STATE UNIVERSITY OF NEW YORK

The State University of New York was established by the State Legislature in 1948. It comprises 47 colleges. Twenty-eight of them are State colleges and 19 are locally-sponsored community colleges. Although separated geographically, all are united in the purpose to improve and extend opportunities for youth to continue their education after high school.

State University offers cultural and professional four-year programs in liberal arts; science, mathematics, and engineering; home economics; industrial and labor relations; veterinary medicine; ceramics; agriculture; forestry; maritime service; medicine; and teacher preparation, as well as two-year programs in a wide variety of fields, including technical courses in agricultural, industrial, health, and service areas. Several of its colleges offer graduate programs.

Governed by a Board of Trustees appointed by the Governor, State University of New York plans for the total development of State-supported higher education. Each college of State University is locally administered. Students should write directly to the institution in which they are interested for admission forms.

Although State University of New York is one of the largest state universities in the country, its students have the additional advantages of attending relatively small colleges.

The State University motto is: “Let Each Become All He Is Capable of Being.”
Curriculums in Agriculture and Ornamental Horticulture

Agricultural Production Technology with majors in:
- Agronomy
- Animal Science
- Poultry Science

Agricultural Service Technology with majors in:
- Agricultural Equipment
- Dairy Industry
- Frozen Foods

Ornamental Horticulture with majors in:
- Biological Technology
- Floriculture
- Landscape
- Nursery

Curriculums in Industrial Fields

Air Conditioning, Heating and Refrigerating Technology
Aircraft Operations Technology
Chemical Technology
Construction Technology with majors in:
- Building Construction
- Highway and Bridge Construction
Electrical Technology
Industrial Instrumentation Technology
Mechanical Power Technology
Mechanical Technology
Photographic Equipment Technology

Curriculums in Business and Professional Fields

Advertising Art and Design
Business Technology with majors in:
- Technical Administrative Assistant
- Technical Secretary, Advertising
- Technical Secretary, Industry
Dental Hygiene

Course Descriptions

The course descriptions are arranged in an alphabetical-numerical order according to the code symbols which precede the names of the courses. The symbols identify or relate to the departments or instructional areas in which the courses are taught.

A1 DESIGN I. Four credit hours.
The elements and principles of design with application to advertising.

A2 DESIGN II. Three credit hours.
Complete color anatomy: hue, value, intensity, harmonies, simultaneous contrast, psychology, color perspective, laws of area. The student selects and applies color schemes to advertising problems.

A3 DESIGN III. Three credit hours.
The principles of design and pictorial composition applied to modern advertising. Layouts, including roughs and comprehensives, in various media for newspaper and magazine advertising.

A4 DESIGN IV. Three credit hours.
All phases of magazine layout, with applications of the principles of design and the language of vision.

A5 DESIGN V. Three credit hours.
The designing of posters and book jackets, and the preparation of spot illustrations for newspaper, magazine, and direct mail use.

A6 FREEHAND DRAWING. Three credit hours.
The technique and use of pencil drawing in commercial art. Freehand perspective drawing, using rectangular and circular objects as models. Problems in pen and ink rendering.

A7 ART APPRECIATION. One credit hour.
The visual arts as well as the dance and music throughout history with emphasis on their effects upon one another and the culture.

A8 ART APPRECIATION. One credit hour.
The important historic and contemporary artists whose paintings have influenced styles and trends in current advertising art. A brief biographical survey is made of each.

A9 FASHION ILLUSTRATION I. Two credit hours.
Fashion illustration, related to the fashion industry. Drawings for line reproduction.

A10 TECHNICAL ILLUSTRATION. Two credit hours.
Advanced isometric and dimetric drawing on such problems as gears and other machine parts.
A11  FASHION ILLUSTRATION II.  Two credit hours.
Contemporary styles in techniques; costumes and drawings for half-tone reproduction.

A12  LETTERING I.  Three credit hours.
The evolution and variations of the Roman alphabet, and the modern styles used in current advertising.  The technique of lettering for reproduction; good letter form and spacing.

A13  FIGURE DRAWING I.  Four credit hours.
Anatomy as related to the basic structure and ideal proportions of the human figure.  The broad masses of the figure in action, perspective, and tones of light and shadow are analyzed and drawn.

A14  FIGURE DRAWING II.  Four credit hours.
The construction of the human figure, based upon the expression of three dimensional form by means of planes.  Tone drawings demonstrating the principles of light and shadow are developed in advertising projects.  Action poses and figure compositions.

A15  AIRBRUSH RENDERING.  Four credit hours.
The care and use of the airbrush and the techniques of airbrush rendering; the shading of objects and backgrounds of various shapes and textures.

A16  DISPLAY LETTERING.  Two credit hours.
The use of lettering tools and the construction of show card alphabets.  Application of color and modern design, and the reproduction of show cards by the silk screen process.

A17  ADVERTISING PRODUCTION I.  Three credit hours.
The various reproduction processes used in the graphic arts.  Color separation drawings for line and half-tone engraving.  Visits to photo-engraving, printing, lithographing, and rotogravure plants.

A18  PHOTO RETOUCHING.  Three credit hours.
Practice in the use of the airbrush.  Retouching of black and white photographs for reproduction.  Mechanical and pictorial subjects.

A19  ADVERTISING ILLUSTRATION I.  Five credit hours.
Using the clothed figure, a style sense is developed.  Analysis of the structure and textures of contemporary costume.  Illustrations are prepared for advertising use.

A20  ADVERTISING ILLUSTRATION II.  Five credit hours.
Interpretation of the elegance, poise, and dignity of the smartly clothed figure.  Sketching from the model, figure composition and background are stressed.  Merchandising illustrations for halftone reproduction are rendered in various media including the Kromo-lite method.

A21  THE ADVERTISING BUSINESS.  Two credit hours.
A survey of modern methods and trends in advertising, as they affect the commercial artist.  An analysis of advertising campaigns; the influence of package design, prices, trade marks, and other factors.

A22  PHOTOGRAPHIC PROCESSES.  Two credit hours.
The use of photographs in advertising, the making of pictures suitable for reproduction by various printing methods, and the production of plates for silk screen and offset lithography.

A23  TECHNICAL ILLUSTRATION.  Three credit hours.
The drawing of mechanical and technical subjects for catalog or handbook illustration; orthographic projection, isometric drawing, mechanical perspective, and airbrush rendering.

A24  ADVERTISING ILLUSTRATION III.  Three credit hours.
Water color techniques and the rendering of illustrations, including figures, for four-color process reproduction.  Students do completed drawings for portfolios.

A25  CARTOONING.  Three credit hours.
The different methods and techniques used in caricature and cartooning.  A survey of the use of cartoons for illustration and advertising.  Problems in characterization, especially in strip, political, advertising, and sports cartoons.

A26  TRADE INFORMATION.  Two credit hours.
Finding employment.  Studies of local conditions in advertising art, methods of entering the profession, and qualifications for advancement.  Wages, hours, prices, and duties of personnel.  Demonstrations in salesmanship.

A27  GRAPHIC ARTS I.  Two credit hours.
An introduction to letterpress printing; setting type; the use of the proofing press.

A28  ART REPRESENTATION.  Two credit hours.
Freehand drawing.  Rendering in various media such as pencil, pen and ink, and wash.  The principles of light and shade; problems in angular and parallel perspective.

A29  ADVANCED REPRESENTATION AND DESIGN.  Two credit hours.
Freehand drawings from models or measurements.  The elements and principles of design.  The application of design to picture composition.  Black and white and color drawing.

A30  GRAPHIC ARTS II.  Two credit hours.
The use of the photo-copying camera, the making of negatives and metal plates for offset printing, and the use of photography for silk screen reproduction.

A31  LETTERING II.  Two credit hours.
The application of modern styles of lettering to advertising problems.  The drawing of modern script and Roman letters.  Finished lettering for magazine and newspaper advertisements, packages, labels, and trade marks.
A32 OIL PAINTING. Two credit hours.
The technique of oil painting. Still life, landscape, and portrait painting.

A33 PHOTOGRAPHY. Two credit hours.
The use of photography in advertising. Illustration, fashion, and industrial subjects.

A34 ADVERTISING PRODUCTION II. Five credit hours.
Preparing drawings for various methods of reproduction; practice in type setting and presswork, silk screen, and offset printing.

A35 STORY ILLUSTRATION. Two credit hours.
Story illustration for books and magazines. Using costumed models when possible and finishing drawings in various media.

A36 CERAMICS. Three credit hours.
Methods of handling clay, slip casting; the use of the potter's wheel. The design and the decoration of pottery, the application of glazes, and firing.

A38 FASHION ILLUSTRATION III. Two credit hours.
Historic costume and its relation to contemporary fashion design. Drawings for full color reproduction.

A39 GRAPHIC ARTS III. Two credit hours.
The operation of the platen press and the offset duplicating machine.

A40 PUBLICATION PRODUCTION I. Two credit hours.
The practical problems of producing publications: studio methods and procedures in following through from the sketches to the finished production.

A41 PUBLICATION PRODUCTION II. Two credit hours.
A continuation of Publication I: the problems connected with various methods of reproduction. The making and use of photostats and velox prints, the specifications of type and the estimation of costs.

A43 DESIGN VI. Three credit hours.
An advanced course in advertising design emphasizing the techniques in producing fresh crisp comprehensive sketches. Each student develops a project suitable for portfolio samples.

A44 MERCHANDISE ILLUSTRATION. Three credit hours.
The preparation of drawings of merchandise for advertising purposes. The drawing and rendering of interiors and mechanical objects in perspective. Students draw from objects, measurements, or orthographic projections.

A45 SEMINAR. Three credit hours.
A discussion of the business relationships in the Advertising Art field. How and where to apply for employment. The preparation and presentation of the portfolio.

A46 ADVANCED FIELD CROPS. Three credit hours.
Cropping systems related to soils, types of farming and environmental factors. Pasture improvement programs. Proper balance of livestock and other enterprises with pastures and fertility programs. Federal conservation programs in relation to fertility maintenance and proper land use. Analyzing conditions on farms and planning for more efficiency in farm operations.

Ag2 AGRICULTURAL ECONOMICS. Two credit hours.
Basic principles and relationships of our economic system, price concepts, nature of modern farming, marketing principles, agricultural credit, agricultural cooperatives, trade barriers and the farmer, governmental price policies and programs. The fundamentals of economics and marketing in relation to Agriculture.

Ag3 ANIMAL BREEDING. Two credit hours.
The basic principles of breeding. Artificial insemination, conversion factors, sire indices, and pedigrees.

Ag4 ANIMAL NUTRITION. Four credit hours.
The proper nutrition of all farm animals. The chemical composition of plants as sources of nutrition, digestion trials, carbohydrates, proteins, fats, vitamins and minerals, computing rations, commercial and home mixed feeds.

Ag5 ANIMAL PHYSIOLOGY AND DISEASE PREVENTION.
Three credit hours.
Anatomy and physiology as a background for disease control and treatment. The normal function of the various organs and systems of the body. Symptoms, causes, and preventive treatment of common ailments of animals.

Ag6 LIVESTOCK AND POULTRY LABORATORY. Two credit hours.
During the First Year, students in Agricultural Production Technology are assigned on alternating schedules to the care of livestock. Opportunity is afforded for acquiring experience and skills in working with farm animals. Students must attain minimum standards of proficiency, which may be gained in a minimum of ten weeks, but may take longer for some.

Students in Agricultural Service Technology will have special assignments according to the needs of their various fields of specialization.

Ag7 BEEF CATTLE MANAGEMENT. Three credit hours.
The place of beef cattle in New York State. Characteristics of the major breeds; selection of stock; feeding and management problems. Work with the Institute Angus herd.

Ag9 POULTRY INCUBATION, BROODING AND REARING II.
Three credit hours.
Brooding and rearing. Brooder house location; selection of practical source of chicks; construction and operation of brooding systems; costs of construction and operation; chick feeding programs; chick health; ranges and range management; housing new pullets and confinement rearing; pedigree hatching; turkey hatching and brooding.

Each student will have practice in brooding chicks and turkey poults.
Agl0 CASH CROP PRODUCTION. Three credit hours.
Specific crops grown as cash enterprises on farms in New York State. Methods of production and marketing of important seed crops and the principal canning crops.

