FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT

ADVANCED PRODUCT INNOVATION AND DESIGN

Board Approval Date: June 20, 2019	**Course Length: 2 Semesters**
Grading: A-F	**Credits: 5 Credits per Semester**
Proposed Grade Level(s): 12	**Subject Area: Elective** **Elective Area (if applicable):** **Career Technical Education**
Prerequisite(s): **"C-" or better in Robotics and Electronics and/or Product Innovation and Design**	**Corequisite(s):** **N/A**
CTE Sector/Pathway: Manufacturing and Product Development/Product Innovation and Design	
Intent to Pursue 'A-G' College Prep Status: Yes	
A-G Course Identifier: (g) Elective	
Graduation Requirement: No	
Course Intent: District Course **Program (if applicable): CTE**	

COURSE DESCRIPTION:

The capstone course is an opportunity for students to demonstrate technical skills, creativity, problem solving, and design thinking in the development of a series of in-depth projects. Students will address an identified challenge or need from the perspective of a specific discipline. Students will create a project plan and manage their time and resources to satisfy customer needs. Successful projects integrate skills and techniques from previous related classes, and embody an awareness of a variety of constraints, including economic factors, user experience, safety, reliability, resources, market needs, aesthetics, ethics, and social impact. Students will have the opportunity to present their work as part of spotlight and showcase events.

DETAILED UNITS OF INSTRUCTION:

Unit Number/Title	Unit Essential Questions	Examples of Formative Assessments	Examples of Summative Assessment
1. Projects for Students with Severe or Moderate Disabilities	What is universal design? What factors need to be considered when developing projects for students with special needs? How can empathy help us relate to students with special needs?	*Daily Log. *Weekly Team Meeting. *Project Progress Reports.	*Project Completion Form (to be completed by the student). *Customer Satisfaction Form (to be completed by the customer).
2. Projects for Teachers	How do I define and document customer needs? What materials are required and what impact does this have on form, function and cost? How do I exceed customer expectations?	*Daily Log. *Weekly Team Meeting. *Project Progress Reports.	*Project Completion Form (to be completed by the student). *Customer Satisfaction Form (to be completed by the customer).
3. Children Museum Exhibits	How do I develop an exhibit that is safe and durable for use by children? What scientific principles will be demonstrated by my exhibit and how will this be communicated to children and parents? How do I inform my customers of the progress made and resolve any issues that arise as the project moves forward?	* Daily Log. * Weekly Team Meeting. * Project Progress Reports. * Mentor Presentation.	*Mid presentation. *Final presentation. *Final exhibit.
4. Competitive Events	How do I break a large project into smaller parts and develop a visual schedule, like a Gantt chart? How do I use and interpret technical instructions and	*Daily Log. *Weekly Team Meeting. *Project Progress Reports.	*Product from competitive event. * Mid Presentation * Final Presentation.

	documents? How do I connect with customers, mentors or other people in my network in a professional manner? What resources are available to research difficult topics and how do I find the information I need?		

ESSENTIAL STANDARDS:

https://www.cde.ca.gov/ci/ct/sf/documents/manproddev.pdf

C1.0 Understand historical and current events related to engineering design and their effects on society.

C1.1 Know historical and current events that have relevance to engineering design.

C1.2 Interpret the development of graphic language in relation to engineering design.

C2.0 Understand the effective use of engineering design equipment.

C2.1 Employ engineering design equipment using the appropriate methods and techniques.

C2.2 Apply conventional engineering design equipment procedures accurately, appropriately, and safely.

C2.3 Apply the concepts of engineering design to the tools, equipment, projects, and procedures of the Engineering Design Pathway.

C3.0 Understand the sketching process used in concept development.

C3.1 Apply sketching techniques to a variety of architectural models.

C3.2 Produce proportional two- and three-dimensional sketches and designs.

C3.3 Present conceptual ideas, analysis, and design concepts using freehand, graphic, communication techniques.

C4.0 Understand measurement systems as they apply to engineering design.

C4.1 Know how the various measurement systems are used in engineering drawings.

C4.2 Understand the degree of accuracy necessary for engineering design.

C5.0 Use proper projection techniques to develop orthographic drawings.

C5.1 Understand the concepts and procedures necessary for producing drawings.

C5.2 Develop multiview drawings using the orthographic projection process.

C5.3 Understand the various techniques for viewing objects.

C5.4 Use the concepts of geometric construction in the development of design drawings.

C5.5 Apply pictorial drawings derived from orthographic multiview drawings and sketches.

C6.0 Understand the applications and functions of sectional views.

C6.1 Understand the function of sectional views.

C6.2 Clarify hidden features of an object using a sectional view and appropriate cutting planes.

C7.0 Understand the applications and functions of auxiliary views.
C7.1 Understand the function of auxiliary views.
C7.2 Use auxiliary views to clarify the true shape and size of an object.

C8.0 Understand and apply proper dimensioning standards to drawings.
C8.1 Know a variety of drafting applications and understand the proper dimensioning standards for each.
C8.2 Apply dimension to various objects and features.

C9.0 Understand the tolerance relationships between mating parts.
C9.1 Understand what constitutes mating parts in engineering design.
C9.2 Interpret geometric tolerancing symbols in a drawing.
C9.3 Use tolerancing in an engineering drawing.

C10.0 Understand the methods of applying text to a drawing.
C10.1 Describe the processes of lettering and/or text editing.
C10.2 Implement standard methods of title block creation and use.
C10.3 Develop drawings using notes and specifications.
C10.4 Plan, prepare, and interpret drawings and models through traditional drafting or computer-aided design (CAD) techniques.

C11.0 Understand the methods of creating both written and digital portfolios.
C11.1 Develop a binder or digital portfolio representative of completed work for presentation.
C11.2 Give an effective oral presentation of a portfolio.

RELEVANT STANDARDS AND FRAMEWORKS, CONTENT/PROGRAM SPECIFIC STANDARDS:

Link to Common Core Standards (if applicable):
Educational standards describe what students should know and be able to do in each subject in each grade. In California, the State Board of Education decides on the standards for all students, from kindergarten through high school.
https://www.cde.ca.gov/be/st/ss/documents/finalelaccssstandards.pdf

Link to Framework (if applicable):
Curriculum frameworks provide guidance for implementing the content standards adopted by the State Board of Education (SBE). Frameworks are developed by the Instructional Quality Commission, formerly known as the Curriculum Development and Supplemental Materials Commission, which also reviews and recommends textbooks and other instructional materials to be adopted by the SBE.

Link to Subject Area Content Standards (if applicable):
Content standards were designed to encourage the highest achievement of every student, by defining the knowledge, concepts, and skills that students should acquire at each grade level.
https://www.cde.ca.gov/ci/ct/sf/documents/ctescrpflyer.pdf and
https://www.cde.ca.gov/ci/ct/sf/documents/manproddev.pdf (pages 17-19)

Link to Program Content Area Standards (if applicable):

Program Content Area Standards applies to programs such as International Baccalaureate, Advanced Placement, Career and Technical Education, etc.

TEXTBOOKS AND RESOURCE MATERIALS:

Textbooks

Board Approved	Pilot Completion Date (If applicable)	Textbook Title	Author(s)	Publisher	Edition	Date
		N/A				

Other Resource Materials

Teacher recommended resource materials

Supplemental Materials

Board approved supplemental materials (Including but not limited to: Film Clips, Digital Resources, Supplemental texts, DVDs, software programs (Pebble Creek, DBQ, etc.)

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