca.gov/ci/gs/hs/cpagen.asp program administered through the California Department of Education (CDE) is a three-year program (grades ten-twelve) structured as a school-within-a-school. Academies incorporate integrated academic and career technical education, business partnerships, mentoring, and internships. Currently, there are nearly 500 CPAs operating in California. Check out their website for an academy directory, information relating to new/past CPA grants, request for applications, etc.

- **The States' Career Clusters Initiative** (SCCI) is an initiative established under the National Career Technical Education Foundation (NCTEF) to provide Career Clusters as a tool for seamless transition from education to career in this era of changing workplace demands. SCCI helps states as they connect career technical education (CTE) to education, workforce preparation, and economic development. The website has many useful tools such as skills & knowledge charts, plans of study that include detailed examples of course sequences, interest surveys, publications, etc. http://www.careerclusters.org

- If you are interested in a fee-based support network for career academies in Finance, Hospitality & Tourism, Engineering, and/or Information Technology, contact the **National Academy Foundation (NAF)**. http://naf.org/

- **ConnectEd – The Center for College and Career**, http://www.connectedcalifornia.org, has many resources for beginning and sustaining academies. Of particular interest may be the area where you will find a matrix for various industry pathways that shows a sample sequence of courses for grades 9 through 12 and offers descriptions of integrated curriculum units that have already been developed and tested in the field. http://www.connectedcalifornia.org/pathways/pathways.php

- **The National Career Academy Coalition (NCAC)** supports a national network of existing and emerging career academies. NCAC assists academies in their development and sustainability utilizing the National Standards of Practice (NSOP), www.ncacinc.com/index.php?option=com_content&task=view&id=37&Itemid=27. The NSOP were drawn from many years of research and experience by numerous organizations involved in high school reform including the Career Academy Support Network (CASN).

- **Queen Anne's County Public High Schools** in Maryland offers course sequences for six career clusters: Arts & Communications; Biological, Environmental & Natural Resources Technology; Business Management Systems; Engineering, Mechanical, & Construction Technology; Health & Human Services; Science & Technology. Detailed information on the program of study, pathways in each cluster and their course planning guide can be found at: http://qacps.schoolwires.net/185110918105433790/lib/185110918105433790/POS.pdf

- **Southfield Public Schools in Michigan** has academy programs in Arts & Communications; Global Business & Information Technology; Medical & Natural Sciences, and The Engineering & Manufacturing Sciences. Look at the academy pages on the site. http://www.southfield.k12.mi.us/education/dept/default.php?sectiondetailid=6894&PHPSESSID=2024022441e73389525e1276d819129d

- **South Grand Prairie High School near Dallas, Texas** offers academy pathways in: Business, Marketing & Management (BAMM); Arts, Communication, and Information Systems (ACIS); Health Sciences (HS); Human Services and Resources (HSR); and Industrial, Manufacturing and Engineering Systems (IMES). Check out each of the Academies' links and the overview of electives on the left of this website http://sgphs.gpisd.org/Academics/Academies/tabid/540/Default.aspx

- **Elk Grove Unified School District near Sacramento**, **California** offers a diverse and broad array of small learning academies and career pathways offering students the ability to specialize in a number of career fields – including public service, business, health, engineering, technology, agricultural-science, auto-technology, education and media. See detailed brochures for some of the academies at http://www.egusd.net/schools/academies.cfm

- **The University of California interactive web site**, www.ucop.edu/a-gGuide/ag/welcome.html, lists model academic courses at www.ucop.edu/a-gGuide/ag/course_descriptions/courses.php?list=approvedbysubject, and Career Technical Education (CTE) electives at www.ucop.edu/a-gGuide/ag/cte for the University of California and California State University systems. On this site you will find guidelines and criteria for gaining UC approval for courses, including CTE courses, downloadable model course descriptions by career pathway, and the type and school location of CTE courses that are offered throughout the state as well as many other resources. Use these courses to add to a core of other college-preparatory academy classes that have been approved by your school. This will ensure that your students have the full range of post-secondary options at graduation.

Agriculture and Natural Resources

This industry cluster focuses on the planning, implementation, production, management, processing, and marketing of agricultural commodities and services, and the related professional, technical and educational services. About ten percent of California workers are engaged in agriculture and related occupations (Career Technical Education Framework for California Public Schools, 2007). Some of the fastest growing and /or highest wage occupations include agricultural marketing and sales personnel, agricultural engineers, laboratory and research technicians, animal reproduction specialists, environmental scientists, landscape and turf manager, and pest management specialists. As with all industry sectors, consideration of how academic courses required for graduation and college will sequence with Career Technical Education (CTE) or elective courses is important. An obvious connection for this industry sector is between the sciences and CTE courses. Also consider how math courses must integrate into the sequence of courses to ensure students can apply what they learn from one course to another. For example, natural resources management relies heavily on statistics and accurate measurement. This industry sector encompasses a wide range of pathways that include: Agricultural Business; Agricultural Mechanics; Agriscience; Animal Science; Forestry and Natural Resources; Ornamental Horticulture; Plant and Soil Science.

Course Sequence Examples

1. **Queen Anne's County Public High Schools in Maryland** has developed a career cluster called Biology, Environmental, and Natural Resources Technology that prepares students for careers such as forest/park ranger, agricultural engineer, laboratory assistant, biologist, horticulturist, land surveyor, soil conservationist, landscape architect, or veterinarian. Students can purse one of three pathways: Natural Resources Management, Plant & Soil Science, or Veterinary Science.

Listed below are the required sequence of CTE courses for each pathway:

Natural Resources Management	**Plant & Soil Science**	**Veterinary Science**
Introduction to Agriculture Agribusiness Management Plant and Soil Science Natural Resources Management	Introduction to Agriculture Turf & Landscape Management Floriculture Plant & Soil Science	Introduction to Agriculture Agribusiness Management OR Biotechnology Veterinary Science 1 Veterinary Science 2

Additional course requirements (depending on the emphasis):

- Advanced Placement Probability and Statistics
- Computer Applications
- Psychology
- World Geography
- Technical Drafting
- Supervised Career Orientation
- Directed Work (Independent Study)
- Business Management
- Additional Science electives
- Additional Business electives
- Additional Math electives
- Internship
- Entrepreneurship

A typical course sequence for Biological, Environmental, and Natural Resources Technology

9th Grade	10th Grade	11th Grade	12th Grade
English Algebra I or Geometry Earth Science or Biology Foreign Language Physical Education/Health Computer Applications	English Geometry or Advanced Algebra Biology or Physics American History Foreign Language Fine Arts **Introduction to Agriculture**	English Advanced Algebra or Trigonometry/ Pre-calculus Chemistry World History **Required course from Pathway** **Courses from additional course requirements list**	English Calculus or Advanced Placement Calculus Government/Economics **Required course from Pathway** **Courses from additional course requirements list** Other courses of interest to student

Visit Queen Anne's County Public Schools High School Program of Study and Career Planning Guide for more information.
http://qacps.schoolwires.net/185110918105433790/lib/185110918105433790/POS.pdf

2. The **Agriculture Science Academy at Santa Paula High School in the Santa Paula Unified High School District**, California. This is a California Partnership Academy for grades 10 – 12. Agriculture science classes include plant science, animal science, ornamental horticulture, agricultural business management and agriculture mechanics. Students have the opportunity to enroll in honors and Advanced Placement (AP) courses as part of the academy. The students maintain an avocado and citrus orchard and an animal farm where they raise and sell livestock. Students are also involved in Future Farmers of America (FFA) for leadership training and animal science. For more information about this Academy program, contact Alex Flores, (805) 525-4592 x2324, aflores@spuhsd.k12.ca.us. More information on CA Partnership Academies can found at www.cde.ca.gov/ci/gs/hs/cpagen.asp.

3. The **Agriculture Technology Academy at Florin High School** near Sacramento, CA in the Elk Grove Unified School District is a California Partnership Academy (CPA) and offers four pathways for students including: Agribusiness/Communication, Environmental Horticulture, Animal Sciences and Agricultural Engineering. Students take English, math, social studies and ag-based science (ag general science, ag biology, ecology) courses as a cohort for grades 10 -12. The following chart shows the suggested CTE course sequence for the four pathways. www.egusd.net/florinhigh/agriculture/index.htm. A short video vignette highlighting this academy can be found at the CASN website by following the CPA button at the top of the page and then clicking on Video Vignettes.

Grade	**Agribusiness/ Communications**	**Environmental Horticulture**	**Animal Sciences**	**Agricultural Engineering**
10	Floral Design	Floral Design	Fabrication with Wood & Metal	Fabrication with Wood & Metal
11	ROP Ag. Sales & Service	ROP Floral Design	Animal Anatomy & Physiology	ROP Ag. Sales & Service
12	Economics in Agriculture	Economics in Agriculture	Ecology	Ag Mechanics

4. The **Global Environmental Sciences Academy at Banning High School**, a CPA, located between Riverside and Palm Springs, CA offers one pathway. Students are scheduled together for English, P.E., social science and math as well as Environmental Studies in the 10th grade; Marine Biology in 11th grade; and Science, Technology and Research as well as Physics in 12th grade. Numerous field trips and other outings complement the course sequence. More detailed information can be found on their website. www.banninghs.org/apps/pages/index.jsp?uREC_ID=73147&type=d&rn=1817437

Sample course descriptions

The University of California site lists several courses under the Agriculture and Natural Resources career path, www.ucop.edu/a-gGuide/ag/course_descriptions/courses.php?list=approvedbycareer&career_id=1, and some additional courses under the approved "college-preparatory elective" category, http://www.ucop.edu/a-gGuide/ag/course_descriptions/courses.php?list=approvedbysubject&subjectarea_id=7. Many

examples of the electives necessary to design a course sequence for an academy in agriculture and natural resources are listed on this site, including: Oceanography, Plant & Soil Science, Veterinary Science, Environmental Field Studies, Agricultural Business & Economics, The Art and History of Floral Design, Agricultural Biology, Animal Science, Agricultural Science 1 & 2.