Agl5 DAIRY BARN MANAGEMENT. Two credit hours.
Additional opportunity for practical experience in working with the Institute dairy herd. Herd management, feeding, breeding, and ailments.
Offered in 4th, 5th and 6th Quarters. Only one quarter required.

Agl6, Agl7 DAIRY CATTLE MANAGEMENT I, II.
Three credit hours each quarter.
Selection of the dairy farm, history and development of the dairy breeds, selection of stock, raising calves and young stock, selection and care of herd sires, feeding and management problems, disease control, and housing.

Agl8 DAIRY HERD RECORDS. Two credit hours.
Cost and production records for a dairy herd. Testing methods. The production figures of the Institute herd serve as practical examples.

Ag21 FARM BUTCHERING. Two credit hours.
The care, selection, handling, and slaughter of animals for the farm meat supply. Instruction and practice in butchering hogs, lambs, calves, and steers, and in meat cutting, curing and smoking, as well as sausage making.

Ag25 SOIL AND CROP MANAGEMENT. Three credit hours.
Basic principles of efficient management of soils and the growing of field crops. Care and cultivation of the soil, fertilization, and special practices in building and conserving soil fertility. Crops common to the Northeast; growth characteristics and environmental requirements. Cultural practices, including land fitting, choice of crops, rotations, and harvesting methods.

Ag26 POULTRY BUSINESS MANAGEMENT. Three credit hours.
Techniques and problems of specialization in the poultry industry, including: automation, vertical and horizontal integration, materials handling, manpower efficiency, work sampling techniques, production control and schedules, output contracts, overhead, and competition from within and without the poultry industry.

Ag32 FIELD CROP PRODUCTION. Three credit hours.
The field crops generally grown in the Northeast; their requirements related to conditions of soil and climate. Crop management for the general farm: selection of varieties and securing of seed; cultural practices and control of pests and weeds; harvest and storage.

Ag33 GENETICS. Two credit hours.
The principles of inheritance in plants and animals. The biological implications of genetics, in terms of the interplay of the effects of hereditary units with environment, as a foundation for applied genetics.

Ag34 FRUIT PRODUCTION I. Three credit hours.
The principles of growing the tree and small fruits commonly cultivated in New York State. Selection of plants, cultural practices in growing the crop to maturity, control of insects and diseases, and harvesting.

Ag36 POULTRY INCUBATION, BROODING AND REARING I.
Three credit hours.
 Hatchery operation and management. Trends in hatchery location, size, and numbers; efficient hatchery plant layout; hatchling egg supply; chick grading and delivery; customer adjustments; organization and management of plant personnel; the advertising budget; and chick selling programs; the beginning problems of brooding and rearing.
Students will operate several makes of incubators.

Ag37 FRUIT AND VEGETABLE CULTURE. Two credit hours.
Principles of fruit and vegetable culture.

Ag40 LIVESTOCK JUDGING. One credit hour.
Recognizing desirable characteristics and judging quality in dairy cattle.

Ag41 POULTRY AND EGG GRADING AND INSPECTION.
Three credit hours.
Federal, and various State grading and inspection laws. Techniques of grading and inspection. Prices, market reports, consumer surveys and quality control.

Ag42 MARKETING FARM PRODUCTS. Two credit hours.
The principles of marketing farm products through cooperatives and other specialized distributive channels.

Ag47 POULTRY BREEDING. Four credit hours.
The history, philosophy, principles and techniques of poultry breeding. Problems of practical and economic importance to poultry breeders. Poultry breeding techniques applied to the College breeding flock.

Ag48, Ag49 POULTRY FEEDS AND FEEDING I, II.
Three credit hours each Quarter.
Proteins, fat, fiber, calories, and vitamins in poultry feed formulation. Current trends such as: increased use of amino acids, use of stabilized fat, effect of metabolizable energy on feed efficiency, trace elements, and feed medication. Problems of economical feed formulation and feed efficiency as they relate to turkeys, broilers, layers, and breeding stock; the use of home grown grains.

Ag50 POULTRY HEALTH. Four credit hours.
Building an effective barrier against poultry diseases, and insuring good health; principles of disease and parasite prevention and control.

Ag51 POULTRY HOUSING TECHNOLOGY I. Two credit hours.
Trends in poultry housing; economies of construction and efficiency of the poultry plant. Poultry farm location, farmstead planning, building orientation, footings and foundations, wall construction and insulation, windows and ventilation, floor construction, roofing materials, electrical facilities, plumbing.
Ag53 POULTRY HOUSING TECHNOLOGY II. Two credit hours.
Effective poultry housing: problems of plant efficiency and plant cost.
Selecting equipment: automatic feeders, automatic egg collectors, egg washers, egg grading equipment, and other labor saving devices for the commercial poultry farm. Floor vs. cage plant, feed rooms and bulk feed handling, egg room design, and poultry retail plants.

Ag54 POULTRY MEAT PRODUCTION. Three credit hours.
The production of the various classes of poultry meat. Poultry farm specialties, including broilers, roasters, hormonized poultry, capons, turkeys, ducks, geese, and game birds.

Ag55 POULTRY PROCESSING AND MARKETING. Three credit hours.
Efficiency and proficiency in preparing poultry meat for the consumer. Quality control in all its aspects. Merchandising techniques.

Ag57 SEMINAR IN AGRONOMY. Two credit hours.
A critical review of previous courses in soils and crops, related to specific problems. Special reports and readings.

Ag58 POULTRY SEMINAR. Two credit hours.
Further study in Poultry Science and allied areas. Consultants discuss problems brought up by the group. Each student selects a problem for study and reports to the class.

Ag59 SHEEP AND SWINE MANAGEMENT. Three credit hours.
The selection, care, feeding, and management of sheep and swine and problems in the operation of such enterprises.

Ag61 SOIL CONSERVATION AND SURVEYING. Three credit hours.
Soil and water resources; factors contributing to soil and water losses and the vegetative and engineering practices involved in establishing control measures.

Ag62 SOIL FERTILITY. Three credit hours.
Plant nutrient needs, including the role of minor elements, for various crops. Constituents used, ratios, and methods of mixing fertilizers. Soil tests for plant nutrients, fertilizer requirements and recommendations correlated with the test. General procedures for building and maintaining soil productivity.

Ag63 SOIL SCIENCE. Three credit hours.
The origin, formation, and chemical properties of soil. Soil texture, drainage, tillage, fertility, and the use of fertilizer, lime, and farm manure related to the growing of plants.

Ag64 SUPERVISED FARM PRACTICE.
Credit hours vary depending on curriculum. Regular assignments to farm activities are scheduled for all students. Experiences such as: operating farm machinery and equipment; preparing land for planting, caring for growing crops; harvesting grains, vegetables, potatoes, and fruit; hauling, storing, and mixing feed; and grading and storing various farm products. Care of livestock and poultry.

Ag66 VEGETABLE PRODUCTION I. Three credit hours.
The fundamentals of gardening: preparing the soil, planting, cultivating and harvesting. Dusting and spraying for insect and disease control.

Ag70 VEGETABLE PRODUCTION II. Three credit hours.
The production of vegetable plants in the greenhouses, hotbeds, and cold frames. Different varieties of cabbage, cauliflower, broccoli, celery, endive, lettuce, tomatoes, peppers, and eggplant. Variety selection, soil preparation and sterilization, sowing of seed, and care of young plants.

Ag71 WILDLIFE CONSERVATION. Two credit hours.
The principles of Conservation. Renewable natural resources such as soil, water, forest and wildlife; the interrelationship of the various conservation programs.

Ag77 LIVESTOCK AND POULTRY SCIENCE. Three credit hours.
The common breeds of farm animals and poultry, their care and management. The economic importance of livestock and poultry in the agriculture of the State and Nation.

Ag79 FARM MANAGEMENT I. Three credit hours.
Data from actual farms related to buying or leasing farm property, financing farm ownership, evaluating returns from farming, and understanding farm problems. Insurance, price trends, and production cycles as they affect farm income.

Ag80 FARM MANAGEMENT II. Four credit hours.

AS1 FROZEN FOODS V. (Advanced Processing) Three credit hours.
Experimental work with foods which are difficult to freeze, such as: beets, tomatoes, eggplant, and precooked foods, to improve the quality and supplement items now produced and frozen commercially.

AS9 TRACTOR OPERATION AND MAINTENANCE. Three credit hours.
Different types of farm tractors; uses and applications. Daily and seasonal maintenance, including common adjustments to keep tractors in good operating condition. Development of skill in tractor operation.

AS10 DAIRY EQUIPMENT AND INSTALLATION. Three credit hours.
Construction, installation, and operation of equipment used in dairy plants. Construction and layout of plants.

AS11 DAIRY MANUFACTURING. Three credit hours.
The production and processing of milk for the manufacturing of dairy products. Power cream separators, clarifiers and problems in the production flow pattern. The homogenizer and the problems of its use. The propagation

AS12 CHEESE MANUFACTURING. Three credit hours.
Soft cheese manufacture: various types of cottage cheese, neufchatel, cream cheese, and soft cheese spreads. Manufacturing and packaging.

AS13 ICE CREAM MANUFACTURING. Three credit hours.
The commercial manufacture of ice cream, sherbets and ices. Ingredients used and their effect on the quality of the product, standardization of the ice cream mix, freezing and hardening equipment, and the manufacture and merchandising of ice cream.

AS14 DAIRY TESTING I. Three credit hours.
The composition of milk and factors affecting the percentage of milk constituents, proper compiling methods, care of samples, and methods of determining the percent of fat in milk and cream by the Babcock method.

AS15 DAIRY TESTING II. Three credit hours.
Special tests on milk and milk products. Methods of determining acidity, moisture, solids, salt, and ash. Students satisfactorily completing this course are eligible to take the examination for the New York State Tester's License.

AS18 FARM EQUIPMENT SERVICE. Two credit hours.
The service aspect of farm equipment retailing. Set-up, installation and service of stationary and field equipment.

AS19 FARM EQUIPMENT RETAILING. Four credit hours.
The principles of the management of a farm equipment dealership. The functions and relationships of the parts department, the service shop, and the sales department. Representatives of farm equipment companies meet with the class. Class trips are made to study the operations of various dealerships.

AS22 FREEZERS AND HOME FREEZING. Two credit hours.
The selection of a home freezer, principles of the preservation of foods by freezing, and demonstrations in food freezing. Ways in which a freezer can pay for itself, foods that can readily be frozen, packaging materials, precooked frozen foods, etc.

AS24 FROZEN FOODS III. Three credit hours.
A comprehensive course in the various phases of the frozen food field. The summer's experience in processing plants is closely tied in to the course. Analysis of retailer and consumer attitude and interest in frozen foods.

AS25 FARM POWER MACHINERY. Four credit hours.
Efficient use of tractive and stationary power units; maintenance and "tune-up" of the equipment on the Institute farms. Laboratory repair jobs of the kind commonly performed by many farmers, supplemented by demonstrations in Service Shop Procedures.

AS26 INSPECTION AND GRADING. Three credit hours.
Established grading techniques for fresh market and cannery trade fruits and vegetables. Various types of grading equipment. Inspection methods with seasonal practice work.

AS28 FROZEN FOODS I. Three credit hours.
The various methods of preparing and freezing foods including meats, vegetables, fruits and poultry. A comparison of various methods in terms of demand, labor, and costs. Refrigeration and refrigerated storage. Consumer interest in frozen foods. Basic information needed by the student in preparation for summer work in a frozen food processing plant.

AS32 WELDING. Two credit hours.
The theory, practical applications, materials, and cost factors applicable to welding. Welding equipment for the farm and small industry. Practice in oxy-acetylene welding and brazing and electric arc welding.

AS33 MARKET MILK I. Three credit hours.
The economic importance of the fluid milk industry in the nation and New York State. Milk and its relation to public health; the production of quality milk; dairy barn and plant inspection; the sanitary code and other ordinances; the function of operation of the country receiving station.

AS34 MARKET MILK II. Three credit hours.
The transportation of milk to the city plant, milk pricing and price plans, city plant operation and management, milk marketing agencies, retail route operation, and operational costs.

AS35 JUDGING DAIRY AND FROZEN FOOD PRODUCTS. Two credit hours.
Recognizing the better qualities in dairy and frozen food products by use of taste, sight, smell, touch and sound. The use of organolyptic analysis in scoring products.

AS38 WATER SUPPLY AND IRRIGATION. Three credit hours.
The location and protection of the home water supply; the selection, care and repair of pumps and accessories and the home plumbing system. Types of irrigation systems including cost, upkeep and the design of portable irrigation systems for various crops.

