CREDENTIAL PROGRAM

The Industrial Arts Department has an approved waiver program for certification of subject matter competency which is a part of the requirement leading to a public school teaching credential. See the Department adviser for details.

MASTER OF ARTS DEGREE

The graduate program for the master of arts degree in industrial arts is based on the equivalent of the undergraduate major at California State University, Fresno. Twenty of the 30 units required for the degree must be in industrial arts. For specific requirements, consult department graduate adviser; for general requirements, see *School of Graduate Studies.* For detailed information about the graduate program, see the *Graduate Bulletin*, available in the Office of the School of Graduate Studies.

COURSES

INDUSTRIAL ARTS AND TECHNOLOGY (Ind A)

Note: Students may be expected to purchase supplementary materials for use in laboratory and activity classes.

101. Energy Conversion and Utilization (3)
Fundamental sources of energy, including the following energy conversion systems: direct mechanical, external combustion, internal combustion, solar power, wind power, electrical and atomic systems. Experiments and demonstrations. (field trips)

102. Industrial Process Control and Instrumentation (3)
Prerequisite: Ind A 51 or 52 or permission of instructor. Industrial process control system principles and components; computers, controllers, transducers, and actuators; mechanical and electrical instrumentation.

103. Industrial Materials and Processes (3)
Chemical and physical properties of metals, plastics, wood, ceramics, fuels, lubricants, and other industrial materials. Structural properties, wear, corrosion, destructive and nondestructive testing; fabrication applications and potentials, cutting, fusion, casting, forming, and other industrial processes.

104. Fluid Power (3)
Prerequisite: Ind A 51 or 52. Selective study of fluid power principles and applications; hydraulics, pneumatics and vacuum; includes pumps, controls, transmission systems, actuators and fluidics. In-depth study of air conditioning-heating theory and applications. (field trips)

105. General Building Construction (3)
Principles of general building construction including classes and requirements of occupancy; fire zone; type of construction; properties and uses of masonry, wood, concrete and steel; contracts and specifications.

106. Production Operations (3)
A survey of production manufacturing operations: quality assurance, work sampling, testing, time and motion study; routing, scheduling and inventory control; flow processes, material handling, and automation. (field trips)

107. Industrial Computer Concepts and Applications (3)
Not open to students with credit in Ind A 151B. Flowcharting and programming techniques; industrial and technical programming systems and support components; data base organization and systems management; and industrial and technical management. (field trips)

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