Arts, Media and Entertainment

This industry sector focuses on careers in designing, producing, exhibiting, performing, writing, and publishing multimedia content including visual and performing arts and design, journalism, and entertainment services. The Arts, Media and Entertainment sector requires perhaps the greatest cross-disciplinary interaction and development because work in this sector has a propensity to be largely project-based, requiring uniquely independent work and self-management career skills. New technological developments are also constantly reshaping the boundaries and skill sets of many arts career pathways. There are three pathways in this industry sector. The Media and Design Arts career pathway comprises a large number of industry occupations, such as user interface design, digital animation, print design, commercial photography, and cinematography. The Performing Arts pathway focuses on the direct creation of art and entertainment by individual artists and includes professional applications of theatre, dance, and music. The Production and Managerial Arts pathway focuses on developing the organizational and managerial knowledge and skills needed to bring arts, media, and entertainment to the public as well as on training those who do the behind-the-scene jobs, such as set design, sound design, digital modeling, film editing, and camera work.

Course Sequence Examples

1. The **Arts & Communications Academy at Southfield-Lathrup High School in Michigan** provides eight major areas of study outlined below. In addition to academic core courses in math, English, social studies, and science, students are required to complete the following:

Grade	**Band**	**Piano**	**Dance**	**Drama**	**Orchestra**	**Television**	**Visual Arts**	**Vocal Music**
9/10	Concert Band	Piano	Dance 1 & 2	Acting 1 & 2	Orchestra	TV 1 & 2	Design & Media 1 & 2 Animation Ceramics Jewelry	Concert Choir
11/12	Marching Band AND Symphonic Band	Inter/Adv Piano AND Composition	Dance Tech AND Dance Comp	Play Production	Orchestra	Camera & Editing AND Studio Tech	Portfolio Development	Varsity Choir AND Madrigal Singers

Check out their website http://www.southfield.k12.mi.us/education/dept/dept.php?sectionid=1165&PHPSESSID=d7dc1b24c5cd53f9f21121e2076b8416for more information.

Other Arts academies include electives such as Mythology and Folklore, Survey of American Music, and Guitar Musicianship.

2. Queen Anne's County Public High Schools in Maryland provides a solid example of course requirements for Arts & Communication with five different pathways for students. Visit Queen Anne's County Public Schools High School Program of Study and Career Planning Guide for more information by using this link http://qacps.schoolwires.net/185110918105433790/lib/185110918105433790/POS.pdf
Over four years, students complete college academic requirements in English, math, science, and social studies. Each of the pathways, however, offers a unique sequence of CTE/elective courses outlined below:

Graphic Design Technology - Computer Applications, Graphic Arts, Graphics & Web Design, and Advanced Web Design.

Liberal Studies - World Language 1 and 2, and TWO of the following: science elective, math elective, social studies elective or English elective.

Media Communications - Computer Applications, Speech/Oral/Media Communications, Communications Technology, Television Production, Advanced Television Production.

Performing Arts – Two years of Advanced Technology Courses OR World Language 1 & 2, AND four years of one of the following: Dance 1, 2, 3, 4; Choral Music 1, 2, 3, 4; Instrumental Music 1, 2, 3, 4; Music Theory, Speech/Oral/Media Communications, Guitar, Piano; Intro to Theatre, Play Production, Actors Studio 1, Actors Studio 2, Play Directing.

Visual Arts - Two years of Advanced Technology Courses OR World Language 1 & 2, AND four years from the following list: Ceramics 1, Ceramics 2, Painting, Watercolor, 3-D Studies, Portfolio Development, Life Drawing.

3. The Media & Technology Academy at Hollywood High School, a California Partnership Academy, provides an example of an academy that stretches through more than one industry sector and integrates technology through all three with three strands: Network Administration, Media & Programming, and Audio & Video Production. By combining the principles of Arts, Media and Entertainment with the Information Technology industry sector students gain diverse skills and knowledge preparing them for college and careers of the 21st century. Below is a summary of the types of career paths students are preparing for through each strand and the CTE course sequence for each strand:

Media and Programming: Web design, programming, animation, advertising, marketing, page layout and design, and digital photography. Course sequence – Intro to Programming, Digital Computing 1A & 1B, Digital 2A or AP Computer Programming A, Digital 2B or Computer Programming B, Digital 3A, Digital 3B.

Audio and Video Production: Screenwriting, storyboarding, video and sound production, and musical scoring, digital editing and effects, and compositing. Apple and Macromedia certifications will be offered to enhance career opportunities. Course sequence – Drawing A & B, Digital Imaging 1A, Digital Imaging 1B, Digital Imaging 2A, Digital Imaging 2B, Digital Production, Cinema.

Network Administration: Set-up, maintenance and administration of computer networks. Troubleshooting, programming and management of equipment and software. Cisco and Microsoft certifications will be offered to enhance career opportunities. Course sequence – Intro to Programming, ROP Computer Operator/Literacy, ROP Computer Operator/Media and Information Technology, ROP Computer Programming A & B.

Students also participate in school-wide programs such as Read 180, Language!, math tutorial,

AVID, CAHSEE prep in math and language arts and Developing Reading Strategies Across the Content Curriculum (the Learning Center), as well as Honors and Advanced Placement courses. More information can be found on their website www.hollywoodhighschool.net/apps/pages/index.jsp?uREC_ID=64229&type=d&rn=4520878

Sample course descriptions

Nearly 3,500 Arts, Media and Entertainment electives meet the requirements for University of California a-g approval, most in the, "f", Visual and Performing Arts category. A list of model courses can be found on the web at http://www.ucop.edu/a-gGuide/ag/course_descriptions/courses.php?list=approvedbysubject&subjectarea_id=6. Courses approved in the "f" category are varied and numerous including: Art History, Beginning Dance, Ceramics, Concert Choir, Drawing & Painting, Fashion Design, Music Appreciation, Jazz Ensemble, Visual Communications. The website also list several model courses under this career path www.ucop.edu/a-gGuide/ag/course_descriptions/courses.php?list=approvedbycareer&career_id=2 such as Film as Literature: Cinematic Analysis, Visual Communications, Technical Theater 3 & 4, Graphic Design, Contemporary Video, Photography, Digital Media Production.

Building Trades and Construction

This industry cluster focuses on careers in designing, planning, managing, building and maintaining the built environment. This includes new structures, restorations, additions, alterations and repairs. Industry-recognized credentials are available from trade associations, industry-established education foundations and industry consortia. A new demand to "green" this industry is growing from consumers, government and other related agencies such as the U.S. Green Building Council. 21st century students interested in this industry will need to gain knowledge and skills related to natural resource management, energy efficiency, recycling existing materials, and compliance with new and existing regulations as well as the traditional emphasis of processes, systems and the way in which structures are built. Collaboration with Regional Occupation Centers/Programs (ROC/P) is highly suggested for this sector as many courses, facility enhancements and partnerships with trade associations can be gained. There are four pathways in this industry sector. They are: Cabinetmaking and Wood Products; Engineering and Heavy Construction; Mechanical Construction; Residential and Commercial Construction.

Course Sequence Examples

1. Arvin High School in the Kern Unified High School District in Bakersfield, California offers an Engineering, Construction and Design Academy. This is a California Partnership Academy covering grades 10 – 12. More information on CA Partnership Academies can found at http://www.cde.ca.gov/ci/gs/hs/cpagen.asp. Students take English, science and math as a cohort. Detailed course content for the career technical education courses are described below.

Grade 10 - Industrial Technology Overview		
Design Drafting • Orientation • Introduction to Drafting • Careers • Sketching • Lettering • Orthographic Projections • Introduction to CAD • Dimensions • Isometrics • Portfolio & Final	Construction • Orientation • Introduction to Construction • Measurement • Safety • Reading Plans • Hand Tool Operation • Machine Tool Operation • Portfolio & Final	Manufacturing • Orientation • Introduction to Manufacturing • Measurement • Safety • Bench Metal • Hand Tool Operation • Machine Tool Operation • Portfolio & Final

All grade 10 students in the academy take this course to get an overview of options leading to more choices as they progress through the sequence of courses.

Grade 11 Course Options		
Architecture: Semester 1 • General Overview and Careers in Design • Orthographic Projection • Isometrics • Sections • Auxiliary Views • Design Concepts • Area Planning and Room Design • House Plan • Careers and Occupations • Resume Writing • Final **Architecture: Semester 2** • Floor Plan (AutoCAD 2000) • Roof Plans • Elevation Plans • Employment Skills and Attitudes • Personal Presentation Skills • Portfolio	**Construction: Semester 1** • General Overview • Measurement • Safety • Sketching • Reading Plans • Estimating • Construction Site Layout • Bill of Materials • Framing/House Model • Tool Operation • Portfolio • Final **Construction: Semester 2** • Careers in Construction • Measurement • Safety • Reading Plans • Surveying • Construction Equipment • Hand Tool Operation • Machine Tool Mastery • Portfolio & Final	**Manufacturing: Year Long** • General Overview • Measurement • Safety • Welding • Bench Metals • Hot Metals (foundry and forging) • Milling and Machining • Portfolio & Final

Grade 12 Course Options		
Engineering Graphics: Semester 1 • General Overview • Careers in Design • Sketching • Orthographic Projection CAD • Inking • Sections • Auxiliary Views • Descriptive Geometry • Resume Writing • Final **Engineering Graphics: Semester 2** • Revolutions	**Construction: Semester 1** • Measurement • Safety • Material Estimating • Framing/Tool Shed • Roofing • Finish Carpentry • Hardware • Hand Tool Mastery • Portfolio • Final **Construction: Semester 2** • Measurement • Safety • Electrical • Plumbing	**Manufacturing:** Units are currently being developed for this course.

• Pipe Drafting • Civil Drafting • Welding Drafting • Solid Modeling (CAD) • Threads • Gears • Employment Skills and Attitudes • Personal Presentation Skills • Portfolio	• Wall Finishing • Hand Tool Mastery • Machine Tool Mastery • Portfolio • Final	

2. Queen Anne County High School in Maryland offers an Engineering, Mechanical & Construction Technology career cluster that includes six pathways: Architecture/Drafting, ASE Auto Certification Preparatory, Carpentry Technology, Engineering Program, Masonry Technology, Welding Technology. The courses include a foundation in science and math. Depending on choices of electives, each of these sequences can be college-preparatory. The course sequence for each of the pathways is outlined below.

Architecture/Drafting – Technical Drafting I, Technical Drafting II/3D, Architectural Design I, Architectural Design II.

ASE Auto Certification Preparatory – Steering and Suspension (semester course), Brake System (semester course), Electrical/Electronics System (year-long course), Engine Performance (year-long course).

Carpentry Technology – Principles of Carpentry Part 1, Principles of Carpentry Part 2, Intermediate Carpentry, Advanced Carpentry.

Engineering Program – Technical Drafting 1; Technical Drafting II/3D; Design, Engineering & Technology I; Design, Engineering & Technology II.