AS39 FOOD PLANT SANITATION. Two credit hours.
The principles and practices employed in dairy and frozen food plant sanitation, including water purification methods, detergents, sanitizing agents, plant sewage disposal, identification and control of insects and pests harmful to sanitary production of foods for human consumption.

AS40 DAIRY PLANT PRACTICE I. Two credit hours.
Practice with milk processing equipment in the new modern Institute dairy plant; bottling, pasteurizing, homogenizing, operation of clarifiers, bottle washers, holding tanks and dump vats. The cleaning and assembly of equipment; the New York State Sanitary Code.
AS42 FROZEN FOODS II. (Precooked) Three credit hours.

The processing of food materials into pre-cooked frozen packages. Various methods and their results; merchandising opportunities and difficulties. Cooking specialty foods for quick freezing, storage, and sampling.

AS44 REFRIGERATION. Three credit hours.

The types of mechanical refrigeration units used in the frozen foods and dairy industries. Principles of mechanical refrigeration; problems involving the calculating of refrigeration requirements including insulation, installation, and maintenance.

AS45 DAIRY PLANT PRACTICE II. One-half credit hour.

Operation and maintenance of equipment for bottling milk, making cheese and ice cream; the high temperature pasteurizer, continuous ice cream freezer, fruit feeder, and packaging machine. Retailing dairy products.

AS46 FARM MACHINERY I. Four credit hours.

Selection, field operation, maintenance, and repair of basic, commonly used farm implements such as plows, harrows, drills, seeders, planters, cultivators, and harvesting machinery, with emphasis on efficiency and economy in use.

A comparison of different makes of machinery, choosing sizes suitable for the power available, combination of field operations to secure proper tractor load, characteristics of materials, ordering repairs, lubrication, bearing construction, and other subjects related to the selection and purchase of equipment. Field operational problems involving "tune-up" of the numerous units of the Institute farms; repair and maintenance work.

AS47 FARM MACHINERY II. Three credit hours.

Importance of farm machinery to Agriculture; principles of mechanics, construction, selection and use; soil preparation machinery; seedbed preparation machinery; seeding machinery; cultivating machinery; dusting and spraying machinery.

AS48 FARM MACHINERY III. Three credit hours.

Harvesting machinery; feed-preparation machinery; fertilizing machinery; transportation equipment; clearing and grading machinery; labor saving equipment; economics of using farm equipment.

AS53 AGROMECHANICS. Three credit hours.

Safe operation and maintenance of tractors. The use and care of common shop tools. Projects in carpentry, plumbing, electrical repair, and cold metal work. The make up and use of concrete and mortar.

AS58 DAIRY PLANT MANAGEMENT. Three credit hours.

Dairy Industry trends, physical plant, plant operations, personnel, production control, purchasing, sales and legal aspects.

AS60 ELECTRICITY, MOTORS, AND CONTROLS. Three credit hours.

Electricity and its applications to the home, farm, and industry, including the study of motor types, controls, and maintenance. Distribution systems, switches, circuits, wire sizes and capacities, and methods and costs of installations under existing electrical codes.

AS61 TRACTOR OVERHAUL. Four credit hours.

The components of the tractor power unit, power train, and chassis; overhaul of Institute tractors.

AS62 AGRICULTURAL DIESELS. Three credit hours.

Diesel engines, with reference to design, construction, and cost of operation as applied to farm operations. Different types of farm diesels. Tear-down, inspection, and service of farm diesel equipment.

AS63 SALESMANSHIP. Two credit hours.

The fundamentals of selling with application to the sale of foods and food machinery. The salesman's responsibilities, knowledge required and experiences necessary for success. Practice in demonstrating sales techniques.

AS69 INTRODUCTION TO FROZEN FOODS. Two credit hours.

Processing fall fruits and vegetables by freezing. An introduction to the problems of this preservation method and an aid to further study.

AS71 SHOP MECHANICS. Three credit hours.

Shop practices and techniques, tools and materials. Woodwork, tool fitting, cold metal work, simple plumbing, power tools, power transmission, lubrication. Shop supplies such as fasteners, abrasives, woods, metals and finishes.

AS79 FROZEN FOODS IV. Two credit hours.

Institutional sales and distribution of frozen foods. Trends, methods of merchandising for this particular market, possible new areas, competitive lines, practical economic considerations and consumer motives. Representatives of industry will assist in the presentation.

B1 AERODYNAMICS. Two credit hours.

The various parts of an aircraft, including aircraft controls and their use. Problems involving lift and drag illustrate the change in performance of an aircraft with a change in velocity, or weight, or altitude, or wing area.

B2 AIRCRAFT TECHNICAL THEORY. Four credit hours.

The technical theory of aircraft maintenance. Shop procedures, interpretation of drawings, working drawings, installation drawings, technical orders, Army-Navy Specifications, and FAA regulations.

B3 AIRCRAFT MAINTENANCE I. Three credit hours.

Maintenance methods, materials, and control regulations for aircraft woodwork, metal work, and welding. The tools and nomenclature of aircraft mechanics.

B4 AIRCRAFT MAINTENANCE II. Four credit hours.

The theory and principles of operation of aircraft engines, engine dis-assembly, and assembly.
B5  AIRCRAFT MAINTENANCE III. Four credit hours.
Phases of maintenance not covered in previous courses on aircraft engine
maintenance, repair, and testing. Repairs on "live" aircraft and engines under
the supervision and instruction of FAA certified mechanics.

B6  AIRPORT PLANNING AND OPERATION. Four credit hours.
The various classes of airport and FAA standards for these classes. Prob-
lems confronting planners. Arrangements of runways, taxi strips, and building
areas. Snow removal, gas handling and storage, and sources of income other
than aviation.

B7, B8  AIR TRANSPORTATION I, II. Two credit hours each quarter.
Air transportation jobs and their requirements, the history and develop-
ment of air transportation, airlines of the United States, and the areas in which
they operate.

B9  AIR NAVIGATION I. Two credit hours.
Air navigation including terms, principles of navigation, the earth, and
methods of locating points on the earth's surface. Chart projections and inter-
pretations. The graphical solution of simple dead reckoning problems; the use
of the E6-B computer slide rule face.

B10  AIR NAVIGATION II. Three credit hours.
Use of the E6-B for the solution of dead reckoning problems. Radius of
action problems and radio bearings and their use.

B11  WEIGHT AND BALANCE. Three credit hours.
Appraisal of the result of improperly balancing or overloading an aircraft.
Finding empty weight and empty weight center of gravity after a series of
installations or removals. The load adjuster and its use.

B12  BASIC WEATHER. Three credit hours.
The elements of weather; temperature, pressure, moisture in the atmos-
phere, and stability of the atmosphere. Teletype sequence reading and cloud
classifications.

B13  WEATHER ANALYSIS. Three credit hours.
Air masses and fronts, and the weather associated with them. Fog forma-
tion, types, and dissipation; hazards to aircraft, such as icing, turbulence, and
thunderstorms.

B14, B15  TRAFFIC CONTROL I, II. Three credit hours each quarter.
Radio aids to navigation, radio frequencies and procedures, ANC-Control
Tower procedures, ANC-Control of instrument traffic, and Civil Air Regula-
tions.

B16  FLIGHT TECHNIQUE. Three credit hours.
Aircraft and engine performance. The use of aircraft and engine cruise
charts. Methods of cruise control; problems involving flight analysis, filling a
flight log, and plotting How-goz-it charts.

B17  ELEMENTS OF RADIO. Three credit hours.
The fundamentals of communication and navigation radio equipment and
its operation. Basic electronic and radio principles relative to aircraft receivers,
transmitters, and navigation systems.

B18  WELDING I. Two credit hours.
Elementary oxy-acetylene welding. Related technical theory in nomen-
clature, safety precautions, and the use and care of oxy-acetylene equipment.
The student acquires enough fundamental skills to run a simple beaded weld.

B20  JET ENGINES. Three credit hours.
Basic theory of the operation of jet engines. Classifications, military
identification, jet theory, thrust augmentation, materials, centrifugal flow, axial
flow, turbo props, and afterburners.

C1  MECHANICAL POWER LABORATORY I. Three credit hours.
The principles of front end geometry, dynamic wheel balancing, and hy-
draulic power. Study and practice in the operation and maintenance of steering
devices, brake systems, springing, and shock-absorption.

C2  MECHANICAL POWER LABORATORY II. Three credit hours.
Operation, construction, and study of gearing, clutches, universal joints,
fluid couplings, transmissions and differentials. Systems of hydraulically actu-
ated steering and braking.

C3  MECHANICAL POWER LABORATORY III. Three credit hours.
The automotive engine and its components. Engine tear-down; reboring;
piston-pin honing; valve and valve-seat grinding; the cooling, cam, fueling, and
distribution systems.

C4  COMBUSTION ENGINE THEORY I. Three credit hours.
Basic information related to the gasoline engine. Two-stroke and four-
stroke cycle engines compared, and analyses of various engine designs. Fuel
combustion, spark advance, and effects in changing compression ratio.

C5  COMBUSTION ENGINE THEORY II. Three credit hours.
A continuation of C4, dealing with conversion of heat energy to mechani-
cal energy; losses; the general energy equation applied to the internal combus-
tion engine. Operating characteristics and carburetion requirements.

C6  ENGINE TEST LABORATORY I. Three credit hours.
Application of the methods and equipment utilized in testing mechanical
equipment applied to testing gasoline engines. Engine indicators; instrumenta-
tion; power absorption dynamometers; calibration of equipment. Study of
carburetors.

C7  ELECTRICAL EQUIPMENT I. Three credit hours.
Electrical principles applied in automotive ignition, lighting, starting, and
generating systems. The care and use of storage batteries, direct current, low
voltage generators, cut-outs, automotive voltage regulators; high tension second-
ary circuits for spark ignition; practice with appropriate electric testing devices.
C8 COMBUSTION ENGINE THEORY III. Three credit hours.
Principles of operation of the diesel engine; theory of combustion, fuel injection systems, metering.

C9 COMBUSTION ENGINE THEORY IV. Three credit hours.
Design and operating characteristics of combustion chambers, governors, scavengers, superchargers, cooling systems.

C10 ENGINE TEST LABORATORY II. Three credit hours.
A continuation of Engine Test Laboratory I: Engine indicators; mixture control and fluid flow in combustion engines. Presentation of comprehensive reports; inspection of various types of diesel injection systems.

C11 ENGINE TEST LABORATORY III. Three credit hours.
The Institute's wide variety of high speed diesel motor-generator equipment is utilized to study various types of fuel injection systems, timing mechanisms, governors, blowers, and superchargers. Combustion chamber design, and auxiliary starting systems.

C12 POWER TRANSMISSION EQUIPMENT I. Three credit hours.
Application of the principles of planetary gear systems and conversion of fluid energy to study of torque converters, over-drives, and a wide variety of automatic transmissions.

C13 FUELS AND LUBRICANTS. Three credit hours.
The history, refining, and testing of petroleum products and "additives". Tests of commercial fuels and lubricants according to American Society Testing Materials specifications, including Saybolt viscosity, flash and fire points, steam emulsion, crank case dilution for oils, distillation range and percentage of water in gasoline, and octane ratings.

C14 POWER TRANSMISSION EQUIPMENT II. Two credit hours.
Automotive hydraulic devices and their servo controls: power steering, power braking, and other actuating devices controlled by hydraulic circuits.

C15 ELECTRICAL EQUIPMENT II. Three credit hours.
Coordinating the learnings in previous related shop, and laboratory courses: analysis of typical, live repair and maintenance problems, using the latest diagnosis and test equipment and procedures customary in modern automotive and diesel service organizations.

C18 GAS TURBINES. Three credit hours.
The construction, operation and performance of various types of gas turbines. Power cycles, compressors, burners, and turbines. Operating characteristics, efficiencies, and accessory equipment. Prerequisite, C4.

C19 MOTOR ANALYSIS EQUIPMENT. Three credit hours.
The principles of operation of electric and fluid measuring equipment; service and maintenance of diagnostic and dynamometer equipment.
E5 CONSTRUCTION LABORATORY V. Two credit hours.
Theory and practice in steel layout and fabrication. Steel connections of beams and columns, cutting, riveting, welding, and sub-assemblies for field erection. Lectures on plumbing, including water supply, sewage disposal, drainage, and venting systems.

