

# The History of and Legislative Basis for Troy Tech

## “A Nation At Risk”

At the outset of his presidency, Ronald Regan commissioned a group of legislators and educators to conduct a comprehensive study that would define the state of education in the United States. After eighteen months, the commission presented its findings in the seminal report, “A Nation At Risk.” Even today, the title echoes the deteriorated state of the country’s educational system in the early 1980’s and the urgency required to correct it.

The unsettling report described a nation that was already far into a state of crisis. The commissioners warned that risk was upon America when she could hardly afford it—at the dawn of the age of information and technology. The two decades that followed this report have only affirmed and confirmed the commissioners’ description of the rising demands of this new era:

- Computers and computer-controlled equipment are penetrating every aspect of our lives—homes, factories, and offices.
- One estimate indicates that by the turn of the century millions of jobs will involve laser technology and robotics.
- Technology is radically transforming a host of other occupations. They include health care, medical science, energy production, food processing, construction, and the building, repair, and maintenance of sophisticated scientific, educational, military, and industrial equipment.

The commissioners noted that in the face of such demands the country’s educational foundations were being “eroded by a rising tide of mediocrity.” They asserted that America’s “once unchallenged preeminence in commerce, industry, science, and technological innovation [was] being overtaken by competitors throughout the world.” They furthermore warned that by allowing other nations to take America’s place at the forefront of the international community, Americans were committing “an act of unthinking, unilateral educational disarmament.”

To support their findings, the commissioners quoted a timely and thorough national survey of student achievement conducted by educational researcher Paul Hurd, who asserted that “[we] are raising a new generation of Americans that is scientifically and technologically illiterate.” John Slaughter, the former Director of the National Science Foundation, echoed Hurd’s opinion. Slaughter stated that there was a “growing chasm between a small scientific and technological elite and a citizenry ill-informed, indeed uninformed, on issues with a science component.” In short, the educational community was responding to the critical need for experts in science, mathematics and technology with complacency and mediocrity.

“A Nation at Risk” called America to come to immediate attention. It challenged the individual states to strengthen the educational content being taught in schools, to raise the expectations and standards for teachers and students alike, to increase the time students spend in school and outside of school on school-related work, and to improve the

preparation of teachers. Once our nation's strength, the educational foundation of America could no longer be eroded by the insufficient educational product of America's schools.

### **California Responds to the Crisis: The Hughes-Hart Educational Reform Act of 1983**

The 1983 national call for an improved educational system piqued the interest and concern of California's lawmakers, who responded to the crisis by ratifying Senate Bill 813, the Hughes-Hart Educational Reform Act of 1983, the most aggressive and comprehensive educational legislation in the history of California. It provided \$800 million to public educational institutions to implement dramatic, substantive, and long-lasting reforms in the structure and content of education. Included in the possible reformative programs that the legislature proposed were Specialized Secondary Programs in fine arts and technology, areas that could capitalize on California's interest in and focus on these industries. The California Department of Education mailed the Program Advisory on Specialized Secondary Programs to schools on September 25, 1985, inviting them to apply for start-up and continuation funding for a period of three years, after which programs were expected to be self-sustaining.

**Still today, Educational Code 58800 provides the legal justification for such specialized programs ([www.leginfo.ca.gov](http://www.leginfo.ca.gov)).**

### **Troy High School Responds to the Call: The Troy Tech Program**

Even in the early 1980's, educational innovation was not uncommon to Fullerton, which prided itself in a long history of excellence in education. For example, it was home to Fullerton Junior College, California's first two-year college, and California State University, Fullerton, the site of one of the most prestigious teacher-training programs in the state. Both schools were commuter schools, drawing thousands of students from several Southern California counties to Fullerton. Moreover, Fullerton's six comprehensive high schools and one continuation high school were also serving students from several communities: Fullerton itself, as well the neighboring communities of Buena Park, La Habra, Placentia, Yorba Linda, and Whittier. The Specialized Secondary Program legislation appealed immediately to Fullerton's administrators and Troy's teachers alike, who saw the opportunity to implement an innovative magnet program in high technology for students living in the Fullerton Joint High School District and beyond. Troy was in the singular position to offer its students unique study and research opportunities at California State University, Fullerton, which is located immediately adjacent to the school.

