Monterey Trail High School

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Design and Technology Academy (DATA)

The Design and Technology Academy (DATA) provides a rigorous four-year program designed to give students training, information, and resources in the areas of Engineering, Computer Science, and Environmental Architecture. Throughout the students' high school career, DATA teachers focus on three main goals: to strengthen students' motivation and commitment to learning by providing purpose for their learning experiences; to improve students' connection to school through personalized learning environments and workplace experiences; and to prepare students to enter industry with appropriate certification and/or post-secondary education.

Students can focus on one or more of the following strands as their major:

DATA Academy Programs of Study

Engineering

Students will engage in various hands-on activities to explore the nature of assorted engineering fields. In addition, the student will learn about many technology sectors such as manufacturing, construction, power and energy, communications, and transportation. Student teams are formed to develop, design, build and present a functional electromechanical prototype. During fabrication, students will perform various manufacturing processes and learn various technologies and concepts such as manual and CNC machining, Arc and MIG welding, CNC plasma cutting, robotics, electronics, pneumatics and mechanical systems. Students may be eligible to apply to CSUS through the ACE Program for transferrable college credit.

Industry Sector: Engineering and Design
Pathway: Engineering Design and Technology

Grade	Academic 1	Academic 2	Academic 3	CTE	Advocacy
9	Math I	English 9	General Science	Computer Technology/ Computers Intermediate	Yes
10	Math II	English 10	Biology	Exploring Technology	Yes
11	Math III (or Algebra II)	English 11	US History/ Chemistry	Computer-Assisted Design/Drafting (CADD)	Yes
12	American Government	English 12	Economics	Engineering A	Yes

The CTE courses required for this academy are described below.

Design and Technology Academy (DATA) (continued)

Computer Science

Students will concentrate on the many aspects of computer science including web page design, computer maintenance and upgrading, computer troubleshooting, computer programming, graphics and animation, network configuration and administration. Industry recognized pre-certification is available including A+ and I-Net.

Industry Sector: Information and Communication Technology
Pathway: Network Communications. Programming and System Development

Grade	Academic 1	Academic 2	Academic 3	CTE	Advocacy
9	Math I	English 9	General Science	Computer Technology and Intermediate Computers	Yes
10	Math II	English 10	Biology	Computer Mathematics/Basic Programming	Yes
11	Math III (or Algebra II)	English 11	Chemistry	Computer Science A	Yes
12		English 12	Economics	Web Design and Development	Yes

The CTE courses required for this academy are described below.

Environmental Architecture

Students will be introduced to architectural design and drafting and will examine current environmental and ecological issues with an emphasis on cross-curricular studies within science, social science, and technology. They will evaluate local and global environmental concerns and develop potential solutions to these problems. The student will incorporate this knowledge into the design process to develop, design, and construct a scaled model eco-friendly residential home. Students may eligible to apply to CSUS through the ACE Program for transferable college credit.

Students enrolled in this academy must complete a sequence of Career Technical Education courses noted below as well as their core academic courses (e.g., English, mathematics, science, social science, etc.) as one cohort. The courses required for this academy are described below.

Industry Sector: Engineering and Architecture
Pathway: Architecture Design

Grade	Academic 1	Academic 2	Academic 3	CTE	Advocacy
9	Math I	English 9	General Science	Computer Technology and Intermediate Computers	Yes
10	Math II	English 10	Biology	Computer-Assisted Design & Drafting (CADD)	Yes
11	Math III (or Algebra II)	English 11	Chemistry	Ecology	Yes
12		English 12	Economics	Environmental Architecture	Yes

The CTE courses required for this academy are described below.

Design and Technology Academy (DATA) (continued)

Course	Class Restrictions	Credits	Description
DATA **Computer Technology** **Course #12111**	Freshman	5	This course focuses on computer technologies and their uses as applied to academic success. Students will learn keyboarding skills, word processing, computer operations, spreadsheets, database, library research technologies, and telecommunications. Students will be able to apply the skills learned in this course to complete assignments in other courses throughout their school career, by using the computer to conduct research, prepare papers, solve problems, and manage information. This course meets the Technology graduation requirement. Students at Monterey Trail High School will be eligible to apply to CSUS through the ACE Program for transferable computer science credit. **Adopted curricular materials:** *Century 21 Computer Applications & Keyboarding,* South Western
DATA **Computers, Intermediate** **Course #12131**	Sophomore Junior Senior Freshman	5	This course provides students an opportunity to continue hands-on experience with computer operations. Students will learn programming techniques, how to use advanced word-processing, desktop publishing to include multimedia presentation and other management systems. **Adopted curricular materials:** *Microcomputer Applications for Business,* South Western
DATA **Computer Mathematics/Basic Programming** **"a-g"/ "g" approved** **Course #3062**	Sophomore Junior Senior	10	This course explores programming taught on a computer in which the language will be applied to the areas of math, science, business, social studies, economics, and ecology. The student will cover such topics as flow-charting, the functions of the processing component of computers, and input-output devices for communicating with computers. This course meets the senior math graduation requirement. *Prerequisite(s): Math I or (Algebra I) with a grade of C or better.* **Adopted curricular materials:** No textbook assigned.
DATA **Computer Science A, Introduction to** **Course #12112**	Sophomore Junior Senior	10	This hands-on course prepares students for careers in Computer Science. Students work on modules in computer hardware, troubleshooting, and local equipment repair. Other topics include investigating computers, upgrading computers, and network configuration. Students at Monterey Trail High School will be eligible to apply to CSUS through the ACE Program for transferable computer science credit. **Adopted curricular materials:** No textbook assigned.
DATA **Web Design and Development** **Course #12138**	Senior	5 5	This course provides students with historical background, varied programming skills, design elements, and current technological practices that will be used to develop professional Web pages. Students will use the Internet to research Web pages and various works of art, which are created via electronic media. In addition, HTML/Java programming language and graphic enhancing software will be combined with artistic layout and design methods to create both functional and aesthetically pleasing Web pages for use on the Internet. **Adopted curricular materials:** *Microsoft Front Page 98,* Course Technology