E6 CONSTRUCTION LABORATORY VI. Two credit hours.
Steel erection of columns, girders, and beams; the erection of concrete forms for enclosing steel members and reinforced concrete slabs; the placement and bending of reinforcing bars; mixing and placing concrete. Lectures on hot water, hot air, and steam heating systems, including heat losses.

E7 CONSTRUCTION DRAFTING I. Four credit hours.
The history of architecture. Blueprint reading and terminology; the interpretation of working drawings. The fundamentals of drafting, including the use of instruments, lettering, dimensioning, orthographic projections, and elements of descriptive geometry.

E8 CONSTRUCTION DRAFTING II. Four credit hours.
Architectural history through contemporary forms. Architectural perspective drawing. Detailing practice in structural steel shop drawings: floor plans, sections, beams, columns, and welded and riveted connections.

E9 CONSTRUCTION DRAFTING III. Three credit hours.
Lectures and discussions on building foundations; sub-soil investigation, piles and spread footings, walls, and columns. Structural detailing practice in welded connections and steel truss layout and shop drawing. Working drawings for reinforced concrete construction: plans and details of slabs, beams, girders, and columns.

E10 ARCHITECTURAL DRAFTING I. Four credit hours.
The principles of architectural design. Creative design problems. Working drawings of plans, elevations and sections for a residence. Lectures on architectural construction including steel and concrete framing systems.

E11 ARCHITECTURAL DRAFTING II. Four credit hours.
Architectural detail drawings for interior wall elevations, fireplace details and schedules which complete the working drawings for the residence developed in Architectural Drafting I. Rendered perspective drawings of the residence and construction of a scale model. Lectures on architectural construction including floor, wall, and roof assemblies. Working drawings for various assemblies.

E12 ARCHITECTURAL DRAFTING III. Five credit hours.
Design of a commercial, industrial, or other type of fire resistant building as an architectural thesis. A comprehensive study, including architectural and structural design with working drawings. Lectures on architectural construction including waterproofing, drainage, condensation, and insulation.
elasticity, temperature stresses, riveted and welded connections, and section properties of various areas. The AISC manual and N. Y. City Building Code. Tension test of steel and compression tests of cast iron, steel and wood.

E41 ELEMENTARY STRUCTURAL DESIGN I. Four credit hours.
Analysis and design of steel and wood beams, girders and columns; eccentric connections, torsion combined stresses, and eccentrically loaded footings. The use of AISC manual and N. Y. City Building Code. Beams and columns of steel and wood are tested to destruction.

E42 ELEMENTARY STRUCTURAL DESIGN II. Four credit hours.
Graphic statics and treatment of live loads such as wind, snow, trucks, and impact. Students design and draw a steel roof truss and simple highway bridge. Familiarization with AASHO specifications.

E51 CONSTRUCTION LABORATORY I. Three credit hours.
Theory and practice in construction, rigging, excavation and grading, layout, concrete form building, mixing and placing concrete, in relation to culverts, footings, and bridge abutments. Contractors' methods are observed in field trips.

E52 CONSTRUCTION LABORATORY II. Three credit hours.
The theory and practice of steel fabrication, including the use of the forge, gas cutting and welding, electric arc welding, steel layout, cutting and drilling structural members. Inspection of steel fabrication shops. Continuation of elementary mechanics. Elementary problems in applied mechanics. An introduction to concrete testing and design of concrete mixtures.

E53 CONSTRUCTION LABORATORY III. Two credit hours.

E54 PLAN READING AND ELEMENTARY DRAFTING.
Four credit hours.
Study of highway and bridge construction drawings to develop interpretation, terminology, the understanding of material symbols, dimensioning, and views. The fundamentals of drafting room practices, including the use of instruments, lettering, dimensioning, orthographic projections, and elements of descriptive geometry.

E55 STRUCTURAL DRAFTING I. Two credit hours.
The elements of steel detail shop drawings. Framing plans and details of deck beams, girders, columns, stringers, and cross-bracing. Use of the AISC handbook.

E56 STRUCTURAL DRAFTING II. Two credit hours.
Reinforced concrete detailing by developing the drawings for a simple bridge; including: reinforcing placement drawings of footings, abutment, wing-wall and deck slab, plans, sections, and bar schedules. Use of the ACI Standard practice for detailing reinforced concrete structures.

E57 HIGHWAY DESIGN. Three credit hours.
A study of highway route location including an interchange with separated grades. Problems involving drainage and grades; the design of ditches and culverts; with layout of a grading plan for a full cloverleaf.

E58 TOPOGRAPHY. Two credit hours.
Surveys by right angles to station plus and stadia methods. Note keeping and plotting, simulating actual working procedures and methods. Stadia notes are plotted by protractor and by drafting machines. Mapping includes: triangulation, contours, roads, rivers, buildings, trees, and swamps.

E59 SENIOR PROJECT. Four credit hours.
A continuation of Highway Design; the layout of a highway project; structural design of a small bridge and culvert, estimating quantities for structures and the highway, and drawing the plans.

E60 SURVEYING I. Three credit hours.
The theory and practical use of surveying instruments. Field practice in taping, differential and profile leveling, and in the reading of horizontal angles. Note keeping, reduction of field notes, computation of bearings, and plotting of traverse lines.

E61 SURVEYING II. Three credit hours.
Latitude, departures, and coordinates for closed and open traverses. Also stadia work, setting grades, slope stakes, and batterboards.

E62 SURVEYING III. Four credit hours.
Route surveying and horizontal and vertical curves.

E63 ESTIMATING. Three credit hours.
Estimating the cost of a highway and bridge project. Computations of areas and volumes of excavation and fills, mass diagrams, concrete and steel estimates for a bridge and a road.

E64 ELEMENTS OF HIGHWAYS. Two credit hours.
Highway construction and concrete and bitulithic pavements. Horizontal and vertical curves, super-elevations, grades, drainage systems, specifications for materials and study of geometric designs of modern highways.

E65 REINFORCED CONCRETE DESIGN. Three credit hours.

E66 HYDRAULICS OF DRAINAGE. Three credit hours.
E67 ADVANCED SURVEYING. Three credit hours.
Traversing by triangulation, use of plane table for topographic map work, calculating and staking horizontal curves using stadia, adjusting instruments. A project covers the surveying and staking out of a simulated real estate development.

F3 DENTAL ANATOMY I. Four credit hours.
Fundamentals of tooth form and function. The student must draw and carve individual teeth to familiarize herself with the anatomical details.

F4 DENTAL ANATOMY II. Four credit hours.
Supporting structures of the mouth and occlusion. The permanent dentition in wax is completed. The identification of extracted teeth.

F9 PREVENTIVE DENTISTRY I. One credit hour.
Orientation in the fundamental features of dentistry as a background for the study of dental hygiene. The history of dentistry as an art and as a profession.

F10 PREVENTIVE DENTISTRY II. One credit hour.
Accepted theories of the causes of dental caries and periodontal disease, and the place of dental hygiene in their control. Lectures on techniques are related to the exercises followed in a concurrent course in the oral hygiene laboratory.

F11 PREVENTIVE DENTISTRY III. One credit hour.
Professional ethics are discussed. Factors that contribute to the healthy condition of the human mouth. Measures which can be employed to prevent or to arrest dental caries and adjacent tissue degeneration.

F12 DENTAL MANIKIN I. Two credit hours.
Each student is provided with a manikin with mounted sets of artificial teeth coated with artificial calculus. She is taught a tested system of instrumentation for the removal of the deposits.

F13 DENTAL MANIKIN II. Two credit hours.
Exercises on the manikins develop finger dexterity and strength. Exercises for the removal of hard deposits; exercises for the removal of stains and the polishing of the teeth. After gaining sufficient proficiency, the student practices these techniques on fellow students.

F14 DENTAL ASSISTING AND OFFICE MANAGEMENT. Two credit hours.
The procedure followed in the dental practice in chairside assisting, charting, care of equipment, and care of the office. Practice at the chair in the Institute Dental Dispensary and in nearby hospitals. The economics of dental practice from the standpoint of initial investment, and the efficient management of the office. Office layout planning; simple, efficient methods of bookkeeping; recall systems.

F15 GENERAL PATHOLOGY. One credit hour.
The fundamentals of microscopic and gross pathology. The importance and significance of the general pathological processes such as inflammation, atrophy, degeneration, necrosis, circulatory disturbances, cysts, and special types of infection.

F17 DENTAL ROENTGENOLOGY I. Two credit hours.
The physics of the laboratory production of X-rays. X-ray tubes and machines. Radiation hazards and X-ray dosages. Principles and application of exposing, processing, and mounting dental roentgenograms. Anatomical landmarks are described and differentiated from conditions which indicate disease or abnormality.

F18 DENTAL ROENTGENOLOGY II. One credit hour.
Practice in exposing, processing and mounting of intraoral roentgenograms. Identification of anatomical landmarks, dental caries, calcareous deposits, and the roentgenogram as a means of checking dental development.

F19 NUTRITION AND DIETETICS. Two credit hours.
Food chemistry with reference to the role of the various foods in nutrition. Dietary deficiencies and their effects. Satisfactory diet from the standpoint of general and dental health.

F20, F21, F22 ORAL HYGIENE PRACTICE I, II, III. Twelve credit hours.
Clinical training in dental prophylaxis in hospitals, schools, industrial plants, and campus clinics. Students are rotated so that all have an opportunity to work in all areas of practice with adults and children. Clinic practice is supplemented with lectures in pathology, periodontia, and dental assisting in hospital dental clinics. Importance of sterilization techniques as related to dental hygiene is emphasized.

F23 ORAL PATHOLOGY. Two credit hours.
Disease of the highly specialized dental and periodontal tissues, and the adjacent oral tissues; their etiology and prevention.

F24 DENTAL MATERIALS. Two credit hours.
Chemical and physical properties, manipulation, uses and care of dental materials, and the performance of basic laboratory procedures.

F26 ORAL SURGERY. Two credit hours.
Local and general anesthetics used in dentistry. The preparation of the patient, instruments, operative procedures, and post-operative treatments. Examinations of the patient and taking of case histories.

F27 CHILD PSYCHOLOGY. Two credit hours.
The principles of child psychology and their application to the problems of child management in the dental office.

F28 CHILD HYGIENE. One credit hour.
Factors influencing infant and child health; nutrition and health habits;
communicable diseases, methods of transmission, incubation periods and symptoms, and methods of affording protection.

F29 MATERIA MEDICA. Two credit hours.

The principles of drug actions and the uses of the more important drugs, especially those used in dentistry. The principles of prescription writing.

F30 INTRODUCTION TO BIOCHEMISTRY. Four credit hours.

A consideration of the inorganic, organic, and physiological chemistry with special reference to the principles of organic and physiological chemistry that are applied in dental practice.

F31 PUBLIC HEALTH AND COMMUNITY DENTAL SERVICE.

One credit hour.

Public Health objectives and methods. The principles of epidemiology and statistical analysis. The relationship of heredity and environment to health, with special emphasis given to oral diagnosis. Factors influencing child health. The roles of state health departments, community dental care organizations, and other group agencies in providing public health dental service and the adequacy of these efforts.

F32 FIRST AID. Two credit hours.

Based on the standard first aid methods of the American Red Cross, supplemented by first aid methods adapted to dental practice needs. The Red Cross First Aid Certificate is awarded to those who pass the course with the required credit.

F33 METHODS AND MATERIALS IN DENTAL HEALTH EDUCATION.

Three credit hours.

Methods and materials used in dental hygiene education as applied to schools and private dental practice. Visual and auditory aids, records and reports, follow-up procedures. Observation and practice.

F34 SCHOOL ORGANIZATION AND ADMINISTRATION.

Three credit hours.

The school system and the school program. Personnel, curriculum, and finance. The functions, duties, and interrelationships of administrative, supervisory, instructional, and school service staffs. The role of the board of education and the relationship of the local school system to the over-all state organization.

F35 HEALTH SERVICE IN SCHOOLS. Three credit hours.

Provisions of the Education Law, the Commissioner's regulations, and the Regents' rules as related to health services. The place and function of health service in public education, and the coordination of the health service program with regional and community programs.

G1 CONSTRUCTION AND MAINTENANCE I. One credit hour.

Basic shop jobs, such as splicing, soldering, taping, cable lacing, drilling, and tapping. The use and maintenance of hand tools and shop equipment; elementary wiring and alarm circuits.

