

Center for Advanced Research and Technology (CART)

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Biomedicine

Students explore issues in medical science and human anatomy and physiology through their involvement in dissections, medical case studies, and research projects. Students investigate how a healthy body functions and how it reacts to disease. Students will practice hands-on medical skills including first aid, CPR, suturing, IV placement and triage.

Required prerequisites: "C" or better in Biology, Chemistry, Algebra 1 and English; 2.5 GPA.

Students take:

- English (H)
- Clinical Anatomy & Physiology (P)
- Adv Topics in Medicine (P) (2 Periods)

Biotechnology ROP

Students explore biotechnology, an exploding science field that leads to high-paying jobs in medicine, biology, chemistry, agriculture, and environmental science. Students apply DNA technology to genetically engineer bacteria, solve medical mysteries, clone tissues, diagnose genetic disease, and explore drug development and testing. Students wrestle with difficult ethical issues that arise as a result of using biotechnology to solve problems. **Recommended prerequisites: "C" or better in English, Algebra 1 and Biology.**

Students take:

- English (H)
- Chemistry (P) or Adv Science

Topics (P)

- Biotechnology Accelerated &
Research (P) (2 Periods)

Business and Finance ROP

The Business and Finance Lab equips students with the financial literacy required to make educated decisions in life. In addition to learning how to manage, invest, budget and earn money; students investigate what it takes to create and own a business. Students work together to navigate the stock market as well as learning the ins and outs of operating their own food truck. Students digitalize their financial decisions through the lens of several professional platforms. Students learn transferable financial skills that they can use to succeed in any economy. **(1)**

Students take:

- English (H)
- US History (P) or Government (P)
- Money and Banking (P)

(2 Periods)

Digital Media and Graphic Design ROP

Students develop skills in communication and message design including color, typography and design principles. They investigate graphic and web techniques in cooperative teams similar to corporate settings. Design students will work on all stages of production using industry-standard software (i.e. Adobe CC) to create original products such as logos, posters, advertisements, websites and two-dimensional animation. **(1)**

Students take:

- English (H)
- Digital Media and Graphic Design (P)

(2 Periods)

- Applied Design For Technology (P)

Digital Marketing, and Entrepreneurship ROP

Students explore how companies, such as Apple, Starbucks, and Nike develop their branding through product development, pricing strategies, promotional campaigns and global product placement. Students develop their own product brands and promotional campaigns, including online advertising, social media, mobile and digital marketing. Students learn industry-standard technology for conducting market research and creating successful online companies and experience real-world learning through internships with non-profit organizations, media companies and advertising agencies. **(1)**

Students take:

- English (H)
- US History (P) or Government (P)
- Economics of Marketing (P) (2 Periods)

Digital Video Production and Broadcast ROP

Students develop skills in television and film production. Using industry-standard software packages (i.e. Adobe CC), students will engage in hands-on, integrated curriculum. They work on all stages of production while creating products such as short films, advertisements, journalism broadcasts, and documentaries. All multimedia students develop skills in the content and presentation of message design, the sociological impacts of media, and the stages of the production cycle. **(1)**

Students take:

- English (H)

- Digital Video Production and

Broadcasting (P) (2 Periods)

- Applied Design For Technology (P)

Engineering, Manufacturing and Robotics ROP

Creativity, knowledge, and skill are used to develop solutions to real-world mechanical engineering problems. Students will work as individuals and in small teams to design, test, and evaluate working prototypes of potential solutions. Using a variety of engineering tools, skills, and practices including cutting-edge CAD and CAM solutions, CNC Machines, 3D Printers, and Laser Cutters, students will engineer design solutions. All students also learn basic electronics, microcontrollers, and computer programming while learning to design, build, and program robotic and automation devices.