Masonry Technology – Masonry Part I, Masonry Part II, Brick & Block Construction, Advanced Masonry.

Welding Technology – Principles of Welding Part I, Principles of Welding Part II, Intermediate Welding, Advanced Welding.

Visit Queen Anne's County Public Schools High School Program of Study and Career Planning Guide for more information by using this link http://qacps.schoolwires.net/185110918105433790/lib/185110918105433790/POS.pdf

A Case for Collaboration

The thought of how can one school offer so many classes surely has passed through your mind at this point. Course and pathway options can be increased by working cooperatively with other high schools, Regional Occupation Centers/Programs and industry apprenticeship programs to combine resources, facilities and teachers enabling more options for students. For example, students from more than one high school may convene at a central location for advanced courses. The Tri-Valley ROP, http://www.tvrop.org, center located in the Bay Area of California is a prime example of this type of collaboration. The Tri-Valley ROP was founded as a joint powers agreement between the Dublin, Livermore, Pleasanton and Sunol Unified School Districts in 1972 and serves seven different high schools. Additionally, ROP students can earn community college credit by exam and receive credit from Las Positas College, and Chabot College.

Sample course descriptions

The University of California has approved over 500 CTE courses related to industrial and technical education. A 2009 statewide analysis found there are 164,045 Industrial and Technology Education courses offered statewide in which only 0.3% meet University of California "a-g" admission requirements. However, courses such as such as Drafting & Design, Advanced Fine Woodworking, Architectural Design & CAD, have been approved in the d, f, and g admission requirement areas. There were substantial increases from the previous year in courses approved in the g-college preparatory elective (19.0%) admission area. Approved courses along with the name of the high school that gained the approval can be found on the web at www.ucop.edu/a-gGuide/ag/cte - click on the link titled 2009-2010 CDE Report: CTE UC-Approved Courses (doc).

Education, Child Development and Family Services

This industry sector focuses on careers in education and training in a variety of settings that offer academic, vocational and technical instruction and education services. High staffing needs and growing emphasis on improving education for all students will create many and varied career opportunities in this field. Careers in child care, teaching, employment and management related to helping consumers such as credit counselors, and social workers are all fields students might be interested in pursuing through this industry sector. There are four interrelated pathways: Child Development, Consumer Services, Education and Family & Human Services.

Course Sequence Examples

1. The **Education and Human Services Academy at John W. North High School in the Riverside** Unified School District in Riverside has been California Partnership Academy since 1995. Students participate in internships during their junior year with assignments to elementary and/or preschools for a total of 180 hours for the year. The career-technical courses are: Education Careers 1 – students explore careers in education and learn about child development; Education Careers 2 – students explore careers in home economics related occupations and in child care; Education Careers 3-- students study psychology and sociology. For more information about this Academy, contact Rosalyn Anderson, Academy Coordinator, (909) 788-7311, ext. 1157, randerson@north.rusd.k12.ca.us. More information on CA Partnership Academies can found at http://www.cde.ca.gov/ci/gs/hs/cpagen.asp.

2. The **Education and Child Development Academy at Peter Johansen High School in the Modesto City High School District**, Modesto, California has been a California Partnership Academy since 1999. This program articulates with the Modesto Junior College TEAM program, the Regional Occupation Center (ROP) elementary education and early childhood education programs, and with the Cal Teach program at the California State University level. The career technical classes study human development from birth through the elderly and explore careers in a variety of education and related fields. The course sequence includes Child Development 1, 2, 3, 4 (semester courses), ROP Early Childhood Education, and Teacher Cadet. Students also take English, social science and science as a cohort for grades 10 – 12. All seniors

participate in internships and/or paid job experiences. For more information about this Academy, contact Nicole Evans, Academy Coordinator, (209) 576-4702 x186, Evans.N@monet.k12.ca.us. A short video vignette highlighting this academy can be found at the CASN website by following the CPA button at the top of the page and then clicking on Video Vignettes.

Sample course descriptions

The University of California site, http://www.ucop.edu/a-gGuide/ag/course_descriptions/courses.php?list=approvedbycareer&career_id=11, lists several model courses under this career path. These courses include: Child Development, Development Psychology of Children, Developmental Psychology of Adolescence, Introduction to Education: An Interdisciplinary and Applied Discipline. Clicking on to the underlined words in the electronic version of this guide will enable a hyperlink directing you to more information.

Energy and Utilities

The Energy and Utilities industry sector consists of many entities both public and private. This sector's career pathways provide career opportunities for persons with varying levels of experience and education and the sector is forecast to experience significant growth in employment over the next decade, particularly in jobs related to water and sewage systems. Increasing demands and the need for conservation of water, energy and natural resources requires students interested in this industry to understand natural resource management including the role of recycling, energy and water efficiency, and compliance with new and existing regulations. As with many industry sectors there are Career and Technical Organizations, http://www2.ed.gov/about/offices/list/ovae/pi/cte/vso.html, such as Skills USA, www.skillsusa.org, that provide professional development for teachers, student competitions, leadership opportunities, work-based learning opportunities and more that can be of assistance and provide networking opportunities when developing or enhancing a sequence of courses. The Electromechanical Installation and Maintenance pathway provides learning opportunities for students interested in working in production, installation, maintenance, and repair. In this pathway students learn how to maintain and repair pipelines and power lines, operate and repair plant machinery, and monitor treatment processes. The Energy and Environmental Technology pathway provides learning experiences for students interested in energy production and environmental concerns. They learn how to install, repair, and maintain power-generating stations, gas plants, water treatment plants, and wet-sewage treatment plants. The Public Utilities pathway provides learning opportunities for students interested in working toward employment or advanced training in a variety of public utility industries, including but not limited to power plant operation, power distribution and dispatching, and operation of water treatment plants or wastewater plants. The Residential and Commercial Energy and Utilities pathway provides learning opportunities for obtaining, verifying, and maintaining primary financial data and records, including recording the usage of electricity, gas, water, and sewer utilities.

Course Sequence Examples

1. **The Philadelphia Academies of Applied Electrical Science,** www.academiesinc.org/program_electrical.html**,** is example of a program that is designed to

serve as an introduction to the electrical field and a wide array of careers in the electrical industry. The program offers instruction in: Electrical Construction, Utility Linesman Program, Network and Cabling, Commercial and Industrial Electronics. Students in this academy have the opportunity to take courses in career specific areas, including Electric Motor Control, Power Distribution Systems, Welding and AC/DC Electrical Systems. Students participate in an internship, which exposes them to the electrical industry and provides further scope of careers and skills required to obtain a job. Career exploration not only in the Electrical field but also in the areas of: Utilities, Communications, Sales, Planning, Operations, Management, Distribution are a part of this academy.

2. **The Career Technical Education Framework for California Public Schools,** www.cde.ca.gov/ci/ct/sf/documents/cteframework.pdf, includes detailed information for each of the four pathways recognized in this industry sector including a list of occupations, sample performance tasks, and sample assignments. A sample sequence of courses listed in the Framework for each pathway is listed below.

Electromechanical Installation and Maintenance

Introductory – Exploring Technology, Technology Core
Concentration – Drafting, Consumer Electronics, Computer Applications
Capstone – CAD/CAM, Technical Writing, A+ Certification, Apprenticeship
Related Academic Courses – Algebra, Geometry, English Composition/Writing, Physics

Energy & Environmental Technology

Introductory – Exploring Technology, Technology Core
Concentration – Consumer Electronics, Machining, Engine Repair and Maintenance
Capstone – Electronics, Metal Manufacturing, Electronic Repair and Maintenance
Related Academic Courses – Algebra, Geometry, English, Physical Science

Public Utilities

Introductory – Exploring Technology, Technology Core
Concentration – Consumer Electronics, Machining, Environmental Science
Capstone –Electronic Repair and Maintenance, Metal Manufacturing, Hazardous Materials Management, Orientation to Apprenticeship

Related Academic Courses – Algebra, Geometry, English, Chemistry

Residential & Commercial Energy and Utilities

Introductory – Exploring Technology, Technology Core

Concentration – Machining Facility, Woods, Drafting

Capstone –HVAC Technician, Construction, CAD/CAM, Orientation to Apprenticeship

Related Academic Courses – Algebra, Geometry, English, Physical Science

3. A number of new **California Partnership Academies** (CPA) with a focus on Green Energy began during the 2009-10 school year due to recent legislation. Assembly Bill (AB) 519 (2008-09) provides funds from the Public Interest Research, Development, and Demonstration Fund to support the development and operation of 61 CPAs for three years, 2009-10 to 2011-12. "The bill would require grantees to create partnership academies that **focus on clean technology and energy businesses** and provide skilled workforces for the products and services for energy or water conservation, or both, renewable energy, pollution reduction, or other technologies that improve the environment in furtherance of state environmental laws." (AB 519). At print time these new academies are just beginning to develop their course sequences but will prove to be a resource for the future. Information on CPAs can be found at http://www.cde.ca.gov/ci/gs/hs/cpagen.asp.

Engineering and Design

This industry sector includes a vast scope of opportunities. The demand is high for engineers in a variety of specializations such as, aeronautical, architectural, biotechnical, chemical, civil, construction, industrial and mechanical. This field also includes opportunities for occupations and post-secondary training as a CAD technician, environmental planner, materials lab and supply technician, quality technician, drafter, or technical writer. Most positions require certification, licensing and/or a college degree. The five pathways in this sector emphasize real-world, occupationally relevant experiences of significant scope and depth. They are: Architectural and Structural Engineering; Computer Hardware, Electrical, and Networking Engineering; Engineering Design; Engineering Technology; Environmental and Natural Science Engineering.

Course Sequence Examples

1. **The E-Tech Academy at Milpitas High School** is a California Partnership Academy. It is a 3-year program grades 10-12 that introduces students to the basic concepts, software and project management skills that are used in the engineering industry.

Grade 10 - Students are enrolled in an **introductory engineering course** that exposes them to both concepts and hands-on software tools to help prepare them for the following year.

Grade 11 - Students learn the **engineering design process** and apply it to a number of hands-on projects such as building a catapult, solar car, wind-driven energy, and a solar cooker. Students are exposed to software programs such as Autocad, Rino, Microsoft Office, Adobe Photoshop and Microsoft Publisher. Students also compete in the Junior ETECH Cup Competition.

Grade 12 - Students **apply concepts and experience** from their junior year and explore a career in engineering, take on hands-on projects such as the Hovercraft and a final project where they create a bicycle out of wood. Students also compete in the Senior ETECH Competition.