G1p CONSTRUCTION AND MAINTENANCE I. One credit hour.

Basic shop jobs such as splicing, soldering, taping, cable lacing, drilling and tapping, and chassis layout and wiring. Use and maintenance of hand tools, shop equipment, and electrical components.

G2 CONSTRUCTION AND MAINTENANCE II. Two credit hours.

The physical components of basic electronic circuits and equipment; chassis layout, construction, and wiring; the use of test instruments and common electronic standards.

G3 CONSTRUCTION AND MAINTENANCE III. One credit hour.

Electrical construction relating to residential and industrial wiring; basic alarm, lighting, and metering systems; the requirements of the National Electric Code for the various installations and circuits.

G4 CONSTRUCTION AND MAINTENANCE IV. One credit hour.

Practical work with direct current motors, and manual and automatic controllers. Motor and controller operation in conjunction with trouble-shooting and preventive maintenance jobs.

G5 CONSTRUCTION AND MAINTENANCE V. One credit hour.

A continuation of Construction and Maintenance IV. Alternating current motors and controllers such as across-the-line starters, resistor starters, and auto transformer starters.

G6 CONSTRUCTION AND MAINTENANCE VI. Two credit hours.

Practical work in the construction of a two-band six tube superheterodyne receiver. Use of equipment to check all sections of a receiver, particularly audio frequency test and measurement.

G7 CONSTRUCTION AND MAINTENANCE VII. Two credit hours.

Practical work in constructing a typical modulated transmitter, including power supplies, modulator, oscillator-buffer, and final. Use of equipment for radio frequency test and measurement.

G8 CONSTRUCTION AND MAINTENANCE VIII. Two credit hours.

Practical experience in video circuitry. Breadboard layouts of typical video and television circuits such as video amplifiers, non-sinusoidal oscillators, deflection circuits, etc. The use of equipment for video circuit test and measurement.

G9 DRAFTING II. (Electrical) One credit hour.

A basic course in electrical circuit diagrams. Practical exercises related to schematic, panel wiring, and controller wiring diagrams. American Standard Association symbols and nomenclature.

G11 DRAFTING III. (Circuit Analysis) One credit hour.

Direct current controller circuits, including practical exercises and an
analysis of schematic and panel diagrams. Counter electromotive force, definite-time, and magnetic-timer motor controller circuits.

G12 DRAFTING IV. (Circuit Analysis) One credit hour.  
A continuation of Drafting III: alternating current motor controllers and electronic control circuits for motors and welders.

G13 DRAFTING V. (Circuit Analysis) One credit hour.  
Drafting practice is correlated with receiver circuit analysis. The drawings are used in the construction of a radio receiver.

G14 DRAFTING VI. (Circuit Analysis) One credit hour.  
A continuation of Drafting V; circuit analysis of radio transmitters. The drawings are used in the construction of radio transmitters.

G15 DRAFTING VII. (Circuit Analysis) One credit hour.  
Advanced course in the analysis of television circuits; drawings of high voltage power supplies, deflection systems, video amplifiers, and components are used in the construction of television components.

G16 ELECTRICITY I. Four credit hours.  
A basic course in direct current theory, with laboratory work. Elementary series, parallel, and combination circuits; the principles of batteries and voltage dividers; wire sizes, resistors, color codes, and the use of the ohmmeter.

G17 ELECTRICITY II. Five credit hours.  
A continuation of Electricity I, coordinated with appropriate laboratory experiments involving: basic instrumentation, line drop problems, magnetic circuitry, inductance and capacitance, and the fundamental principles of direct current motors and generators. Alternating current fundamentals of periodic functions, reactances, impedance, and Ohm's Law for alternating current circuits.

G18 ELECTRICITY III. Four credit hours.  
A continuation of the alternating current principles of Electricity II. Voltage and current relations in single phase alternating current circuits containing resistance, capacitance, and inductance. Resonance and effects of frequency on circuit elements. Power and factor relationships, with an elementary analysis of polyphase circuits. Experimental laboratory work to verify these principles.

G18p ELECTRICITY III. Three credit hours.  
A continuation of the alternating current principles taught in Electricity II. Voltage and current relations in single phase alternating current circuits containing resistance, capacitance, and inductance. Resonance and effects of frequency on circuit elements. Power and power factor relationships; an elementary analysis of polyphase circuits.

G20 ELECTRICITY IV. Five credit hours.  
The principles of construction and operating characteristics of direct current generators and motors, and alternators. An introduction to alternating current polyphase systems and transformers. Application and operating characteristics of series, shunt, and compound motors and generators.

G21 ELECTRICITY V. Five credit hours.  
A continuation of Electricity IV: a more advanced study of voltage, current, power, and power factor relationships in polyphase systems. Single phase and polyphase transformer phasing and connections. The principles of operation and operating characteristics of single phase and polyphase a.c. motors. Experimentation on instrument-motors, fractional horsepower, and the smaller type polyphase industrial motors.

G22 CHEMICAL PROCESSES CONTROL. Three credit hours.  
Basic chemical processes including paints and pigments, petroleum, plastics, synthetic fibers, coal and coal tar, medicinal and pharmaceutical chemicals, and ferrous and non-ferrous alloys.

G23 ELECTRONICS I. Three credit hours.  
The fundamentals of electronic tubes; of thermionic emission and types of emitters, and static characteristics of the diode, triode, tetrode, pentode, and multi-element vacuum tubes. Principles and characteristics of gas, photo sensitive, and cold cathode type tubes.

G24 ELECTRONICS II. Four credit hours.  
The fundamentals of rectification and power supply filtering as related to half-wave and full rectifiers. Direct current and alternating current amplifiers, voltage and power amplification, load matching and circuit analysis of push-pull phase inversion, cathode follower, and relay amplifiers.

G26 ELECTRONICS III. Four credit hours.  
Regenerative and degenerative feedback amplifiers, feedback oscillators for all frequency ranges and other forms of oscillators including negative resistance, bridge type, and non-sinusoidal oscillators. Transistors and circuit applications.

G26p ELECTRONICS III. Four credit hours.  
The application of electronics to photographic equipment such as flash timers, projection amplifiers, C-R timing circuits, phototube circuits, and electronic relay circuits.

G27 ELECTRONICS IV. (Industrial) Four credit hours.  
An advanced course in the field of industrial electronics. Motor, welding and temperature controllers; telemetering, servomechanisms, and radio frequency heating; the fundamental operations of computers.

G29 INSTRUMENTS I. Four credit hours.  
The design, calibration, maintenance, and use of electrical instruments: d.c. and a.c. voltmeters, ammeters, wattmeters, ohmmeters; the impedance bridge, vacuum tube voltmeter, Kelvin bridge, oscilloscope, frequency meter, and electrical standards. Practical experience in the use, construction, and calibration of the instruments.
G30 INSTRUMENTS II. Five credit hours.
Design theory relative to instruments; methods of installing, calibrating, and repairing pressure, temperature, and liquid level indicators and recorders.

G31 INSTRUMENTS III. Six credit hours.
Instruments and mechanisms used in industrial process control: flow meters, valves, pressure liquid level, and temperature controllers; methods of remote control and telemetering. Installation, calibration, and maintenance of control instruments.

G35 COMMUNICATIONS ELECTRONICS I. Five credit hours.
Audio systems and radio receivers: filament circuits, power supplies, vibrator and mechanical rectifiers, matching systems, power amplifiers, voltage amplifiers, intermediate frequency and radio frequency amplifiers, oscillators, and converters. The principles of decoupling, automatic volume control, phase inversion, frequency conversion, and tracking. Laboratory work correlates the principles and applications of these electronic circuits in the complete receiver.

G36 COMMUNICATIONS ELECTRONICS II. Six credit hours.
Radio transmitters and modulating systems: vacuum tube oscillators, buffers, frequency doublers, power amplifiers, and methods of modulation; principles of neutralization, parasitic and harmonic suppression, and radio frequency measurements; transistor characteristics and transistor circuitry.

G37 COMMUNICATIONS ELECTRONICS III. Six credit hours.
Fundamentals of the television field: the principles of picture tubes, wide band amplifiers, high frequency oscillators, mixer systems, intermediate frequency amplifiers, video detectors, high voltage power supplies, synchronizing and deflecting systems, and direct current reinserterion. Experimentation with and analysis of television circuits.

G38 TRANSMISSION LINES AND ANTENNAS. Three credit hours.
The principles of electrostatic and electromagnetic fields, radiation and radiation resistance, and voltage and current distribution. Transmission lines, antenna feed systems, propagation, direction finders and radio range, and antenna arrays.

G39 HOUSEHOLD ELECTRICITY. Two credit hours.
Maintenance problems of the common household appliances, and basic wiring. Basic concepts of electricity to give an understanding of electrical terms and components. Safety precautions and uses of electrical power in the home; rules and regulations of the National Electrical Code.

G40 ELECTRICAL MACHINERY. Four credit hours.
The principles of construction and operating characteristics of d.c. and a.c. motors and controllers, generators, and transformers. Electrical equipment and polyphase systems as related to servomechanisms. Experimentation and applications of d.c. and a.c. motors, generators, controllers, and transformers.

H1, H2, H3 ENGLISH I, II, AND III. Three credit hours each quarter.
Orientation to college life and adjustment to Institute academic practices. Modern study techniques, emphasizing the development of superior reading skills. Class discussions explore codes of conduct and parliamentary procedure, and afford opportunity for student papers and talks.

An orderly sequence of language experiences, integrating various areas of oral and written communication, enables the student to think clearly, to express himself effectively with ease and to understand the expression of others. Technical reports, research papers, business letters, and informative speeches stimulate student awareness of the concrete nature of report language.

Frequent assignments to conduct meetings and group discussions provide opportunities for speaking before a critical audience, using persuasive techniques and practicing problem solving procedures. Studies in semantics develop insights into the symbolic nature of language, connotation, denotation, charged meanings, judgments, inferences, slanting, assertions, and assumptions. The mass media of communication, including television, radio, magazines, and newspapers, are used to reinforce textbook and class discussions.

H4 SOCIOLOGY. Three credit hours.
Cultural, psychological, and sociological aspects of personality development are investigated. Through studies of social institutions, such as the family, neighborhood, community, labor union, business organization, church, school, professional group, service groups, and farm organization, a dynamic concept of the role of man in society emerges. Intercultural, interracial, and other social problems are discussed.

H5 POLITICAL SCIENCE. Three credit hours.
Local, state, national and world government is reviewed. Some other governmental systems are studied. Key problems in human relationships, involving cooperative aspects of our political and social economy, are analyzed. A mature appreciation of world problems, the role of the United Nations, and the democratic way of life is developed.

H6 APPLIED ECONOMICS. Three credit hours.
Successful adjustment from student life to active participation in the world of affairs: securing and advancing on a job; understanding credit, loans, banks, insurance programs, social security benefits, investments, retirement plans, and taxation; obtaining shelter; and handling problems relating to death.

H7 APPLIED PSYCHOLOGY. Two credit hours.
Designed to enable students to understand and get along with people, this course explores the several schools of psychology, personality and character development, common maladjustments, and popular fallacies and misconceptions. Practical application of psychological theory and technique is stressed through case-studies, including advertising, salesmanship, personnel management, public relations, and domestic affairs.

H8 BAND OR ORCHESTRA. One credit hour.
The Institute Band participates in many school and community functions, performing selected compositions from the standard band literature.
H9 CONTEMPORARY AMERICAN LITERATURE. Two credit hours.
Selected readings in American short stories, novels, plays, and poems of
the past three decades. The influential writers of this period are studied, with
particular attention paid to the social and political currents of the times. The
effects of modern book selling methods, and the relationship of modern writing
to films, radio, and television are discussed.

H10 GLEE CLUB OR MIXED CHORUS. One-half credit hour.
Membership in the Glee Club is restricted to men; the Mixed Chorus is an
organization for men and women. Both groups prepare and perform an extensive
annual repertoire.

H11 MUSIC APPRECIATION. Two credit hours.
A historical survey of music, beginning with the earliest known musical
literature and culminating in the music of our own time. Representative
compositions, heard through recordings, enable the student to follow the
development of musical forms, trends, and styles. Particular attention is given
to American folksong and jazz.

H12 PUBLIC SPEAKING. Two credit hours.
Using the speech work of the English courses as a basis, this course
includes the study of impromptu, extemporaneous, and special occasion
speeches. Considerable emphasis is given to role-playing in preparation for
personal interviews, job applications, and job situations.