Design and Technology Academy (DATA) (continued)

Course	Class Restrictions	Credits	Description
DATA **Exploring Technology** **Course #12350**	None	5 5	This course provides students with the chance to explore CADD/CAMM/CNC milling and lathe, aerodynamics, TV/Video production, small engine assembly, transportation, plastics, pneumatics, electronics, biotechnology, research and design, robotics, woodworking, and more. Students have an opportunity to examine many different modern technologies, as well as careers associated with them. Exploring Technology 9 must be completed before enrollment in Exploring Technology 10. Students must pass a safety test in the first five days to remain enrolled. No new enrollment will be permitted after the first five days of class. Course may be repeated for credit. *Prerequisite(s): Grade of C or better in Exploring Technology A to be enrolled in Exploring Technology B.* **Adopted curricular materials:** *Technology Today & Tomorrow,* Glencoe
DATA **Computer Aided Design/Drafting (CADD)** **Course #12100**	Junior	10	This course provides resources for an introductory course in design drafting with the use of Autodesk design and drafting software. The course reviews design principles with an emphasis on mechanical drafting, fundamentals in geometric construction, multi-view projections, basic dimensioning, and text. The course also reviews file management, the Cartesian coordinate system, drawing setup, drawing aids, layer usage, editing objects, and arrays. Students will complete a series of drawings on the computer to demonstrate understanding of the concepts presented. The course covers both 2D and 3D drawing concepts. The culminating project of the course is the design drawing of a multi-component solid model that includes an assembly drawing, detail component drawings, and an exploded view drawing with a bill of material. Seniors enrolling in CADD may request math credit for the course. Students will be eligible to apply to CSUS through the ACE Program for transferable engineering credit. **Adopted curricular materials**: *Applying Auto-Cad*, Glencoe
DATA **Environmental Architecture** **Course # 16115**	Senior	10	This course introduces students to architectural design and drafting with an emphasis on the environmental aspects residential communities have on the environment. The student will incorporate content knowledge from their academy Ecology course into the architectural design process to develop architectural drawings of a passive solar home. Architectural design topics such floor plans, plot plans, site plans, schedules, electrical plans, plumbing plans, room planning, elevations, building and wall sections, wall and ceiling construction, footing and foundations, roof designs, doors and windows, stairs, fireplaces and chimneys, perspective and presentation drawings, as well as ancillary and passive heating and cooling systems, passive solar design, the solar slab, climate control systems, xeriscape landscaping and topography, and energy efficient appliances are incorporated into the design process. This course is designed to prepare motivated students who plan on majoring in related fields of architecture and architectural engineering. Seniors enrolling in Environmental Architecture may request math credit for the course. *Prerequisite(s): Computer Aided Design/Drafting (CADD) or Instructor's approval* **Adopted curricular materials:** *Residential Design Using Revit Architecture 2009,* SDC

Design and Technology Academy (DATA) (continued)

Course	Class Restrictions	Credits	Description
DATA Engineering A **Course #12340**	Junior Senior	10	This course is designed for students to engage in various hands-on activities to explore the nature of assorted engineering fields. During this exploration, students will gain insight into the educational requirements of the engineering profession, required skills for most engineers, and the roles and functions of engineers. In addition, through challenging and enjoyable projects, students will learn Newton's Laws of Motion, the cornerstone of engineering. Other problem-solving projects will focus on mechanical engineering, electronic engineering, structural engineering, and electrical engineering. While utilizing the engineering design process, students will design, develop, model, and test an engineering solution based on given criteria. Students at Monterey Trail High School will be eligible to apply to CSUS through the ACE Program for transferable engineering credit. *Prerequisite(s): Exploring Technology or instructor approval.* **Adopted curricular materials:** No textbook assigned.
DATA Ecology **"a-g"/ "g" approved** **NCAA approved** **Course #4630**	Junior Senior	10	This course is designed to give first-hand laboratory experience in observing and working with organisms in their environment. Students must be willing and able to work in a hands-on setting. Class topics will include studies of food webs and food energy, plant and animal populations, communities and ecosystems, as well as studies in human ecology. Students will also learn about the ecology of the Sacramento area. Students will be expected to complete individual projects and long-term assignments. Homework consists of reading, lab reports, term papers, and a research project. Students will be exposed to the FFA, supervised occupational experience programs, and careers in Agriculture Business. This course meets the life science requirement for graduation. *Prerequisite(s): Biology with a grade of C or better.* **Adopted curricular materials:** *Environmental Science,* McGraw-Hill

Related electives that a student in the DATA Academy might take include:

- **Engineering B** (Students majoring in the Engineering strand who passed Engineering A in their Junior year with a" C" or better are recommended to take Engineering B. However, this course is not an academy graduation requirement.)

For a description of academic courses and the elective identified above, see Section 1. Please contact the school should you need further information.