Elective courses include Drafting 1A, Drafting 1B and Architectural Design. More information can be found on their website
http://milpitashs.schoolloop.com/cms/page_view?d=x&piid=&vpid=1225168789276

2. **The Academy of Engineering,** www.academyofengineering.org, is a partnership among Project Lead The Way, Inc., the National Academy Foundation, and the National Action Council for Minorities in Engineering, Inc. A number of high schools including University High School in Los Angeles are implementing this model. Check out University High's website for an example of what this partnership looks like in action.
www.universitywildcats.org/apps/pages/index.jsp?userGroupREC_ID=30460&uREC_ID=30460&type=d&title=Academy+of+Engineering&un=TDE-AcadEng&rn=6311689

The Project Lead The Way (PLTW) Pathway To Engineering (PTE) curriculum is designed as a four-year high school sequence. Foundation courses are supplemented by a number of electives to create eight rigorous, relevant, reality-based courses.

Foundation Courses
Introduction to Engineering Design (IED) - Using 3D computer modeling software, students learn the design process and solve design problems for which they develop, analyze, and create product models.

Principles of Engineering (POE) - Students explore technology systems and engineering processes to find out how math, science, and technology help people.

Digital Electronics (DE) - Students use computer simulation to learn about the logic of electronics as they design, test, and actually construct circuits and devices.

Specialization Courses
Aerospace Engineering (AE) - Students learn about aerodynamics, astronautics, space-life sciences, and systems engineering through hands-on engineering problems and projects.

Biotechnical Engineering (BE) - Students apply biological and engineering concepts related to biomechanics, genetic engineering, and forensics.

Civil Engineering and Architecture (CEA) - Teams of students collaborate on the development of community-based building projects and conceptual design for project presentations.

Computer Integrated Manufacturing (CIM) - Students learn concepts of robotics and automated manufacturing by creating three-dimensional designs with modeling software and producing models of their designs.

Capstone Course

Engineering Design and Development. Teams of students, guided by community mentors, work together to research, design, and construct solutions to engineering problems.

Sample course descriptions

The University of California site, www.ucop.edu/a-gGuide/ag/welcome.html, lists several courses under this career path and some additional courses under the college preparatory elective category. These courses include: Applied Physics & Engineering 1, Applied Physics & Engineering 2, Architectural Design 1 and 2, Chemical Engineering /Technology I, Engineering I, Engineering II, Introduction to Engineering Design 1-2, Multimedia Information Technology, Physics of Electronic Robotics, Pre-Engineering & Design, Principles of Engineering, Product Development, Robotics, Robotics Engineering Technology. Clicking on underlined words in the electronic version of this guide will enable a hyperlink bringing you to more information.

Fashion and Interior Design

The Fashion and Interior Design industry sector is a multi-billion-dollar enterprise offering a wide variety of careers. Highly sophisticated, it involves market research, brand licensing, and intellectual property rights, design, materials engineering, product manufacturing, marketing, and distribution. According to the California Fashion Association, a particularly high demand exists for preproduction jobs involving computerized pattern making and product data management for larger companies. Contributing to the growth in the fashion industry's gross sales is a global focus on the Los Angeles lifestyle involving, for example, apparel, textiles, home furnishings, and furniture; the growing use of international sourcing; and the development of new technologies (http://www.cde.ca.gov/ci/ct/sf/documents/cteframework.pdf).

The interior design industry employment has been projected to grow by 12 percent through 2012 as demand rises for the interior design of private homes, offices, restaurants, facilities that care for the elderly, and a variety of retail establishments (Bureau of Labor Statistics, U.S. Department of Labor, "The 2004–14 Job Outlook in Brief," Occupational Outlook Quarterly, Spring 2006. http://www.bls.gov/opub/ooq/2006/spring/contents.htm). This industry sector includes two interrelated pathways—(1) Fashion Design, Manufacturing, and Merchandising; and (2) Interior Design, Furnishings, and Maintenance.

Course Sequence Examples

1. **The Career Technical Education Framework for California Public Schools,** www.cde.ca.gov/ci/ct/sf/documents/cteframework.pdf, includes detailed information for the two pathways in this industry sector including a list of occupations, sample performance tasks, and sample assignments. A sample sequence of courses listed in the Framework for each pathway is listed below.

Fashion Design, Manufacturing, and Merchandising

Introductory – Home Economics Careers; Technology Comprehensive Core

Concentration – Fashion, Textiles and Apparel; Apparel Design and Construction

Capstone - Careers in Fashion Design, Manufacturing, and Merchandising; Fashion Merchandising; Apparel Manufacturing and Production; Fashion History and Design

Related Courses – Economics, Art, Business, History

Interior Design, Furnishings and Maintenance

Introductory – Home Economics Careers; Technology Comprehensive Core

Concentration – Environmental Design; Housing and Interior Design

Capstone - Careers in Interior Design, Furnishings and Maintenance; Interior Design

Related Courses – Art History; Computer Graphics or Computer-Aided Design

2**. Far West High School in Oakland is a new California Partnership Academy** that opened its doors for the 2009-10 school year. Far West High School's Fashion Art Academy features classes in fashion design, visual arts, and graphic design. Experiences in other arts—jazz, spoken word, dance, fashion design, digital art, choir, and hip hop are also available throughout the year. Partnerships with Mills College and California College for the Arts expands programs and activities for all students. For more information contact Principal Beverly Jarrett, beverly.jarrett@ousd.k12.ca.us.

3. **Manatee High School in Florida** will implement a new Small Learning Community in the 2010-11 school year that includes an interior design pathway. The sequence of courses will include: Design Services Core, Principles of Interior Design Techniques, Interior Design Techniques and Interior Design Specialist.

Sample Course Descriptions

Currently, there is only one sample course description in this industry sector on the University of California website for approved college preparatory courses. The course is Fashion Design and History. Click on the title of the course to follow a hyperlink to view the detailed course outline.

There are many post-secondary options for students interested in this industry. A good resource for teachers developing a sequence of courses is to look into regional opportunities for students to learn more about how to best prepare students for this growing field. A few options include:

- The Academy of Art University in San Francisco, www.academyart.edu
- International Academy of Design and Technology in Chicago and Seattle, www.iadtchicago.edu, www.iadtseattle.com/
- The Interior Design Institute, www.theinteriordesigninstitute.com

- Fashion Institute of Design and Merchandising, http://fidm.edu/
- California College for the Arts, www.cca.edu/
- Massachusetts College of Art and Design, www.massart.edu/
- University of Cincinnati, The College of Design, Architecture, Art and Planning, http://daap.uc.edu/
- University of California Los Angeles, www.college.ucla.edu/
- The School of Media, Culture and Design at Woodbury University, http://mcd.woodbury.edu/

Finance and Business

The Finance and Business industry sector, a vital contributor to the U.S. economy, employs more than six million people in related occupations. In all areas of this sector, advances in technology and trends toward direct marketing provide for many fast-growing career opportunities. For example, employment of accountants and auditors is expected to grow at a rate about equal to the average for all other occupations, and career opportunities in banking are expected to increase at a greater rate than normal as a result of the expansion of banking and investment institutions. Because of market globalization and an increasing demand for investment advice, employment in financial management will also continue to grow (www.cde.ca.gov/ci/ct/sf/documents/cteframework.pdf). Students interested in this industry sector should develop knowledge and skills in mathematics, communications and technology. The sector includes three pathways. Accounting Services provides instruction in developing and utilizing general accounting systems; Banking and Related Services focuses on the fundamentals of lending and banking regulations; and Business Financial Management helps develop skills in investment analysis and guidance.

Course Sequence Examples

1. The **National Academy Foundation (NAF)**. With 20 years experience and a network of over 500 academies in 40 states, NAF, http://naf.org, is a premier resource for finance and business academies connecting students with the world of financial services, offering curriculum that covers banking and credit, financial planning, international finance, securities, insurance, accounting and economics. To view brief course overviews follow the link to http://naf.org/lesson-plans?keys=&field_theme_value_many_to_one=Finance. Courses include: Applied Finance, Business Economics, Business in a Global Economy, Entrepreneurship, Ethics in Business, Financial Planning, Financial Services, Insurance, Managerial Accounting, Principles of Accounting, Principles of Finance.

2. **Queen Anne County Public High Schools, Maryland** offers a Business Management Systems career cluster with six pathways: Accounting; Computer Information Systems; Information Technology; Marketing/Management; Office Management; Paralegal. Visit Queen

Anne's County Public Schools High School Program of Study and Career Planning Guide for more information by using this link
http://qacps.schoolwires.net/185110918105433790/lib/185110918105433790/POS.pdf

Required career technical education course sequences for each pathway are listed below:

Accounting – Computer Applications I, Accounting I, Accounting II, Advanced Accounting

Computer Information Systems - Computer Applications I & II, Accounting I, Business Law OR Visual Basic I, Computer Science OR AP Computer Science

Information Technology - Computer Applications I, Introduction to PC Repair and Support I & II, Introduction to Computer Networking

Marketing/Management – Computer Applications I and FOUR of the following: Marketing I & II, Business Management, Business Finance Management, Business Law

Office Management - Computer Applications I & II, Accounting I, Document Processing, Office Technology

Paralegal (this is a dual enrollment program with a local community college) - Computer Applications I, Document Processing, Business Law, Chesapeake College Classes: PLG 101 Introduction to Paralegal Studies OR PLG 102 Techniques of Legal Research

2. The Global Business and Information Technology Academy at Southfield High School, in Michigan, has developed three pathways with specialized courses in Accounting/Finance, Management/Marketing, and Information Technology. In addition to academic core courses in math, English, social studies and science, academy students are required to complete courses from among the following during their 11th and 12th grade years:

Management/Marketing - Business Law 1 & 2; Into to Marketing 1 & 2; Small Business Ownership & Management; Entrepreneurship; International Business Co-op

Information Technology – Visual Basic Applications 1 & 2; Applied Business Technology;

Digital Graphics and Careers

Accounting/Finance – Business Finance 1 & 2; Accounting 1 & 2

Sample course descriptions

The University of California site, www.ucop.edu/a-gGuide/ag/welcome.html, lists several courses under the college preparatory elective category, www.ucop.edu/a-gGuide/ag/course_descriptions/courses.php?list=approvedbysubject&subjectarea_id=7. Model courses include: Business Economics; Business Economics – Entrepreneurship; Topics in Global Economics and Finance, Virtual Enterprise.