H13 MARRIAGE AND THE FAMILY. Two credit hours.
The basic orientation that will better enable the student to make a satisfac-
tory marriage. The significance of the family in our society and a practical
understanding of the marriage relationship.

H14 WORLD GEOGRAPHY. Two credit hours.
The physical features of the earth and man's adjustment to them. Current
political and economic issues are examined in their relationship to geography.

H15 CULTURAL ANTHROPOLOGY. Two credit hours.
The origin and development of culture, customs, and folkways in various
parts of the world. Through the use of specially prepared dramatic recordings,
an analysis is made of the cultural basis for the variation of behavior between
peoples.

H16 HISTORY OF THE THEATRE. Two credit hours.
A survey of the theatre from the Greek Theatre to the present day.

H17 MODERN MUSIC. Two credit hours.
An analysis of present day techniques of writing music. Atonality,
Twelve Tone Scale, Bitonality, and other trends in music writing are studied.
North and South American folk songs and jazz are presented to show their
forms, styles, and the influence each has on the other.

J1 PERSONAL AND COMMUNITY HEALTH. Two credit hours.
The essentials of good health and healthful living. Material selected and
organized with reference to the health problems shown to be of major impor-
tance to college students.

J2 to J4 PHYSICAL EDUCATION. One-half credit hour each quarter.
The history and rules of various sports. In competitive games, students apply
the rules and develop fundamental skills. Emphasis is placed on sports
which have a carry over value.

K1 GENERAL CHEMISTRY I. Five credit hours.
Fundamental laws underlying chemical action. The properties of the elements
and their compounds, the periodic system, and atomic structure. Exper-
iments verify chemical laws.

K2 GENERAL CHEMISTRY II. Five credit hours.
The chemical families, with industrial applications, including the element-
ary metallurgy of ferrous and non-ferrous metals. Reaction rate, chemical
equilibrium, solutions, electrochemistry, and the colloidal state.

K3 QUALITATIVE ANALYSIS. Five credit hours.
Systematic analysis and identification of the common cations and anions
using micro and semi-micro procedures. Laboratory techniques in separating
groups and individual ions.

K4 QUANTITATIVE ANALYSIS I. Five credit hours.
The theory and methods of qualitative analysis. The technique of
gravimetric analysis. The examining of unknown samples, including some com-
mercial products.

K5 QUANTITATIVE ANALYSIS II. Five credit hours.
Volumetric analysis, stressing the separating of elements found in ferrous
and non-ferrous alloys, ores, and minerals.

K6 ORGANIC CHEMISTRY I. Four credit hours.
A systematic study of the aliphatic carbon compounds. Hydro-carbons,
acids, alcohols, esters and other compounds are prepared.

K7 ORGANIC CHEMISTRY II. Four credit hours.
Aromatic and heterocyclic compounds including their nomenclature,
reactions, and synthesis of the simpler compounds.

K8 TECHNICAL ANALYSIS. Five credit hours.
The more difficult analyses and typical methods used in the industry.
Additional applications of the principles of quantitative analysis such as chlor-
ide determinations by Fajans and Volhard methods, Kjeldahl-Gunning method
for nitrogen, manganese in steel by bismuthate method.

K9 CHEMICAL PROCESSES I. Four credit hours.
Unit operations of the chemical industry including fluid flow, heat trans-
fer, evaporation and distillation. Laboratory work includes the correlation
and interpretation of data obtained from unit operation equipment.

K10 CHEMICAL PROCESSES II. Four credit hours.
A continuation of Chemical Processes I. Extraction, drying, filtration and
grinding.

K11 CHEMISTRY PROJECT. Three credit hours.
Individual projects or investigations in quantitative analysis, organic chem-
istry, biochemistry, industrial chemistry, or metallurgy, involving library,
laboratory work, and individual help from members of the chemistry staff.

K12 INSTRUMENTS OF ANALYSIS. Five credit hours.
The use of the more common instrumental methods of analytical work.
Potentiometric, spectrophotometric, polarigraphic, and electrolytic separation
methods.

K13 INSTRUMENTS. Four credit hours.
Instrumentation applied to chemical processes: the various devices used
in measuring and controlling liquid level, flow, pressure, temperature, relative
humidity, and pH. Heat exchanger design, valve and pipe sizing, automatic
control, and interpretation of graphic and charted results.

K13p CHEMICAL INSTRUMENTATION. Three credit hours.
Instrumentation applied to general chemistry, including the control of
temperatures and solutions. Principles of colorimetry, titrmetry, pH measure-
ments, polarigraphy, refractometry, mass-spectrometry, and infrared analysis.

K14 TECHNICAL SKETCHING. One credit hour.
Geometric constructions, chemical drawing symbols, preparation of flow
charts, oblique and isometric pictorials, section views of chemical equipment,
and preparation of blueprints.

K16 INTRODUCTION TO PHYSICAL CHEMISTRY. Three credit hours.
Gas, liquid and solid state; solutions and solubility; elementary thermo-
dynamics; chemical equilibria and free energy; the Phase Rule and ionic
equilibria; chemical kinetics.

K34 METALLOGRAPHY I. Four credit hours.
Specific projects with ferrous materials carried to completion. Photom-
icrographs of each stage are an integral part of every project. Prerequisites
M1, M13.

K36 METALLOGRAPHY II. Four credit hours.
Similar to M13, with emphasis on non-ferrous materials. Prerequisites
M1, M13.

K44 BIOCHEMISTRY I. Four credit hours.
The colloidal state; the carbohydrates, lipids, proteins, vitamins and
enzymes.

K45 BIOCHEMISTRY II. Four credit hours.
The chemistry of digestion and metabolism, blood and urine, with options
in specific studies and laboratory projects in one of these fields or in enzymatic
chemistry, nutrition or pesticides.

M1 INDUSTRIAL MATERIALS AND PROCESSES.
Credit hours vary with curriculum.
The chemical and physical properties, methods of producing and utilization
of industrial materials. Casting, press working and welding. Metallurgical,
physical, and non-destructive testing and inspection correlate instruction. Field
trips.

M2 MECHANICAL DRAFTING I. Credit hours vary with curriculum.
Techniques of engineering drawing. Principles of orthographic and iso-
metric drawing, applied geometries, freehand sketching, multi-view projection,
using A.S.A. standards.

M3 MECHANICAL DRAFTING II. Credit hours vary with curriculum.
Applied mechanical design. Double auxiliary views, sheet metal layout,
gears, cams, and aircraft drawings. Standard A.S.A. practices are used.

M4 DESCRIPTIVE GEOMETRY. Two credit hours.
Finding auxiliary views, true sizes, shapes, and angles of lines and planes.
Locations, intersections of lines and surfaces, and the intersection of surfaces.
Developments.

M5 APPLIED MECHANICS I. Four credit hours.
Applied statics dealing with composition, resolution and equilibrium of
forces, free-body diagrams, graphics, force polygons, centroids and moments
of inertia. Physical tests of engineering materials related to M5 and M12.

M6 TOOL DESIGN I. Three credit hours.
The organization and function of a tool design department in relation to
typical industrial problems. The planning and basic principles of tool design.
From part drawings and production plans are developed such drill jigs, milling
fixtures, special cutting tools and gages as are necessary to facilitate economical
interchangeable manufacture.

M7 TOOL DESIGN II. Three credit hours.
Processing of sheet metal for fabrication, involving calculations of flat
pattern, material behavior, and tool planning. Working from a part drawing
the student selects a method of production, working on piercing-blanking,
compound and progressive die drawings.

M8 MACHINE TOOL LABORATORY I.
Credit hours vary with curriculum.
The use and care of hand tools for bench layout, drilling, tapping, ream-

M9 MACHINE TOOL LABORATORY II. Three credit hours.

The construction and operation of various types of engine lathes. Instruction and practice relative to correct set-up and tool grinding procedure, straight and taper turning, boring, drilling, and threading.

M10 MACHINE TOOL LABORATORY III. Three credit hours.

Horizontal and vertical milling machine operations, including the use of the dividing head. Various types of tools, arbors, and accessories related to selection of the correct tool for the job. The construction of the machines, safety practices, and proper care. Plain milling, straddle milling, keyway cutting and surface milling using inserted tooth cutters, and cutting reamer flutes and spur gears.

M11 MACHINE TOOL LABORATORY IV. Three credit hours.

The construction, operation, and set-up of the following production machine tools: gear shaper, thread miller, hand screw machine, surface grinder, and cylindrical grinder. Production set-ups, operation sheet writing, and maintaining tolerances in production.

M12 STRENGTH OF MATERIALS. Four credit hours.

Through tests in the laboratory strength calculations of various riveted, bolted, and welded connections are verified. Allowable design stresses for various steel alloys, cast iron, and aluminum alloys. Mathematical analysis and design of simple beams and frames, control systems, connecting rods, shafts, and gears. Methods of calculating flexural and torsional deflections in beams and shafts.

M13 METALLURGY. Credit hours vary with curriculum.

Practical metallography and heat treatment. Binary alloy systems, involving the application of steel, aluminum, copper-base, and non-corrosive alloys, with correlative studies of hardness, strength, ductility, fatigue, and toughness. The development of good metallographic techniques, with emphasis on ferrous metallurgy.

M14 KINEMATICS. Credit hours vary with curriculum.

The design of belt and pulley systems, clutches, bearings and their lubrication, and gearing, cams, and linkages; design and detailed working drawings for each phase. The use of manufacturers' catalogs, local plant standards, and handbook data.

M15 MACHINE DESIGN II. Four credit hours.

Problems relative to designing products which use a variety of fastening methods, such as screws, rivets, and welding. Beam and shaft formulas; the use of handbooks, standards, and properties of materials information. Design and detailed working drawings for each project.

M16 MANUFACTURING ANALYSIS I. Four credit hours.

Advanced machine tool practice, utilizing precision equipment and materials. Techniques and production problems analyzed, such as: precision hole location, surface finish, cutting tool geometry, broaching, and cam milling. Problems involving calculation and machine tool set-ups.

M17 MANUFACTURING ANALYSIS II. Three credit hours.

Analysis of methods practices in hobbing, internal grinding, form grinding, and cutting fluids. Theory and demonstrations in carbide and ceramic tooling principles; design, brazing, grinding, and selection for production manufacture.

M18 TIME STUDY AND ESTIMATING. Two credit hours.

The techniques of work simplification, motion economy, use of decimal timer, computing time studies and establishing standard data, fatigue, and other allowances. Estimates of the cost of running actual jobs in the machine tool laboratories, including all manufacturing costs, are checked against actual times studied on the job. Work correlates with course M16.

M19 PRODUCTION PLANNING AND PLANT LAYOUT. Three credit hours.

The development of a product from the idea stage to full scale production in terms of a manufacturing organization. The functions and interrelationship of design and test engineering, machining, methods, testing, time study, and plant layout as they apply to the direct manufacturing operation. Organization of work area in the light of material handling, safety, service facilities, and arrangement of equipment using laboratory layout case problems.

M20 PRECISION INSPECTION. Two credit hours.

The principles of precision inspection applied to typical industrial situations. The theory and application of standard gages, gage blocks, indicators, sine bars, placheks, thread inspection, comparators, gear inspection, tool maker's microscope, and casting layout.

M21 SCIENCE PROJECT.

Senior students under direction of a faculty advisor, may elect an applied science project within their curriculum. The proposal for such a project must be submitted in detail four weeks in advance of the Quarter.

M22 FIELD TRIPS. One credit hour.

Field trips to industrial plants during the senior year. Reports are submitted on these experiences. Credit is granted in the sixth quarter.

M23 MECHANISMS. Two credit hours.

Slide crank, straight line, toggle, parallel motion, and drag link mechanisms. Graphic construction of cams for uniform, harmonic, and uniform accelerated and retarded types of motion. Velocity ratio calculations of variable speed drives, plain and compound gear trains, and planetary systems.

M24 APPLIED MECHANICS II. Three credit hours.

A fundamental course in applied dynamics: The laws of motion, forces affected by them, friction, and energy. The design of machine members undergoing motion. Prerequisite, M5, Applied Mechanics I.
M25 METALLURGY II. Credit hours vary with curriculum.

Non-ferrous metals, and such other metals as tend to render the same service. Techniques of correlating structures with heat treatment of precipitation hardening alloys. Corrosion and its prevention.

