circuits, and systems; the design and characterization of electronic communication and electromagnetic systems; the development and application of computers; and the automation and control of industrial processes and man-machine interactions.

Electrical engineers design and develop electronic circuits, equipment, and systems in the areas of *electromagnetics* (antennas; radar, radio, and television systems), *communications and control* (telephone systems; satellite communications; aircraft and missile guidance systems), *computer sciences* (computers; automated manufacturing; robots; artificial intelligence), *physical electronics and optics* (transistors; integrated circuits; optical display devices; lasers), *power systems and energy conversion* (hydro, thermal, nuclear, solar electric power generation; analysis and synthesis of power transmission and distribution systems; on-line power control and dispatch centers), and *bioelectronics* (sensory aids for the physically handicapped; biomedical instruments for clinical applications).

Industrial Engineering. Industrial engineering is concerned with the design, improvement, and installation of integrated systems of people, materials, equipment, and energy. It draws upon specialized knowledge and skill in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design to specify, predict, and evaluate the results to be obtained from such systems.

Industrial engineers give valuable service to management in decision making relative to the most efficient utilization of people, materials, equipment, and energy. Industrial engineers are a prime source of management talent and therefore are in demand by a wide variety of organizations, even those not usually regarded as "industrial."

Mechanical Engineering. Mechanical engineering deals with engineering problems relating to the generation, transmission, and utilization of energy in the thermal or mechanical form. It is concerned also with engineering problems related to the production of tools, machinery, and their products and to heating, ventilation, refrigeration, and plumbing in their research, design, production, operation, organization, and economic aspects.

Mechanical engineers are concerned with propulsion systems; cryogenics; environmental systems for control of humidity, temperature, and air cleanliness; transportation equipment including land, water, and space vehicles and mechanical, pneumatic, and hydraulic conveyor systems; power components including engines, turbines, rockets, jets, and fuel cells; and machinery such as pumps, fans, compressors, blowers, valves, and material handling and processing equipment including machine tools and food processing equipment.

SURVEYING AND PHOTOGRAMMETRY

This program prepares specialists in the science and art of making measurements necessary to determine the relative positions of points on or near the earth's surface (Surveying) and the science of making measurements from photographs (Photogrammetry).

The Surveyor/Photogrammetrist applies his knowledge for: map making, locating property boundaries, collecting data for engineers and architects to use in design of structures, making measurements for guiding construction operations, measuring the size and shape of the earth, delineating boundaries of water bodies, and accurately establishing horizontal and vertical control points for scientific and engineering works. Photogrammetry is used for a wide variety of unusual measurements such as: topology of the human body, non-destructive testing of engineering materials, determining size and volume of animals, vehicle accident investigations, structural deformations, criminology investigations, and architectural and anthropological surveys.

HIGH SCHOOL PREPARATION

Recommended preparation for engineering or surveying and photogrammetry consists of: English (4 years), algebra (2 years), geometry (1 year), trigonometry (½ year), physics or chemistry (1 year). Additional recommended courses are: advanced mathematics (½ year), chemistry or physics (1 year), mechanical drawing (½ year).

TRANSFERS

Transfers from community colleges or other institutions of higher learning are accepted under provisions outlined under *General Information—Admissions.* Students planning to transfer to the California State University, Fresno engineering or the surveying and photogrammetry programs should follow as closely as possible the outline of the program of their choice.