Health Science and Medical Terminology

The Health Science and Medical Terminology industry sector focused on careers in planning, managing, and providing health care and research related services continues to be one of the fastest-growing occupational fields. The pathways and careers offer options to match a variety of the aptitudes, interests, abilities and academic achievement of students. Most positions require certification and/or licensing. The career pathways are grouped in functions that have a common purpose and similar attributes: Biotechnology Research and Development; Diagnostic Services; Health Informatics; Support Services; Therapeutic Services.

Course Sequence Examples

1. Southfield High School Medical & Natural Sciences Academy, in Michigan, http://www.southfield.k12.mi.us/education/dept/dept.php?sectionid=1166. Students select from three courses of study: medical, natural and environmental sciences. They are also provided enrichment activities and may have opportunities to work with Providence Hospital, Wayne State Medical School and Community EMS. In addition to academic core courses in math, English, social studies, and science, students at this academy complete courses from among the following in 11th and 12th grade:

- Anatomy and Physiology
- AP Biology
- AP Chemistry
- Biotechnology
- Health Skills Training
- Health Career
- Organic Chemistry
- Microbiology
- AP Environmental Science
- Botany

2. Queen Anne County High School, Maryland, Health and Human Services Career Cluster offers six pathways. Visit Queen Anne's County Public Schools High School Program of Study and Career Planning Guide for more information by using this link http://qacps.schoolwires.net/185110918105433790/lib/185110918105433790/POS.pdf. The course sequences for EMT Fire Rescue and Health Care Technology pathways are outlined below. The other four pathways in this career cluster include: Cosmetology, Criminal Justice,

Early Childhood Care Program, and Hotel/Restaurant Management. Details of these pathways are not included here as they fit elsewhere in this guide.

EMT Fire Rescue – Computer Applications I, Emergency Medical Care, Firefighter I, Hazard Materials/Operations/Emergency Response to Terrorism, Truck Company Fireground, Operations/TRVMR.

Health Care Technology – Psychology and *FOUR* of the following: Becoming a Health Care Provider, Environmental & Personal Safety, The Human Body I, The Human Body II, Providing Health Care I, Providing Health Care II. All six are required for certified nursing assistant and geriatric nursing assistant.

2. The Health Science Academy of Jacksonville High School in North Carolina was recently certified by the National Career Academy Coalition (NCAC) as meeting the National Standards of Practice (NSOP) for Academies. Click this link for more info on the NSOP www.aypf.org/publications/Career%20Academy%20National%20Standards%20of%20Practice.pdf. A highlight of this academy, that all should strive to achieve, is the opportunity for students to gain industry certifications. Details on the certifications as well as the courses included in the academy are listed below:

Health Team Relations – This course is designed to assist potential health care workers in their role and function as health team members.

Biomedical Technology – This survey course challenges students to investigate current and 21st century medical and health care practices using computerized databases, the Internet, media, and visiting health team professionals.

Allied Health Science I – This course investigates the health professions and related sciences.

Allied Health Science II – This course is designed to prepare potential health care workers, preferable seniors, to become effective multi-skilled health team members. The work-based learning strategy appropriate for this course is a minimum 75-hour clinical internship where

student interns job shadow in health care in local hospitals, medical/dental/veterinarian offices, nursing/convalescent/retirement facilities, wellness center, etc.

Medical Sciences I – This course uses advanced investigative approached to the study of human and social sciences as related to medicine and health care.

Medical Sciences II and Medical Sciences II (Honors) – This specialized course is designed to prepare potential health care workers, preferably seniors, for performance in an advanced technical or professional health career. Work-based learning strategies include the development of individualized clinical skills specifically related to a selected mentorship (minimum of 45 hours) with an exemplary health professional.

Health Sciences Advanced Studies – This culminating course is for seniors who are career-focused in a health or medical career. Three parts of the course include a research paper, a product, and a presentation. Students work under the guidance of a teacher-facilitator in collaboration with community members, business representatives, and other school-based personnel.

Nurse Aide, Level I Certification - A student may acquire Nurse Aide Level I certification if the student successfully completes selected core competencies in Allied Health Science I, Allied Health Sciences II and supplemental competencies identified in the state approved Nurse Aide, Level I curriculum. A drug screening, criminal background check, and up-to-date shot record (at the student's expense) are also required. Following successful completion of Allied Health Sciences II students must score at least 85 percent on a written examination and 100 percent on a performance assessment.

Pharmacy Technician, Entry-level Certification - This rigorous on-line course is designed to prepare students for entry-level employment as a pharmacy technician. Included in the course is a clinical experience. Prior to clinical placement, a drug screening, criminal background check, and up-to-date shot record (at the student's expense) are required. Upon completion of the course, students will take the exam required by the State of North Carolina for certification as a pharmacy technician. This course is offered in conjunction with Medical Sciences II or within Advanced Studies.

Check out their website for more information.
http://jacksonville.nc.och.schoolinsites.com/?PageName='OrganizationPage'&OrganizationID='8972'

3. The **Human Services Academy at Nathaniel Narbonne High School in Los Angeles**, California, started in 1998, enjoys partnerships with local universities, colleges, community colleges and the Regional Occupation Program (ROP). Students also benefit from the California Student Opportunity and Access Program (SOAP), in which post-secondary education provides outreach and guidance to high school students. The career technical courses include: Grade 10 Future Studies in which students survey the world of work in the 21st century with a strong emphasis on the skills, attributes and knowledge that are needed to be successful. In grade 11, Introduction to Human Services provides an in-depth look at career options in the human services fields and provides students with job performance feedback from the ROP teacher, worksite supervisors and mentors. In grade 12 students take psychology or introduction to sociology and are also required to complete 30 hours of community service, paid or volunteer, in a people-to-people setting.

Grade	Academic Class 1	Academic Class 2	Academic Class 3	Academic Class 4	Career Technical Education Class
10th	English 10	World History	Integrated Science	Spanish	Communications Lab: Future Studies
11th	English 11: American Literature	U.S. History	Integrated Science	Spanish	Introduction to Human Services
12th	English 12	Government Economics	Spanish or Science		Psychology or Sociology and Community Service

Sample course descriptions

The University of California site, www.ucop.edu/a-gGuide/ag/welcome.html, lists several courses that have been approved under the Health Science and Medical Terminology industry sector as well as a number in the college-preparatory elective category. These courses include course descriptions for: Advanced Topics in Medical Research, Anatomy and Physiology, Bioengineering I, Biotechnology 1A, 1B, Human Biology, Medical Arts and Science, Sports Medicine, The Human Genome.

Hospitality, Tourism and Recreation

This industry cluster focuses on careers in the management, operations and marketing of restaurants, other food services, lodging, attractions, recreation events and travel-related services. One of the fastest growing industries students choosing a career in this industry sector are eligible for positions throughout the world, with potential for advancement and ready availability for continuing employment. These careers require educational preparation ranging from high school education to four-year and advanced degrees. Apprenticeship and internship programs and technical schools play a large role in educating for these careers. The level and type of education required depends on the level and type of job responsibilities. Many positions prefer, and some require, certification. This sector encompasses three distinct yet related pathways: Food Science, Dietetics and Nutrition; Food Service and Hospitality; and Hospitality, Tourism and Recreation.

Course Sequence Examples

1. NAF, http://naf.org/, is a premier resource for **Travel, Tourism, and Hospitality Academies**. Students chart career paths in one of the world's largest industries, from hotel management to sports, entertainment, and event management, and includes the study of geography, economics, and world cultures. The following outlines the course overviews included in this career pathway as a NAF Academy:

Principles of Hospitality and Tourism - This is the first course students' take in the Academy of Hospitality & Tourism and provides an overview of the current hospitality and tourism industry. Students learn about the history of the industry, explore traveler motivation and consumer needs, the industry's economic and environmental impacts, domestic and international travel, and sales in tourism. Finally, students explore careers in the hospitality and tourism industry.

Customer Service - This course introduces students to the concept of service as a critical component of a hospitality or tourism business. Students analyze both good and poor customer service in a variety of contexts and through various methods. Students explore communication skills and strategies, and they use a problem-solving perspective to understand barriers to

communication and good service. They learn various means of measuring the quality of service and explore careers that focus on customer service.

Geography & World Cultures - This course introduces students to the importance of geography in the hospitality and tourism industry through the study of travel or "destination" geography. It introduces students to the concepts and vocabulary of geography as they explore the world's geographic regions, focusing on factors that create desirable travel destinations: weather/climate, physical features, cultural elements, and historical interest.

Hospitality Marketing - Hospitality Marketing introduces students to the objectives, strategies, and tools that are important to marketing in the hospitality industry, expanding on topics introduced in Principles of Hospitality and Tourism. Students learn about each phase of marketing and the wide range of options that all marketing managers and business owners consider as they create, or revise, marketing plans. Students also explore career opportunities in the field of hospitality marketing.

Sports, Entertainment and Event Planning - This course introduces students to the skills and knowledge required in the event planning profession. After studying the steps involved in planning a special event, students learn about event planning in sports. They then examine the unique requirements of event planning in entertainment and the performing arts. Students gain valuable experience in project management that can be applied to any career path. They also examine careers in the field of event planning.

Sustainable Tourism - This course introduces students to the profound changes taking place worldwide in the tourism industry. Students examine the environmental and socioeconomic impacts and interrelationships of tourism, as well as the transition to a greener tourism economy. They explore the ramifications of tourism development in terms of increased sustainability, profitability, and benefits to the surrounding communities, and they examine ecotourism as a model for sustainability.

2. **The Vineyard Academy at Windsor High School** located in the wine country of Sonoma County California is a California Partnership Academy (CPA). Curriculum is academically rigorous and relevant to real life. Students are enrolled as a cohort in their English and social

studies courses. These academic courses are taught with an emphasis on hospitality. 11th graders in the program study Business Accounting/Management, Culinary Arts I, Hotel Management I, and are matched with an industry mentor. As 12th graders, students take Culinary Arts II, Event Planning/Travel, and are placed in an internship. Details on each of these courses can be found in their Course Catalog http://www.windsorhs.com/guidance/pdf/Course Catalog Original 06-07.pdf.