Students take:

- English (H)
- Physics and Technology (P)
- Product Development (P) (2 Periods)

Environmental Science and Field Research ROP

Students explore the San Joaquin Valley, San Joaquin River, Pacific Coast, and the Sierra Nevada Mountains. Students will carry out hands-on projects relating to careers in marine biology, wildlife rehabilitation, air quality, river ecology, alternative energy, and forests. Students have the opportunity to work with environmental professionals and government agencies to complete scientific projects. Some examples are growing native plants, restoring native wildlife habitats, rehabilitating injured and orphaned wildlife, monitoring forests, wetlands and conducting studies of tide pools and beaches. **(1)**

Students take:

- English (H)
- Wildlife Zoology (P)
- Environmental Research and Technology (P) (2 Periods)

Forensic Research and Biotechnology

Students explore how to process crime scenes using a variety of different scientific techniques. They participate in several interactive physical evidence simulations which include topics such as DNA/ biotechnology, fingerprinting, ballistics, and accident reconstruction. Students will also investigate the criminal mind by applying forensic profiling classifications to real case studies. **Recommended prerequisites: "C" or better in Biology, Algebra I and English.**

Students take:

- English (H)
- Physical Forensic Science (P)

- Forensic Research and

Biotechnology (P) (2 Periods)

Interactive Game Design ROP

*Primarily for returning CART seniors or by special permission of the instructor

Students will craft both 2D and 3D objects, integrating them into immersive video games. Students will explore object-oriented programming, 3D modeling, rigging, and animation. Students create 2D animated sprites powered by the GDevelop Game Engine and then advance to 3D modeling, honing their skills with the industry-standard Blender 3D software and the Unreal Game Engine. All students will also sharpen their abilities in presentation and written communication and acquire valuable insights into the inner workings of the gaming industry. **Prerequisite(s): Database, Graphics, Programming, or Web Design.**

Students take:

- English (H)
- Interactive Game Design (P) (2 Periods)
- Applied Design For Technology (P)

Law and Order and Policy

Students study the major aspects of constitutional, criminal, and civil law. Projects teach students about their individual rights, criminal procedure, how laws are made, and how to make a legal argument. Students learn how to research and discuss current and historical controversial issues relating to the law. All students have the opportunity to participate in mock trials and field trips to local and federal courthouses and law firms.

Students take:

- English (H)
 - Government and Economics (P)
 - Law and Order and Public Policy (P)
- (2 Periods)

Psychology and Human Behavior

Students investigate the inner workings of the human mind using principles found in psychology and neuroscience. Through research, students consider the factors that influence, control, change, and modify behavior. Students explore the world of psychology through labs, multiple hands-on activities, and projects. Projects include working in teams to create illusions that investigate how the brain constructs a person's perception of reality. In addition, students build on existing research by designing and conducting experiments based off studies found in academic journals. **(2)**

Students take:

- English (H)
- Neuroscience (P)
- Psychology of Human Behavior (P)

(2 Periods)

User EXperience (UX) Design ROP

Students will learn the User Experience (UX) Design process of empathizing with users, defining the problem, ideating solutions, designing wireframes and prototypes, and testing solutions. Throughout the course of the year, students will create 3 different apps, develop a robust online portfolio showcasing those apps, and have the opportunity to earn their Google certification in UX Design.

Students take:

- English (H)
- User Experience Design (P) (2 Periods)
- Applied Design For Technology (P)

Web Application Development ROP

From smartphones and video games to music, medicine, and more, computer science touches everything we do. Students will discover how the Internet works, dig into cryptography, and build their own apps. They will be introduced to the broader field of Computer Science while becoming certified to design, develop, and deploy web apps using developer tools such as CSS, HTML, JavaScript and SQL. Students apply the concepts of object-oriented programming, scripting, and user-interface design to ensure that end-users have a positive experience and keep returning to their applications. **(2)**

Students take:

- English (H)
- Applications Programing (P) (2 Periods)
- Applied Design For Technology (P)

College Credit

- (1) Qualified students may earn college course credit through **CSU Fresno**.
- (2) Qualified students may earn college course credit through **Clovis Community College**.