The timing of the legislation and the selection of Troy as the magnet site could not have been better. Already, a small, visionary group of teachers who had sensed the changing winds of education had begun work on a technology-based program for Troy. To this end, they had secured a three-year grant to fund the training of teachers in technology and computer-assisted instruction; the funds had been made available through Assembly

Bill 551. The training program was in its second year when the State Department of Education passed the Specialized Secondary Programs Legislation. Troy embraced the legislation and turned to implementing the next logical step in its evolution: teaching Troy's students a technologically enriched curriculum.

In its original proposal, Troy sought to establish a magnet program, and specifically, a center for advanced technological studies that would be known as Troy Tech. The program was to provide high technology training to talented students in grades 9 through 12 in two major strands: (1) a math/science/engineering strand that would allow students to concentrate on math/advanced sciences or computer science/engineering, or (2) an applied high technology strand that would allow students to concentrate on a number of technological fields. Furthermore, Troy Tech would bring Troy into partnership with local businesses, colleges, and universities. The program had the enthusiastic support of Beckman Instruments, Chevron Oil Research, Hughes Aircraft, Beatrice Companies, Johnson Controls, and California State University, Fullerton.

To underscore the program's consistency with the legislative intent of SB 813, Troy Tech would "provide high technology training to eligible students in the district and other nearby districts," an educational ideal that the State sanctioned and that Troy upholds to this day.

The original proposal was granted by the California Department of Education in 1985, and Troy continued to receive the maximum funding from the state for the following two years. After receiving the initial three years of grant monies, Troy Tech became completely self-sustaining.

### **Troy Tech Today: A Dynamic Program**

In its twenty-year history, Troy Tech has experienced continual and considerable growth and development in response to the changing needs of society. Troy Tech is not the Digital High School Program Grant that many schools have used to upgrade their school's hardware, although Troy has made use of such monies also. It is not a computer repair program; it is not a series of ROP classes. Furthermore, Troy Tech satisfies more than just local standards established by a single school or an isolated district. Troy Tech classes are academic in nature, and, in fact, the majority of classes, beginning with the freshman-year courses are approved by the University of California. Modifications in the program are made at the recommendation of a team of teachers, industry mentors, and leading professors in colleges and universities across the state and nation. Because Troy High School has continued to focus on the high educational ideals expressed in "A Nation at Risk," the Troy Tech Program has exceeded the minimal requirements established by Ed. Code 58800 for a Specialized Secondary Program each year since its founding.

Today, the structure and content of the Troy Tech Program reflect the highest educational ideals of two decades of educators and lawmakers.

## **Time Invested in Education**

The increased time allotted to the educational day and year and called for in “A Nation at Risk” is evident in several ways:

- In their four years at Troy, all Troy Tech students take four to six years of science classes and four to five years of mathematics classes. These subjects have been structured to provide the foundation for the program’s technical studies.
- California State University, Fullerton, which is located just a block away from Troy, works in partnership with the school to provide college math and science classes to advanced students. Advanced students attend classes both at Troy and at CSUF.
- About 250 Troy Tech students are currently dual-enrolled in Troy and CSUF through the advanced mathematics program offered on Troy’s campus.
- Troy Tech students take classes in a seven-period day—Troy Tech English, math, science, social science, and foreign language, physical education, and a Troy Tech technical class. The seven-period day guarantees qualified Troy Tech students ample time to complete the IB Diploma.
- Advanced Troy Tech students enroll in at least three years of summer school classes to supplement or accelerate their program of study.

## **Improved and Expanded Standards and Content**

The Troy Tech Program has undoubtedly improved the educational content of Troy’s academic classes, while it has also expanded in the breadth and depth of its course offerings.

In its most simple definition, Troy Tech is a four-year, sequentially arranged program of classes culminating in a 150-hour Internship in the senior year. Students are required to take two foundational classes in the freshman year, to be enrolled in a technical class each semester thereafter, to take a Pre-Internship class in the junior year, and to complete the Internship in the senior year. Other improvements are as follows:

- The original two strands of the program have been expanded into five: Media Arts, Computer Science and Information Systems, Business and Business Systems, Engineering and Architecture, and Leadership. Each strand focuses on technology as its basis. Students are encouraged to sample among the five strands throughout their experience at Troy.