3. **The Career Technical Education Framework for California Public Schools** includes a sample sequence of courses for all of the industry sector pathways. Below is a sample sequence of courses in the Food Science, Dietetics and Nutrition pathway. The courses include:

Introductory – Home Economics Careers & Technology Comprehensive Core I & II.
Concentration – Food for Health & Fitness; Food Technology & Nutrition; Food Science (Chemistry of Foods)
Capstone – Careers in Food Science, Dietetics and Nutrition
Related Courses – Chemistry; Individual & Family Health; Biology; Anatomy; Computer Applications

Sample course descriptions

The University of California site, http://www.ucop.edu/a-gGuide/ag/welcome.html, lists a few courses under this career path and some additional courses under the college preparatory elective category. These courses include: Chemistry in the Community, Food and Nutritional Science, Food Science, Marketing Economics, and Virtual Enterprise.

Information Technology

Information Technology (IT) focuses on careers related to the design, development, support and management of hardware, software, multimedia and systems integration services. IT careers are available not only in the IT industry but also in every other sector of the economy, from Agriculture and Natural Resources to Transportation. Technology and the growing complexity of global commerce, education and society has expanded the need for everyone of the 21st century to have the skills to manage and analyze electronic information. Opportunities for technically and professionally trained persons are outstanding in this career path. Skills for evaluating data, the ability to work with people and clear communication are companion components for careers in information technology. The IT industry offers a dynamic and entrepreneurial working environment that has had a revolutionary impact on the economy and on society. Information Technology careers are divided into four pathways: Information Support and Services, the foundation of all successful business organizations today; Media Support and Services, involving the creation, design, and production of multimedia products and services; Network Communications, involving network analysis, planning, and implementation; and Programming and Systems Development, involving the design, development, and implementation of computer systems and software.

Course Sequence Examples

1. The **Academy of Information Technology** as part of the **National Academy Foundation (NAF)**, http://naf.org/, prepares students for career opportunities in programming, database administration, web design and administration, digital networks, and other areas in the expanding digital workplace. The following are short descriptions of each of the courses in the sequence.

Principles of Information Technology is the first course student's take in the Academy of Information Technology. It provides an overview of information technology and introduces students to the basics of hardware and software. Students examine hardware components including peripherals, connectors, and memory. Students explore common operating systems, software applications, and programming languages. Students learn about types of networks and network topology, and they set up an email client/server connection.

Web Design is a hands-on introduction to designing, building, and launching Web sites. Students learn about Web development including HTML coding, usability, design, and Web-based publishing tools. Students determine business requirements, gather Web content, create Web pages, conduct usability testing, launch their Web sites, and plan how to attract traffic. Finally, students take a look at various career opportunities in Web design.

Computer Networking is a hands-on introduction to peer-to-peer and client/server networks. The course guides students through all phases of implementing and troubleshooting common TCP/IP Ethernet networks. It covers network components, cables, and connectors, as well as the OSI model, protocols, and topologies. Students implement and troubleshoot a LAN and learn about access issues for WANs. Finally, students explore opportunities for network-related careers.

Computer Systems walks students through the intricacies of setting up hardware, installing software, connecting to a network, and connecting to the Internet. Students get hands-on practice upgrading operating systems. They get practice assembling and disassembling computer hardware including peripherals, motherboards, FRUs, and connectors. Students also learn troubleshooting techniques. Finally, students get a chance to explore careers for computer systems professionals.

Database Design covers all aspects of the database life cycle, from collecting user requirements to delivering a database application. Students get hands-on practice in a true-to-life database project as they move from a statement of requirements to a conceptual model, then to an entity-relationship model. They translate this into a relational database. Finally, they create, test, and document the associated database application. Students also examine career opportunities as database professionals.

Digital Video Production provides a hands-on introduction to digital video production. It guides students through all phases of digital video production, from planning, executing, and managing a video shoot to editing footage. Students explore methods of sharing and broadcasting digital videos, including platform versions, CDs/DVDs, and web delivery. They also learn about publicizing a digital video, using techniques such as search engines to direct viewers to the

production.

Introduction to Programming uses Python as a basis for learning general programming skills. Students learn programming principles by comparing Python to other programming languages. They use models as a way to quickly solve new problems using knowledge and techniques already learned. Students complete over 60 programs in the course, including both text and graphics/animation programs. In addition to programming, students learn program design, documentation, formal debugging, and testing. Finally, students examine career opportunities in programming.

2. **The Business, Engineering and Technology Academy at Herbert Hoover High School** is a California Partnership Academy. The academy provides technology skills and certification, business ethics, and scholarships to students to prepare them for jobs in this highly competitive field and opportunities for higher learning. Classes are offered in Business Technology, Introduction to Programming, AP Computer Science, Desktop Publishing, Graphic Arts, Computer Applications, and Introduction to Business and the Net. These courses prepare students for careers in accounting and financial management, computer science and information systems, business management, desktop publishing and graphics, arts and print technology, and sales and marketing. For more information contact the Lead Teacher, Ellen Towers, (619) 283-6281 x2288.

3. **The Career Technical Education Framework for California Public Schools** includes a sample sequence of courses for all of the industry sector pathways. Below are the course sequences listed in the Information Support Services pathway. The courses include:

Introductory – Keyboarding; Computer Applications; Business Communications.
Concentration – Office Technology
Capstone – Microsoft Office Specialist Certification
Related Courses – Word Processing, Spreadsheet; Database Presentations

Sample course descriptions

The University of California site, http://www.ucop.edu/a-gGuide/ag/welcome.html, lists four approved model courses under the Information Technology industry sector: Computer Programming Basics A/B CP, Computer Programming: Applications for the Web 1, Computer Science 1, Computer Science 2. In the category of approved math courses two innovative courses that could be applicable to an IT pathway include: Data Analysis and Multimedia Information Technology. In the electronic version of this guide, click on the underlined words to follow a link for more information.

Manufacturing and Product Development

This industry sector focuses on careers in planning, managing and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance and manufacturing/process engineering, graphic communications, and graphic design. Products include every aspect of the economy including: computers, communications equipment, electronic components, high-tech instruments, apparel, metal products, chemicals, plastics, aircraft, ships, missiles and space products, and search and navigation equipment to name a few. Both large and small manufacturers are important participants in the electronics, multimedia, and other emergent regional industrial clusters. Many positions require certification and some require licensing. As in all industry sectors, students instructional program should integrate technical preparation and academics with career awareness, career exploration, and skill preparation. There are four pathways: Graphic Arts Technology, Integrated Graphics Technology, Machine and Forming Technology, and Welding Technology.

Course Sequence Examples

1. **The Engineering and Manufacturing (TEAM) Sciences Academy at Southfield High School in Michigan**, offers three specialized programs: NASA/Aerospace, Computer-Aided Design, and Manufacturing. http://www.southfield.k12.mi.us/education/dept/default.php?sectiondetailid=514. All three programs provide practical experience in the most contemporary career fields. The Academy offers opportunities for job shadowing, paid summer internships and community service. Students are required to exhibit leadership and improvement throughout their high school experience.

In the NASA/Aerospace pathway students gain a wide range of experiences from building rockets for national competition to attending teleconferences with actual NASA engineers. Southfield High School receives NASA sponsorship. A NASA Explorer School is one of the few schools in the nation that works with NASA in providing students with unique, cutting-edge educational experiences in fields related to aeronautical engineering.

The Computer-Aided Design program offers students opportunities to apply industrial standards to the design process using the most up-to-date software available. CAD students are provided with opportunities to compete in various drafting competitions throughout the year where they can win prizes such as scholarships and cash. The CAD program promotes membership in various organizations, allowing students to meet and learn from some of industry's best.

Manufacturing students solve real-world problems using one of the most sophisticated lab designs found in today's high schools. Manufacturing students can also apply their skills in competition. These students build two robots every year with the assistance of parents and engineers. One robot competes at the county level and the other competes nationally.

Below are the courses for grades 10 – 12:

Grade	NASA/Aerospace Pathway	Computer-Aided Design Pathway	Manufacturing Pathway
10th (same courses for all three paths)	Introduction to World Lit. & Composition Geometry or Algebra II Science Social Studies Foreign Language T.E.A.M.Foundation/PC Applications I Health Elective(s)	Introduction to World Lit. & Composition Geometry or Algebra II Science Social Studies Foreign Language T.E.A.M.Foundation/PC Applications I Health Elective(s)	Introduction to World Lit. & Composition Geometry or Algebra II Science Social Studies Foreign Language T.E.A.M.Foundation/PC Applications I Health Elective(s)
11th	American Lit. & Comp. Algebra II or Pre-Calculus Physics Foreign Language Physical Education I-II DC Fundamentals/DC Lab PC Hardware/Computer Network Communication Systems Elective(s)	American Literature Algebra II or Pre-Calculus Physics Foreign Language Physical Education I-II Computer Applications in Manufacturing Mechanical Drafting I Elective(s)	American Literature Algebra II or Pre-Calculus Physics Foreign Language Physical Education I-II Introduction to Manufacturing Mechanical Drafting I Machine Tools Elective(s)

12th	College English Calculus Democratic Citizenship Foreign Language or Elective Speech AC Fundamentals/AC Lab Electronic Devices with Electronic Devices Lab Elective(s)	College English Calculus Democratic Citizenship Foreign Language or Elective Speech CAD I CAD II Basic Mechanisms Elective(s)	College English Calculus Democratic Citizenship Foreign Language or Elective CAD I NC Machining Hydraulics/ Robotics Elective(s)

2. **The Laguna Creek High School Manufacturing Production Technology Academy (MPTA)** is a California Partnership Academy established in 1994. It is considered a model program by ConnectEd, the California Center for College and Career. The Academy provides a schoolwide entrepreneurial focus with three pathways: design and engineering, business and marketing, production and manufacturing. The curriculum is designed in partnership with industry and postsecondary institutions. Students completing the Academy's four-year course of study can receive up to nine units of Mechanical Engineering coursework from CSU Sacramento. The curriculum combines core learning and advanced specialized courses with mentoring/job shadowing and hands-on experience in labs that simulate manufacturing. The academy began with an academic curriculum that was already "a to g" approved and then built the career component into its academic classes. Two CTE classes, CAD and Design and Implementation, are "a to g" approved. The centerpiece of the Academy is a technology lab providing training that is aligned with the California Guidelines for Industrial Technology. The academy offers students hands-on training in Computer Numeric Control (CNC), mill and lathe, robotics, welding, graphic design, biotechnology, aerodynamics, pneumatics, plastics, research and design, and flight simulation. The Industrial Technology building also houses a woodworking/cabinet-making lab and a CAD lab networked to the technology lab. For more information contact the Lead Teacher Bill Giovannetti, (916) 683-1339 x6823.

