

IA 197. Energy Utilization and Instrumentation (3)

Fundamental sources of energy; energy converters using direct mechanical force, external combustion, internal combustion, and electricity as energy sources; mechanical, thermal, and electrical instrumentation for industrial process indication and control.

IA 199. Senior Problem in Industrial Technology (3)

Prerequisite: senior standing in industrial technology. Approved problem or research project in the area of the student's option.

GRADUATE COURSES

(See *Course Numbering System—Definitions and Eligibility*)

IA 224. Industrial Education Philosophy and History (2)

Evolution, development, and present status of industrial education; industrial arts education and trade and industrial education; industrial arts in general education; developing, promoting, and improving a program of instruction in industrial arts.

IA 270. Graduate Technical Problems in Industrial Arts (2-9; max total 9 if no area repeated)

Technical work in selected areas; research under supervision of instructor.

IA 280. Problems in Industrial Arts Research (2)

Seminar in research procedures in the industrial arts; basic bibliography, research form and method.

IA 284. Seminar in Industrial Arts (2-6; max total 6 on master's degree if no area repeated)

Advanced study in different phases of industrial arts; recent developments and trends in the various design, drawing, and technical areas of industrial arts.

IA 285. Planning Industrial Arts Facilities (2)

Planning and organizing various types of school shops; architectural considerations, selection and specifications of equipment. Field trips.

IA 286. Safety and Related Problems (2)

Research and study of safety problems in industrial education; planning and evaluation of specific safety programs.

IA 287. Planning and Organizing Industrial Arts Curriculum (2)

Modern industrial arts curriculum; organization and management; recent trends concerned with equipment, supplies, content, safety, and methods.

IA 288. Administration and Supervision of Industrial Arts (2)

Policies and procedures in administration and supervision of industrial arts.

IA 290. Independent Study (1-3; max see reference)

See *Regulations and Procedures—Independent Study*.

IA 299. Thesis or Project (2-4; max total 4)

Prerequisite: see *Master's Degrees—Thesis Requirement*. Preparation, completion, and submission of an acceptable thesis or project for the master's degree.

IN-SERVICE COURSES

Note: In-service courses (300 series) are not intended for use on degrees except by special, prior approval. See Extension and Summer Session Bulletins for course descriptions.

IA 341. Problems in Industrial Arts (2; max 6 if no area repeated)