- Entering freshmen are required to take the program's two foundational classes: Computer Logic and Algorithms, an introductory class in digital electronics, and Fundamentals of Programming, an introductory class in computer programming. Troy High School computer science instructors authored both classes, which have been approved by the University of California System under Area G of the admissions qualification criteria. These courses are unique to the Troy Tech Program.
- Over 20 other technical classes are available within the five strands, the vast majority of which are UC-approved under Area G, elective credit.
- Advanced Placement courses in Computer Science A and AB and two International Baccalaureate courses, Business and Management and Design Technology, are available to sophomore and junior Troy Tech students. These offer weighted grades, college-level curricula and exams, and UC recognition and university credit.
- Computer Science AB and IB Business and Management are honors-level Pre-Internship classes for high level students.
- Students may engage in advanced computer science studies in robotics and programming languages. Troy High School computer science instructors authored both classes, which have been approved by the University of California System under Area G of the admissions qualification criteria. These courses are unique to the Troy Tech Program.
- Each strand of the Troy Tech Program offers one or more competitive teams for students to join so that they can gain local, state, national and international recognition.
- Troy Tech juniors prepare for their Senior Internship in a Pre-Internship class, which emphasizes job shadowing, resume and letter-writing, job interviewing techniques, and other business-related skills. Troy High School business instructors authored this class. It is unique to the Troy Tech curriculum.
- Troy Tech seniors complete a 150-hour Internship in a self-selected field of business or academia with an approved professional mentor. Students have completed their internships at local, national, and international sites. Students receive 10 units of high school elective credit for their Internship. This class is *not* the same experience as the 200-hour CAS project, which is required of the IB Diploma candidates. Students who are dual-enrolled as Troy Tech and IB Diploma candidates complete both projects over the course of 350 hours.

- Many Troy Tech Interns have entered their projects in prestigious contests such as the Siemens-Westinghouse Math, Science, and Technology Competition and the Intel Science Talent Search. Students have won at the regional and national levels and earned thousands of dollars for their efforts; many have been published in professional journals.
- Troy maintains a database of over 1,000 mentors who are available to work with Troy's Interns.
- Advanced Troy Tech students take their academic studies in the school's Advanced Placement and International Baccalaureate classes.
- 98 percent of Troy's IB Certificate and Diploma students are enrolled in the Troy Tech Program.
- Troy's mathematics classes are content-enriched so that from Troy's Trigonometry – Honors class, students transition directly into Math 150 A and B, then Math 250 A and B, both full-year CSUF college calculus classes *taught on Troy's campus*. Thus, students receive two full years of college calculus credit by the time they graduate from Troy. These classes are offered *in addition* to AP Calculus A and AB. Students enrolled in these classes may apply for their CSUF transcript at CSUF itself. Over 250 students this year at Troy are enrolled in the advanced mathematics program.
- Mathematics and science teachers make extensive use of technology in teaching and reinforcing concepts and conducting labs. For example, students use departmental computer notebooks and interfacing digital microscopes to perform science labs, and they use scientific calculators to learn and reinforce mathematics concepts. These tools are core to the academic courses.
- Troy Tech students are required to take technology-based English classes in the freshman and sophomore years.
- English, math, science, history, and foreign language classes make extensive use of technology for teaching; students produce technology-based reports and presentations in many of their classes.
- Troy's library is fully computerized. Freshmen use individual computer notebooks in orientation sessions.
- In each classroom throughout the school are at least three computers for student and teacher use.

- Academic and Troy Tech classes make extensive use of other forms of technology including electronic whiteboards, LCD projectors, graphing calculators, digital microscopes that interface with computers and projectors, specialized software, digital cameras, and other electronic equipment.
- Troy High School has its own server, which has considerably increased the speed and memory of the school's extensive network.
- Troy High School employs a full-time computer specialist to maintain the school's 1,000+ computers.
- The Troy Tech Program has financial support from the Fullerton Joint Union High School District, as well as The Troy Support Organization, which has secured additional grant monies from public and private endowments.
- Each semester, Troy Tech students must satisfy academic and disciplinary standards to continue in the program.
- The attrition rate of students from the Troy Tech Program the freshman to the senior year is less than one percent.
- The average gpa of the 2006 Troy Tech seniors is 3.78.
- Each year, 100 percent of Troy Tech seniors graduate from high school, and 99 percent of the Troy Tech graduates pursue postsecondary studies at prestigious colleges and universities across the state and nation.