Sample course descriptions

The University of California site, http://www.ucop.edu/a-gGuide/ag/welcome.html, lists several model approved courses under the college preparatory elective category. They are: Engineering I, Engineering II, Introduction to Engineering Design 1-2, Pre-Engineering & Design, Principles of Engineering, Product Development, Robotics, Robotics Engineering Technology. Click on any underlined word(s) in the electronic version of this guide for a link with more information.

Marketing, Sales and Service

Marketing, the transfer of goods and services among businesses and consumers, affects the economy at every level. This sector is designed to prepare learners for careers in planning, managing, and performing marketing activities. As businesses in the United States evolve to compete successfully in the global marketplace, a growing need exists for employees with business expertise and the ability to analyze and respond to emerging trends. Marketing includes the processes and techniques of transferring products or services to consumers and is a function of almost every business. It exists with in an environment of rapidly changing technology, interdependent nations and economies and increasing demands for ethical and social responsibility. Included are four career pathways: E-commerce, which provides instruction in using electronic tools to market products and services; Entrepreneurship, which develops skills and abilities to begin and operate a business independently or with other individuals; International Trade, which focuses on understanding the global business environment; and Professional Sales and Marketing, which builds knowledge of the sales process, sales management, and marketing information management.

Course Sequence Examples

1. **The International Business Academy** has it's roots in **Mark Keppel High School** 2005 Exemplary Career Technical Education award from the California State Department of Education, and a 25 year history of awarding Certificates of Achievement to graduates who complete a sequence of business courses. It is a California Partnership Academy (CPA). The goals of the academy include instilling a sense of pride in students with multiple language skills while exposing them to global career opportunities; and, that business skills will be an essential part of each of their careers and their lives. Required academy courses at each grade level are:

10th grade - English, World History, and Digital Media
11th grade - English, U.S. History, and Economics & Entrepreneurship
12th grade - World Literature or Contemporary Themes, and International Business

Several elective course selections are also available for students interested in preparing for the business of life, including: Business & Personal Law, Personal Finance, Accounting, and

Computer Literacy & Applications.

For more information contact the Lead Teacher, Michael Green, (626) 572-2242.

2. **La Mirada High School Academy of Commerce and Entrepreneurship** (ACE), http://www.lamiradahighschool.com/apps/pages/index.jsp?uREC_ID=34989&type=d&rn=6217602, program is a California Partnership Academy (CPA), www.cde.ca.gov/ci/gs/hs/cpagen.asp. The table below outlines the coordinated sequence of courses.

Grade 9	ACE Language Arts 9	ACE Health	ACE PE	Academy Math	**ACE Orientation to Business**
Grade 10	ACE Language Arts 10	ACE World History	Academy Math	**ACE Business Law**	**ACE International Business**
Grade 11	ACE Language Arts 11	ACE U.S. History	Academy Math or Accounting	**ACE Marketing**	**ACE Entrepreneurship**
Grade 12	ACE Language Arts 12	ACE Government	ACE Economics	**ACE Virtual Enterprise**	**Internship**

The ACE business academy boasts two unique programs. The first is the Business Education Scholarship Training B.E.S.T. program, which is a non-profit organization that sponsors the "Apprentice" program. The Apprentice program is a competitive internship program that has the "Apprentices" work as interns for 4 months and compete in 4 business challenges. For more information on the B.E.S.T. program visit www.socalbest.org. The other program is Virtual Enterprise (VE). VE is the Senior class for ACE students in this class students create and run a fictitious business and compete against other high schools in California. Students are given the opportunity to travel and compete in several business categories. For more information on the Virtual Enterprise program for California visit www.virtualenterprise.org. By successfully completing the ACE course sequence, students meet all requirements for entrance into a community college or California State University (CSU) system. For more information contact Lead Teacher Derek Wood, (562) 868-0431 x3160.

3. **The Bayshore Business Academy**, known as The BIZ at Bayshore High School in Florida, is a nationally accredited "Model Academy" with the National Career Academy Coalition (NCAC).

NCAC utilizes the National Standards of Practice (NSOP) for accreditation purposes. Read more about the NSOP at http://www.aypf.org/publications/Career%20Academy%20National%20Standards%20of%20Practice.pdf. The BIZ also received a "Model of Excellence" award from the NCAC at its National Conference in November 2006. The Bayshore Business Academy is a 3-year program for grades 10 – 12 that integrates business, social studies and English. The academy has a college preparatory curriculum focused around careers in business. Courses offered in the academy are: English II, III and IV; English II, III, and IV Honors; World History; American History, Economics/American Government, Entrepreneurship, Legal Aspects of Business, and Business Supervision. Students who complete all of the academy coursework with a grade "C" or better and pass all requirements for admission to Manatee Community College (MCC) can receive credits from MCC for Computer Information Systems (3 credits) and Management & Supervision (3 credits). This represents a savings of over $400 in college tuition. Check out the website for more information http://www.manatee.k12.fl.us/sites/highschool/bayshore/biz/default.htm.

Sample course descriptions

The University of California site, http://www.ucop.edu/a-gGuide/ag/welcome.html, lists several courses under this career path and some additional courses under the approved "college preparatory elective" category. These courses include: Business Economics, Entrepreneurship, Economics of Business Ownership, Marketing Economics, Topics in Global Economics and Finance, Virtual Enterprise. Click on the underlined word(s) in the electronic version of this guide to follow a link with more information.

Public Services

The Public Services sector provides a foundation for students in government, national security, foreign service, public management and administration, public safety, emergency and fire management, security and protective services, law enforcement, legal and human services. Growth in this industry sector is expected to be steady due to heightened interest in homeland and border security, social equity, and the retirement of workers from the baby-boom generation. Many positions require certification and/or licensing. It encompasses three career pathways, Human Services, Legal and Government Services, and Protective Services, which emphasize processes, systems, and services related to serving the public's interest.

Course Sequence Examples

1. The **Criminal Justice & Community Services Academy at Hiram Johnson High School in the Sacramento City Unified School District**, Sacramento is a California Partnership Academy that began in 1996. This Academy utilizes the "Street Law" program in its technical courses, which combine government principles into a common criminal justice vernacular. It also uses an "Administration of Justice" program published by a retired Los Angeles officer. The wide range of industry partnerships provides the students with a real-world look at the various fields within the criminal justice system. For more information about this Academy, contact Mike Washington, Lead Teacher, (916) 277-6300 x1911. More information on CA Partnership Academies can found at http://www.cde.ca.gov/ci/gs/hs/cpagen.asp.

Grade	Academic Course 1	Academic Course 2	Academic Course 3	Career Technical Course
9th				Law 1
10th	English 10	World History	Physical Training	Law II
11th	English 11	U.S. History	Physical Training	Law III
12th	English 12		Physical Training	Law IV

Law I is designed as an introductory class for freshmen interested in the Academy of Criminal Justice. It covers general aspects of Constitutional Law, balancing rights with responsibilities, nature of crimes, understanding the media in relation to crime and crime reporting, basic types of laws, history of law enforcement, and types of court systems found in the United States.

Law II covers cultural diversity, fairness policies, street gangs, organized crime, choices and consequences, narcotics and drug abuse, and introduction to the juvenile justice system.

Law III covers state and federal crimes, classes of crimes, parties to crimes and due process. Students examine the right to privacy, search and seizure laws, arrest procedures, elements of the various crimes against persons, the juvenile justice system, forensic science and crime scene investigation.

Law IV examines citizen advocacy, the voting process, crimes against property, miscellaneous crimes, civil law, family law, consumer law, and continuation of forensic science and crime scene investigation.

2. The **Monroe High School Police Academy in the Los Angeles Unified School District**, California has been developed based on employment requirements of the Los Angeles Police Department (LAPD). The teachers work closely with the LAPD to create a college-bound law enforcement curriculum. The Monroe campus has a state-of-the-art computer lab, a forensic science lab, a weight room, an obstacle course, a driver education bungalow and a roll call room. The seven areas of focus for the curriculum are academics, discipline, physical fitness, individualized support, work experience, leadership activities and support services. For more information about this program, contact Donna Finkelstein, (818) 830-4248, or visit their website at http://monroe.lausd.k12.ca.us/glsys/staticpages/index.php?page=mag-policeacad More information on California Partnership Academies can found at http://www.cde.ca.gov/ci/gs/hs/cpagen.asp.

Grade	Academic Class 1	Academic Class 2	Academic Class 3	Academic Class 4	Career Technical Education Class
10th	English 10	Spanish	Forensic Science	Physical Training & Policies	Law & Youth / Civil Law
11th	English 11: American Literature	U.S. History		Physical Training	Criminal Justice
12th	English 12	Economics and Government		Physical Training	Administration of Justice / Internships

3. The **Internal Revenue Service (IRS) Careers Academy at Roosevelt High School in the Fresno Unified School District**, enjoys a mutually beneficial relation with the Internal Revenue Service. Students are provided employment opportunities during the summer, receive VITA training through the IRS in which students are trained to do volunteer income tax assistance, are mentored by IRS employees, and engage in mock interviews by IRS executives. In the career technical courses, students focus on higher order thinking and problem solving skills, delegation of authority, teamwork, social skills, communication skills, leadership skills, life skills, personal effectiveness skills, and computer and multi-media literacy and usage. Project East takes students from developing and initiating a project to portfolio development, project presentation and reflection.

Grade	Academic Class 1	Academic Class 2	Academic Class 3	Career Technical Education Class
10th	English II	Modern World History	Earth Science	Employability Skills I
11th	English III: American Literature	U.S. History	Biology	Employability Skills II
12th	English IV	Economics and Government	Chemistry	Project East

4. **The Career Technical Education Framework for California Public Schools,** www.cde.ca.gov/ci/ct/sf/documents/cteframework.pdf, includes detailed information for all of the pathways in this industry sector including a list of occupations, sample performance tasks, and sample assignments. A sample sequence of courses listed in the Framework for the Human Services pathway is listed below.

Introductory – Introduction to Human Services; Conflict Resolution

Concentration – Principles of Recovery and Psychosocial Rehabilitation; Recovery and Special Populations

Capstone – Helping Relationships, Psychosocial Rehabilitation Worker Field Experience

Related Courses – US History, English, Biology, Algebra

Sample course descriptions

The University of California site, http://www.ucop.edu/a-gGuide/ag/welcome.html, lists several

courses under this career path and some additional courses under the approved "college preparatory elective" category. These courses include: Community Service: A Sociological Perspective, Forensic Biology, Forensic Science, International Issues & Public Policy, International Relations, Law and Order and Public Policy. An "innovative course" approved for social science is Race and Social Justice. Click on the underlined word(s) in the electronic version of this guide to follow a link with more information.