M26 DESCRIPTIVE GEOMETRY II. Three credit hours.

Graphical and mathematical solutions for angles required in tooling of machine and aircraft parts. Determination of location and approximate sizes by graphics; evaluation by logarithmic trigonometry.

OH1 FLOWER SHOP MANAGEMENT I. Two credit hours.

Instruction and application of principles in designing and making floral arrangements such as wreaths, sprays, baskets, bouquets, and corsages.

OH2 COMPOSITION AND DESIGN. Two credit hours.

The elements and principles of art for creative design; with emphasis on application in the field of horticulture. Free hand drawing, rendering of trees and shrubs, perspective drawing and lettering.

OH4 FLOWER SHOP MANAGEMENT II. Two credit hours.

Locating, managing, and operating a flower shop as well as the designing of pieces for special occasions. The arts of making corsages and arranging flowers for the home, church, hotel, and ballroom. Advertising, buying and selling, and all factors relative to location and equipment.

OH5 FLOWER SHOP MANAGEMENT III. Two credit hours.

A continuation of Flower Shop Management II.

OH6 GREENHOUSE MANAGEMENT I. Four credit hours.

Florist crops for the wholesale and retail markets; modern cultural practices in growing cut flowers and pot plants in the Institute greenhouses.

OH7 GREENHOUSE MANAGEMENT II. Four credit hours.

A continuation of Greenhouse Management I.

OH8 GARDEN PRACTICES. One credit hour.

Instruction, orientation, and field experience in the various phases of garden activity. Each week the explanation and demonstration of a new subject precede the assignment to duties. A rounded experience is the objective. Tools, techniques and standards of workmanship are taught. Grades are based on aptitude, performance and subject knowledge. Written examinations are scheduled.

OH10 HERBACEOUS PLANTS I. Two credit hours.

Identification and study of spring and early summer flowering bulbs and garden flowers, with consideration of methods of propagation and culture, adaptability and landscape values. Emphasis on outdoor study of plant materials during the season of bloom.

OH11 HERBACEOUS PLANTS II. Two credit hours.

A follow-up of Herbaceous Plants I, dealing with late summer and fall blooming bulbs and plants.

OH12 HERBACEOUS PLANTS III. Two credit hours.

Flower border design involves the application of principles of composition to produce harmonious designs. A knowledge of plant textures, color, growth habits and seasons of bloom is necessary.

OH13 LABORATORY IN HORTICULTURAL PROCEDURES. Three credit hours.

Every student has the opportunity to develop initiative and to acquire knowledge, skills, and judgments through participation in garden, nursery, greenhouse and laboratory exercises.

OH15 PLANT NUTRITION. Three credit hours.

A study of the environment and cultural techniques to affect the desired development of tender and hardy ornamental plants; the elements of weather, soil microbial activity, and chemical nutrients.

OH16 HOUSE AND CONSERVATORY PLANTS I. Three credit hours.

The identification, propagation and culture of greenhouse cut flowers, florist pot plants, conservatory plants and other plants of economic importance.

OH17 HOUSE AND CONSERVATORY PLANTS II. Two credit hours.

A continuation of House and Conservatory Plants I. Additional plants used by florists; the construction of dish gardens and terrariums; the use of plants as a permanent part of the home.

OH20 LANDSCAPE SURVEYING. Two credit hours.

The use of the surveying instruments necessary to measure land and plot landscape area, locate objects, and determine levels of elevation.

OH21 TURF MANAGEMENT. Three credit hours.

Creating and maintaining turf for home grounds, parks, roadsides, and golf courses. The control of insects, diseases, and weeds.

OH22 NURSERY MANAGEMENT I. Four credit hours.

Commercial nursery stock production dealing with soil improvement, crop rotation, planting operations, cultivation, mulching, weed control, fertilization, pruning, shearing, digging and storage.

OH23 NURSERY MANAGEMENT II. Four credit hours.

Market trends as they affect kinds and quantities of nursery plants to be grown and the planning and layout of a nursery.

OH24 PHOTOGRAPHY. Two credit hours.

The making of pictures which can aid in selling horticultural products and services. The techniques of taking pictures, film development, printing, and enlarging.

OH25 PLANT BREEDING I. Three credit hours.

The principles of heredity including Mendelian laws and their applica-
tion to breeding. Laboratory practice in breeding techniques with emphasis on the breeding of greenhouse and horticultural crops.

OH26 PLANT PROPAGATION I. Three credit hours.
An introduction to important factors in the propagation of ornamental plants. Propagation by seed, cuttings, division, layering, and grafting.

OH27 PLANT PROPAGATION II. Three credit hours.
An advanced course in woody plant propagation as practiced by the commercial nurseryman. New methods and materials in the propagation of plants by seeds and vegetative means.

OH28 PLANT PROPAGATION III. Three credit hours.
A continuation of Plant Propagation II.

OH30 LANDSCAPE CONTRACTS AND SPECIFICATIONS. Two credit hours.
Nursery cost finding, contracts, specification and methods of estimating landscape costs. Methods of calculating areas, volumes and plant quantities for complete landscaping. Writing various types of contracts and specifications.

OH32 PLANTING PLANS I. Two credit hours.
On-the-job sketching and plan presentation as is often done by nurseries, as well as planning of small home grounds in the drafting room.

OH33 PLANTING PLANS II. Three credit hours.
A continuation of Planting Plans I.

OH34 PLANTING PLANS III. Three credit hours.
A continuation of Planting Plans I and II with added studies in sketching and perspective. Examples of good landscaping are studied on field trips.

OH36 ARBORICULTURE I. Two credit hours.
The fundamentals of shade tree care. Practical experience in rope work, techniques of climbing, pruning, tree planting and feeding.

OH37 ARBORICULTURE II. Two credit hours.
Special techniques and problems, including lightning protection, cavity work, use of power tools, diagnosis of tree ills, and shade tree evaluation.

OH38 WOODY PLANTS I. Three credit hours.
The Woody Plants courses give a picture primarily of the woody plants grown in nurseries for landscape purposes, and secondarily of those found in arboretums, woodlands and fields of Northeastern United States. Identification, culture, uses, flowers and fruits, and ecological relationships. Deciduous shrubs and small trees are in this first study.

OH39 WOODY PLANTS II. Three credit hours.
Broad-leaved and narrow-leaved evergreens.

OH40 WOODY PLANTS III. Two credit hours.
Vines and small, medium, and large deciduous trees.

OH41 WOODY PLANTS IV. Two credit hours.
Advanced study of the plants previously considered, and of the lesser-known trees, shrubs, and vines. An understanding of plant peculiarities and requirements, and the ability to evaluate them for landscape purposes are important objectives.

OH42 HORTICULTURAL SOILS. Three credit hours.
Basic soil principles affecting the development of ornamental plants, with emphasis on the effect soils have on root activity and plant development.

OH43 PLANT GROWTH STUDIES. Three credit hours.
Recognition of the many and varied forms of horticultural growth patterns essential to the horticultural technician. Course content covers formation of plant foods, growth regulators and their effect on plant development.

OH44 FRUIT PLANTING. Two credit hours.
Ornamental and practical uses of standard and dwarf fruit trees, nut trees, and small fruits suitable in this area. Pruning, grafting, training, and proper employment of these plants in the home landscape. The various phases of fruit culture and application to landscape design.

OH46 LANDSCAPE CONSTRUCTION. Two credit hours.
The materials and techniques used in construction of garden terraces, walks, drives, walls, pools, and fences. Irrigation and drainage.

OH57, OH58 SEMINAR I, II. One credit hour each quarter.
A review of the ornamental horticultural field showing the advantages to be gained by specializing in Nursery Management, Biological Technology, Floriculture, and Landscape Planning and Construction. Specialists give personal experiences so that the students can have a better understanding of each field. Students participate with the faculty in reviewing projects or experiments so that each may know what is taking place in related fields.

OH59 NURSERY MANAGEMENT III. Four credit hours.
A continuation of Nursery Management I and II.

OH60 LANDSCAPE PLANS I. Three credit hours.
Skills are developed in the drafting room where the principles of design are applied to landscape problems. Preliminary landscape sketches in plan, elevation, and perspective. Grading, staking, planting plans, and simple details of architectural construction.

OH61 LANDSCAPE PLANS II. Five credit hours.
A continuation of Landscape Plans I.

OH62 LANDSCAPE PLANS III. Five credit hours.
A continuation of Landscape Plans I, II.

OH63 INDOOR LANDSCAPING. Two credit hours.
The uses of house plants in homes and professional buildings. Plans are drawn of room interiors showing the plants and their value to the decorating scheme. The most widely used and popular house plants are studied.
OH64 GREENHOUSE MANAGEMENT III. Four credit hours.  
The growing of flowering potted and spring bedding plants.

P1 METAL PROCESSING I. Credit hours vary with curriculum.  
Sheet metal work with galvanized sheet iron, stainless steel, and aluminum, using the brake, shear, roll formers, and crimping and beading machines. The principles of layout, and radical and triangulation methods of outlining patterns. Machine tool operation or other shop processes, depending on curriculum.

P2 METAL PROCESSING II. Credit hours vary with curriculum.  
Advanced shop processes, according to curriculum: pipe fitting, tube bending and fitting, machine tool operation, or practical electric wiring utilizing underwriter's code.

P3 HEATING LABORATORY I. Three credit hours.  
Principles, construction, and operation of oil, gas, and stoker fired furnaces and their components. Tests for combustion efficiency, heat transfer capacity, and flue gas analysis. Principles and practices of metal fabricating, electric circuitry, and fire-box installation applied to domestic and commercial equipment.

P4 HEATING THEORY I. Four credit hours.  
Heat transmission as applied to buildings; heat loss surveys of typical structures; theory of firing rates and combustion; operation, construction of heat disseminators, boilers and furnaces. Projects involving design, layout, and sizing of steam heating systems.

P5 HEATING THEORY II. Three credit hours.  
An extension of Heating Theory I. Study and design of one-pipe and two-pipe forced hot water systems; panel heating; and various types of warm air heating.

P6 THERMODYNAMICS. Credit hours vary with curriculum.  
Fundamental concepts of heat, calorimetry, fuels and their combustion, and the interrelationships among heat, volume, and pressure. The thermal properties of air related to temperature and humidity. Thermodynamics of fluids used in refrigerating and heating systems.

P7 ELECTRIC MOTORS AND CONTROLS. Three credit hours.  
Basic theory and principles of electrical energy and magnetism applied to the study of motors and controls. Construction, operation, and wiring to a plan of various systems of motor operation and control.

P8 REFRIGERATION LABORATORY. Three credit hours.  
The construction, application, and operation of compressors, refrigerant control valves, driers, evaporators, and hermetic units. The installation of refrigerant lines, connecting condenser units, evaporators, and refrigerant control valves; adding refrigerant, checking refrigerant charge, and leak detection.

P9 REFRIGERATION THEORY. Four credit hours.  
The principles of thermodynamics and physics of heat energy which apply to the compression and expansion of various refrigerating fluids. The control of the refrigeration cycle in the various types of systems, and mathematical analyses of capacities and temperature ratings.

P10 AIR CONDITIONING LABORATORY. Three credit hours.  
The operation, testing, and servicing of air conditioning equipment, including the analysis of control circuits; water conservation equipment; special types of refrigerant control valves.

P11 AIR CONDITIONING THEORY I. Four credit hours.  
The application of thermodynamics to atmospheric conditions. Methods of conditioning air; intensive analyses of size, type, and power requirements for circulation heating and cooling equipment. Use of American Society of Heating and Ventilating Engineers standards in working out plans and in choosing equipment.

P12 AIR CONDITIONING THEORY II. Three credit hours.  
The problems studied in the previous courses are translated into terms of purchasable equipment utilizing manufacturers’ catalogs, trade literature, and standards.

P13 SYSTEMS DESIGN I. Three credit hours.  
Projects in the field of refrigeration systems. Analysis of cooling loads, equipment sizing and selection, and layout for commercial and industrial installations. Presentation of data, specifications, sizes of lines, and the system’s layout.

P14 SYSTEMS DESIGN II. Three credit hours.  
Installation, through design, of year-round air conditioning systems for domestic, commercial, and industrial structures. Studies of heating, ventilating, and cooling loads, the sizing and selection of equipment, the sizing of ductwork and piping, and the installation of control systems. The presentation of data and estimates, utilizing contemporary catalog data, and a complete system’s design.