### **Preparation of Teaching Staff**

Over 25 staff members are associated with Troy Tech Program. They are exceptionally well qualified with industry experience, higher academic degrees, and a mean teaching experience of 17 years.

- Two full-time staff members coordinate and direct the Troy Tech Program. They are supported by a full-time secretary.
- Four computer science and math teachers serve as graders for the Advanced Placement Program. Two are table leaders for national AP grading sessions in South Carolina, and two are currently AP trainers.
- The College Board has invited one of Troy's Computer Science teachers to be on the committee that authors Advanced Placement Computer Science exams.

- Two members of the Computer Science Department have co-authored manuals for the Advanced Placement Program.
- Nine internship advisors monitor student interns during the summer Internship Program. Senior interns numbered over 300 in the 2005 summer session. They performed internships in five countries and more than 50 cities across five states.
- The Troy Tech Program enjoys the support of every academic department on campus. Internship Advisors are a part of the English, Math, Science, Social Science, Fine Arts, and Computer Science departments.
- Several of Troy's teachers also serve on the teaching staffs of Fullerton Community College and California State University, Fullerton.
- Many Troy Tech teachers are valuable mentor teachers in the CSUF Teacher Education Program.
- Each year, teachers attend Advanced Placement and International Baccalaureate training sessions.
- Troy's Counseling Department supports Troy Tech students with three full-time counselors and two full-time guidance technicians.
- Program directors and counselors host numerous informational meetings each year to answer parents' and students' questions about course offerings, college and university applications and requirements, as well as other important topics and issues.
- Troy Tech teachers supplement their classroom instruction with visiting industry mentors.

### **Community Outreaches**

Troy Tech Program directors, counselors, teachers, internship advisors, department chairpersons, and administrators host and participate in many community-based events each year to improve college and university connections, industry relations, feeder junior- and middle-school transitions, and the general public's understanding of the Troy Tech Program:

- Senior Interns participate in two major events each year: the Troy Tech Mentor Breakfast, a fall event for senior Interns and their mentors, and the Troy Tech Fair, a spring event for senior Interns to showcase their projects for district administrators, teachers, and students; for mentors; for



community leaders in academia, business, civic and political life; for incoming freshmen and their families; for the media; and for other interested members of the community.

- Internship Advisors visit every California-based mentor and intern each year at the internship site. Advisors maintain close contact with mentors who are beyond reasonable driving distance by way of email, telephone, and fax.
- Monthly tours of the Troy Tech Program are offered each year in the fall semester. Each tour is attended by as many as 20 families.
- Each year a program director visits over 30 middle and junior high schools in four counties to inform students about the program.
- The Troy Tech Program is advertised on local radio stations, in local newspapers and magazines, and on the Internet. Troy distributes 2,500 information packets each year. The packets are also available on the school's website.
- Two major informational meetings are held in January for interested students and their families.
- Three testing dates are offered each January. Qualified current eighth graders are eligible to test for and enter the four-year program.
- Each year, department leaders meet with district feeder school teachers to ease the transition of incoming students.
- A 24-hour website is available to interested parties at [www.troyhigh.com](http://www.troyhigh.com)
- Lectures and homework assignments are posted on Troy's website for current students.

### **Recognition**

- Twice, the College Board has named the Troy Tech Computer Science Program as the number one program (of its size) *in the world* (AP Report to the Nation, 2005 and 2006)
- The Troy Tech Program has received the coveted Golden Bell Award from the California School Board Association. The Golden Bell Awards Program promotes excellence in education by recognizing outstanding programs in school districts and county offices of education throughout California. Golden Bell Awards reflect the depth and breadth of education programs necessary to address students' changing needs.

- In April 2005, Troy High School was again named a California Distinguished High School.
- Troy High School is a National Blue Ribbon School of Excellence and a New American High School National Showcase Site.
- Troy High School has twice named by *Newsweek* in its 100 Best High Schools in America list (2005, 2006).

For a complete list of Troy's awards and distinctions, please see the Troy Tech Booklet, which is available on Troy's web site, [www.troyhigh.com](http://www.troyhigh.com).

### **Choice: The Strength of Troy Tech**

At the core of Troy Tech's structure is public choice. Students apply to the program because they have a particular interest in technical studies; they *want* to attend. Their motivation to come and succeed has been the driving force behind the improved educational product offered by Troy Tech.

Today, students from four counties and over 100 public and private junior and middle schools participate in the program.