Transportation

This industry sector focuses on careers and businesses involved in the planning, management and movement of people, materials and products by road, air, rail and water. It also covers support services such as infrastructure planning and management, logistic services and maintenance of mobile equipment and facilities. It will also continue to adapt to changing technology and repair techniques as vehicle components and systems become increasingly sophisticated. Examples include developments in rocket technology, super-capacity jet airplanes, hybrid and hydrogen fuel-cell technology affecting automobiles, and diesel trucks that run on biodiesel or other alternative fuels. The transportation industry sector features three career pathways that provide opportunities from entry-level jobs requiring high school diplomas to progressive careers requiring advanced degrees. The three pathways emphasize real-world, occupationally relevant experiences of significant scope and depth in Aviation and Aerospace Transportation Services, which includes maintaining aircraft, operating airports, and designing and flying various types of aircraft; Collision Repair and Refinishing, which includes painting, repairing, and refinishing vehicles; and Vehicle Maintenance, Service, and Repair, which includes maintaining, servicing, and repairing light-, medium-, and heavy-duty vehicles.

Course Sequence Examples

1. The **Transportation Academy at Anaheim High School** is a California Partnership Academy started in 1998 allows students to learn about a variety of modes of transportation and the technologies that make them possible. Transportation Tech I introduces transportation systems and technologies. In Transportation Tech II the students explore and investigate various transportation-related technologies such as solar energy, auto design, robotics, lasers and fiber optics. In Transportation Tech III students use the knowledge and experience gained in the previous years to integrate current transportation technologies with more complex or involved technologies. For example, students work with city traffic managers to coordinate traffic flows, analyze the current patterns of traffic, and create and suggest possible alternative patterns to improve traffic flow. For more information on this Academy, contact Brett Schumm, Lead Teacher, (714) 493-1937, schumm_b@auhsd.k12.ca.us or check out their website at

http://anaheim.auhsd.k12.ca.us/ata/index.jsp?rn=7385756. More information on CA Partnership Academies can found at http://www.cde.ca.gov/ci/gs/hs/cpagen.asp.

Grade	Academic Course 1	Academic Course 2	Academic Course 3	Career Technical Education Course
10th	English II	World Cultures/ Geography	Biology	Transportation Technology I
11th	English III	U.S. History	Chemistry	Transportation Technology II
12th	English IV		Physics	Transportation Technology III

2. Some academies focus on one particular mode of transportation such as automotive, air transportation, marine transportation, and space exploration. The **Technical Institute Academy at Lassen High School in Susanville**, California focuses on the automotive industry. This academy is able to offer high-level technical courses through a partnership with their Regional Occupation Program (ROP). They are a nationally certified Master NATEF program and AYES in automotive and offer Advanced Automotive, Collision Repair, Auto Parts Supply and Diesel Equipment Repair as their advanced classes for the Academy. The Energy and Transportation class for 10th grade students is a basic class in automotive and understanding of tools and transportation careers and choices. The two-year Diesel program teaches the basics to being a HD Diesel mechanic. The Collision Repair program is an ICAR program and teaches auto collision and painting. The Auto Parts Supply class teaches the basic skills and knowledge needed as an automotive counter-person. For more information on this Academy, contact John Crosby, Project Director, at (530) 251-1121, jmcrosby@hotmail.com or check out their website at www.lassentechnicalinstitute.com. More information on CA Partnership Academies can found at http://www.cde.ca.gov/ci/gs/hs/cpagen.asp.

Grade	Academic Class 1	Academic Class 2	Academic Class 3	Academic Class 4	Career Technical Education Class
10th	English 10	World History	Algebra I or Geometry		Energy and Transportation
11th	English 11	American History	Geometry or Algebra II	Physical Science credit is offered for the Advanced Automotive courses	Advanced Automotive, Collision Repair, Auto Parts
12th	English 12	Civics/ Economics		Science Credit is granted to Advanced Automotive courses	Advanced Automotive, Collision Repair, Auto Parts

3. **The Career Technical Education Framework for California Public Schools,** www.cde.ca.gov/ci/ct/sf/documents/cteframework.pdf, includes detailed information for all of the pathways in this industry sector including a list of occupations, sample performance tasks, and sample assignments. A sample sequence of courses listed in the Framework for the Aviation and Aerospace Transportation Services pathway is listed below.

Introductory – Small Engines, Exploring Technology, Technology Core, Basic Automotive
Concentration – Electronics, Auto 1
Capstone – Avionics, Radio Communications, Aviation Aircraft Engines
Related Courses – Digital Electronics, Algebra, English, Chemistry, Computer Technology

Sample course descriptions

The University of California site, www.ucop.edu/a-gGuide/ag/welcome.html, lists only one course under this career path as well as under the approved "college preparatory elective" category. It is Auto Physics.

A New Era for UC a-g approved CTE Courses

However, the state of California has embarked on an ambitious agenda to support and expand the development of career technical education opportunities within schools. Initiatives such as workforce innovation partnerships, the expansion of California Partnership Academies, ROC/Ps and Tech Prep programs, the adoption of State Board of Education approved CTE standards (2005) and curriculum framework (2007), and CTE-related legislation (i.e. SB 1543, SB 70, AB 2648 and others) have combined to place greater attention on issues related to the development and expansion of "a-g" courses that include an academically rigorous CTE component.

Since the 2001-02 year, the number of CTE courses accepted for "a-g" approval has increased dramatically. In 2001, UC had approved just 258 CTE courses. In 2009, over 7,600 CTE courses are approved to meet UC "a-g" Admission requirements or about 32.4 percent of the 23,600 CTE courses offered in California schools. Moreover, it is expected that the number of approved CTE courses will continue to climb. Please consider submitting your course(s) for approval.

APPENDIX

Crosswalk of States' Career Clusters and California Industry Sectors

States' Career Clusters (16 Total Career Clusters)	**States' Pathway within in Cluster**	**California Industry Sectors** (15 Total Industry Sectors)	**California Pathways within in Industry Sector**
Agriculture, Food & Natural Resources	• Food Products & Processing Systems • Plant Systems • Animal Systems • Power, Structural & Technical Systems • Natural Resources Systems • Environmental Service Systems • Agribusiness Systems	Agriculture & Natural Resources *(see also Hospitality, Tourism and Recreation for food component)*	• Agricultural Business • Agricultural Mechanics • Agriscience • Animal Science • Forestry & Natural Resources • Ornamental Horticulture • Plant and Soil Science
Architecture & Construction	• Design/Pre-Construction • Construction • Maintenance/Operations	Building Trades & Construction *(see also Engineering and Design for Architecture component)*	• Cabinetmaking & Wood Products • Engineering & Heavy Construction • Mechanical Construction • Residential & Commercial Construction
Arts, Audio-Video Technology & Communications	• Audio and Video Technology and Film • Printing Technology • Visual Arts • Performing Arts • Journalism & Broadcasting • Telecommunications	Arts, Media and Entertainment	• Media and Design Arts • Performing Arts • Production and Managerial Arts
Business Management & Administration	• General Management • Business Information Management • Human Resources Management • Operations Management • Administrative Support	*(see Finance)*	
Education & Training	• Administration and	Education, Child Development and	• Child Development

	Administrative Support • Professional Support Services • Teaching/Training	Family Services	• Consumer Services • Education • Family and Human Services
Finance	• Securities & Investments • Business Finance • Banking Services • Insurance	Finance and Business	• Accounting Services • Banking and Related Services • Business Financial Management
Government & Public Administration	• Governance • National Security • Foreign Service • Planning • Revenue and Taxation • Regulation • Public Management and Administration	*(see Public Services)*	
Health Science	• Therapeutic Services • Diagnostics Services • Health Informatics • Support Services • Biotechnology Research and Development	Health Science and Medical Terminology	• Therapeutic Services • Diagnostics Services • Health Informatics • Support Services • Biotechnology Research and Development
Hospitality & Tourism	• Restaurant and Food/Beverage Services • Lodging • Travel & Tourism • Recreation, Amusements & Attractions	Hospitality, Tourism, and Recreation	• Food Science, Dietetics and Nutrition • Food Service and Hospitality • Hospitality, Tourism and Recreation
Human Services	• Early Childhood Development & Services • Counseling & Mental Health Services • Family & Community Services • Personal Care Services • Consumer Services	Public Services *(see also Education, Child Development & Family Services)*	• Human Services • Legal and Government Services • Protective Services
Information Technology	• Network Systems • Information Support and Services	Information Technology	• Network Communications • Information Support

	• Web and Digital Communications • Programming and Software Development		and Services • Media Support and Services • Programming and Systems Development
Law, Public Safety, Corrections and Security	• Correction Services • Emergency and Fire Management Services • Security & Protective Services • Law Enforcement Services • Legal Services	*(see Public Services)*	
Manufacturing	• Production • Manufacturing Production Process Development • Maintenance, Installation & Repair • Quality Assurance • Logistics & Inventory Control • Health, Safety and Environmental Assurances	Manufacturing, Sales and Services	• Graphic Arts Technology • Integrated Graphics Technology • Machine and Forming Technology • Welding Technology
Marketing	• Marketing Management • Professional Sales • Merchandising • Marketing Communications • Marketing Research	Marketing, Sales and Service	• E-commerce • Entrepreneurship • International Trade • Professional Sales and Marketing
Science, Technology, Engineering & Mathematics	• Engineering and Technology • Science and Math	Engineering and Design	• Architectural and Structural Engineering • Computer Hardware, Electrical, and Networking Engineering • Engineering Design • Engineering Technology • Environmental and Natural Science Engineering

Transportation, Distribution & Logistics	• Transportation Operations • Logistics Planning and Management Services • Warehousing and Distribution Center Operations • Facility and Mobile Equipment Maintenance • Transportation Systems/Infrastructure Planning, Management, and Regulation • Health, Safety and Environmental Management • Sales and Services	Transportation	• Aviation and Aerospace Transportation Services • Collision Repair & Refinishing • Vehicle Maintenance, Service and Repair
		Fashion and Interior Design *(there is not a similar States' Career Cluster)*	• Fashion Design, Manufacturing and Merchandising • Interior Design, Furnishings, and Maintenance
		Energy & Utilities *(there is not a similar States' Career Cluster)*	• Electromechanical Installation and Maintenance • Energy and Environmental Technology • Public Utilities • Residential and Commercial Energy and Utilities