P15 EQUIPMENT TESTING. Two credit hours.  
A coordination of the related, shop, and laboratory courses previously undertaken. Studies of equipment loads, heat balances, capacities, and efficiency of refrigerating, heating, and air conditioning equipment.

P16 ELECTRICITY I. Three credit hours.  
Electric principles and applications in refrigeration and air conditioning. Principles of series and parallel circuits applied to stack controls and relays, operation and maintenance. Supply systems such as single-phase and three-phase; transformer principles and connections.

P17 FLUID MECHANICS. Credit hours vary with curriculum.  
Hydraulic flow of liquids and gases; hydrokinetics, including viscosity; Bernoulli’s equation; Reynolds number; and the use of measuring instruments.
The flow of compressible and incompressible fluids. Applications in the field of hydraulic machines, heating, refrigerating, and air conditioning.

P18 HEATING LABORATORY II. Two credit hours.
Operation, installation, and service of oil burning equipment with special emphasis on low pressure and rotary burners; gas burners and their controls.

P19 ARCHITECTURAL DRAFTING. Three credit hours.
Developing construction plans of homes and small commercial buildings which include heating, cooling, electrical, and sanitary systems.

P20 CONTROL SYSTEMS. Three credit hours.
Theory and practice from the broad field of control circuitry, applied to systems for heating, cooling, and year-round air conditioning. Analysis, diagnosis, wiring, and service of electrical and pneumatic systems.

P21 HEATING AND COOLING EQUIPMENT.
Credit hours vary with curriculum.
The principles of heating and cooling, the nature of systems, and the kinds of equipment. Lectures, demonstrations, and field trips.

R1 PHOTOGRAPHIC PROCESSES I. Two credit hours.
Basic concepts underlying the science of photography. The associated laws of physics and chemistry applied to the perpetuation of the optical image. Photographic optics, sensitometry and densitometry.

R2 PHOTOGRAPHIC PROCESSES II. Five credit hours.
The sensitometric and densitometric aspects of high and medium contrast photosensitive materials. Measurement, evaluation and control of natural and artificial illuminants. Professional cameras and equipment are used. The technical how and why of photography rather than the artistic.

R3 PHOTOGRAPHIC PROCESSES III. Five credit hours.
The devices and process of the thin base and narrow strip-width photographic media. Microfilm, film sound recording, motion picture and screen process equipment of the professional and non-professional classes.

R4 PHOTOGRAPHIC PROCESSES IV. Four credit hours.
Color photography. The laws of physics and chemistry that govern the many aspects of color. Photographic color materials, modern color processes and color reproduction principles.

R5 PHOTOGRAPHIC PROCESSES V. Five credit hours.
Application of the background and knowledge gained in previous courses to the complex equipment, processes, and procedures associated with the photo-finishing field. Drafting, photo-chemistry, physics, electricity, mechanisms, photography, electronics and business.

R7 PHOTOMECHANISMS II. Three credit hours.
The mechanisms and related equipment employed in the fields of 8 mm. and 16 mm. motion picture. Nomenclature, function, and design requirements of component parts. Unit layout efficiency and problems in kinetics. Experience with modern motion picture cameras and projectors.

R8 PHOTO-ELECTRONICS. Two credit hours.
Optical and magnetic sound recording and reproducing systems of the motion picture and audio visual fields. Application of the laws of optics, kinetics and electronics to recording, amplifying, and reproducing mechanisms. The standards of the SMPTE AND ASA are conformed to.

S— MATHEMATICS.
The department offers a flexible program to provide for variations in students' needs and backgrounds. By this means any student may progress as far and as rapidly as he is able.

Industrial-technical students entering with minimum requirements in mathematics should take sequence S11-S13.
Students with three satisfactory years of high school mathematics should take sequence S17-S19.
Students with four years of high school mathematics should start their sequence with S23.
Students completing S13 will be required to take S23 before electing the calculus, while those students who satisfactorily complete S19 may then elect the calculus.
Agricultural and Business Technology students listed for S6 and S15 may also elect any of the above sequences that their background warrants.

S5 MATHEMATICS. Two credit hours.
Applied mathematics peculiar to art; mathematics necessary for personal business transactions; the general divisions of mathematics and their applications.

S6 MATHEMATICS. Three credit hours.
The principles of arithmetic, algebra, geometry, trigonometry and the slide rule, applied to technical fields. Continued in S15.

S7 GEOMETRICS. Three credit hours.
Geometric figures and the application of mathematics to graphic arts. Graphs, charts, and geometric figures; the use of the slide rule.

S8 GEOMETRICS. Two credit hours.
Geometric principles applied to graphic art. Graphic mathematics, using charts, graphs, and geometric figures.

S9 BUSINESS MATHEMATICS. Two credit hours.
Application of mathematics to business. Ratio and proportion, percentage, decimal fractions, reciprocal tables, interest and bank discount, present worth, graphs, measurements, logarithms, arithmetic and geometric progression, and
annuities. Statistical principles; average, median, mode, range, and average deviation.

S11, S13 MATHEMATICS. Four credit hours each quarter.
An integrated course treating algebra, trigonometry, and selected topics from analytic geometry, with stress on fundamentals and computation. (S11, S13 may also be offered for three quarters at three credits each as S11, S12 and S13.)

S15 MATHEMATICS. Credit hours vary with curriculum.
This course varies with each curriculum and encompasses the special mathematics required in each field together with applications.

S16 ELEMENTARY STATISTICS. Three credit hours.
A descriptive approach dealing with the collection, arrangement and interpretation of statistical information. Central tendency, frequency distribution, elementary curve fitting and probability.

S17, S19 MATHEMATICS. Four credit hours each quarter.
A unified course in freshman mathematics designed to prepare the students for calculus. The modern approach is used. Sets and set theory are applied to standard topics. (S17, S19 may also be offered for three quarters at three credits each as S17, S18 and S19.)

S23 ANALYTIC GEOMETRY. Three credit hours.
Cartesian coordinates, the straight line, conic sections, algebraic and transcendental curves, rectangular and polar coordinates.

S25 MATHEMATICAL ANALYSIS. Three credit hours.
Elementary differentiation and integration. Fundamental problems, using graphs as a rough method of solution; exact methods are then developed with differentiation and integration of algebraic functions.
For students who do not plan to take further courses in calculus.

S27 CALCULUS I. Three credit hours.
Functional notation, limits, continuity, derivatives, definite integrals, and applied problems.

S28 CALCULUS II. Three credit hours.
Differentiation of transcendental functions, methods of indefinite integration, and applied problems.

S29 CALCULUS III. Three credit hours.
Solid analytic geometry, partial differentiation, multiple integration, and applied problems.

S30 PHYSICS: MECHANICS AND HEAT. Four credit hours.
The basic principles of mechanics and heat.

S32 PHYSICS: MECHANICS. Three credit hours.
Same as S30 but limited to the study of mechanics.

S34, S35 GENERAL PHYSICS. Three credit hours each.
This course continues for two terms. An elementary descriptive course including mechanics, heat, sound, light, and electricity for Business Technology students. Most of the topics in S30 and S36 are included, but with a minimum of emphasis on the mathematical concepts.

S36 PHYSICS: ELECTRICITY, SOUND, AND LIGHT. Four credit hours.
The basic principles of d.c. electricity, sound, and light.

S38 PHYSICS. Three credit hours.
Same as S36 but limited to the study of electricity.

S39 PHYSICS: HEAT, LIGHT, AND SOUND. Four credit hours.
The basic principles of heat, light and sound.

S41 GENERAL CHEMISTRY. Three credit hours.
A lecture and laboratory course to familiarize students with the fundamental laws of chemistry.

S42 CHEMISTRY I. (Inorganic Chemistry) Three credit hours.
Fundamental laws of chemistry including atomic structure, elements, compounds and their reactions, solutions of definite strength and solubility, chemical arithmetic and the metric system, ionization and the pH scale.

S43 CHEMISTRY II. (Introductory Biochemistry) Three credit hours.
The colloidal state, the carbohydrates, lipids, proteins, vitamins, and enzymes, including the structure and nomenclature of organic compounds.

S46 BIOCHEMISTRY II. Four credit hours.
A study of the chemistry of foods; digestion and metabolism with options in specific studies and laboratory projects in one of these fields or in enzymatic chemistry, or pesticides.

S50 SURVEY OF SCIENCE I. Three credit hours.
An introductory course, cultural and practical in its aim, giving a basic background in Life Science. Laboratory investigations of plants and animals illustrate the application of facts and principles to everyday living.

S51 SURVEY OF SCIENCE II. Three credit hours.
A descriptive course to give the student the citizen's appreciation and basic background in the area of Physical Science. The sciences, dealing with Matter and Energy apart from life, are investigated to illustrate their effects on everyday living and its human implications. The appreciation of the scientific method and the extension of this method to other fields is fostered.

S52 BOTANY. Four credit hours.
(Similar to S58 with one additional lecture and laboratory hour, for Chemical Technology majors).

S53 ZOOLOGY. Four credit hours.
(Similar to S56 with one additional lecture and laboratory hour, for Chemical Technology majors).
S54 ECONOMIC BOTANY. Three credit hours.
Plants used in commerce and industry, for medicines, pest control, spices, twine, and foods. Plant collecting and herbariums.

S56 ZOOLOGY. Three credit hours.
The world of animal life and the processes which activate and govern it: physiology, morphology, anatomy, reproduction, and genetics. Representative animals from the Protozoa to the Vertebrates are investigated in the laboratory.

S57 CLIMATOLOGY. One credit hour.
The factors that make the weather and their relation to agriculture and horticulture. The manipulation and reading of weather instruments.

S58 BOTANY. Three credit hours.
The fundamentals of plant science, with particular reference to seed plants: physiology, anatomy, morphology, reproduction, and genetics.

S59 ENTOMOLOGY AND PLANT PATHOLOGY I. Three credit hours.
The nature, growth, structure, habits, and injurious effects of insects and disease-producing organisms. Control measures and application equipment.

S60 GENERAL MICROBIOLOGY. Two credit hours.
The physiology, culture and differentiation of microorganisms. Fundamental principles of microbiology in relation to man and his environment. Required course for Agricultural Production and Dental Hygiene curricula.

S61 GENERAL MICROBIOLOGY. Three credit hours.
Same as S60 Microbiology except for one additional lecture period. Required for Dairy Industry, Frozen Foods, and Biological Technology.

S62 PATHOGENIC MICROBIOLOGY AND IMMUNOLOGY. Two credit hours.
Prerequisite, S60 or S61. The role of microorganisms in the diseases of man and animals with emphasis upon the differentiation and culture of bacterial species, types of disease, modes of disease transmission; therapeutic and epidemiological aspects. Infection and resistance; sero-diagnostic methods.

S63 FOOD MICROBIOLOGY. Three credit hours.
The relationships of microorganisms to fresh and preserved foods, milk, and dairy products, and methods of control. Laboratory techniques for determination of sanitary quality of foods and dairy products. Bacteriological and public health aspects of water supplies and sewage disposal.

S64 DAIRY MICROBIOLOGY. Three credit hours.
The relationships of microorganisms to milk and dairy products; standard laboratory methods of examination. Dairy food quality control methods.

S65 MICROBIOLOGY OF FROZEN FOODS. Three credit hours.
Relationships of microorganisms to frozen foods; laboratory analysis of raw and pre-cooked frozen foods. Quality control methods in the frozen foods plant.

S70 ENTOMOLOGY AND PLANT PATHOLOGY II. Three credit hours.
Recognition of, and control measures for the common insects, plant diseases, rodents and their injuries on fruits, vegetables and field crops. A collection of insects, plant diseases and plant injuries is required.

S71 ENTOMOLOGY AND PLANT PATHOLOGY III. Three credit hours.
Recognition of the common insects, plant diseases, rodents, and injuries on ornamental woody and herbaceous plants. Control measures and their timing based on the stage of the pest or growth of the plant. A collection of insects, plant injuries, and plant diseases is required.

S72 ENTOMOLOGY AND PLANT PATHOLOGY IV. Three credit hours.
The identification and control of pests and diseases of plants grown under glass, using latest chemical materials and control equipment.

S90 ANATOMY AND PHYSIOLOGY I. Four credit hours.
The fundamentals of the skeletal system, the muscular system, the circulatory system, the brain, and the nervous system. The physical and chemical background of physiology, the general function of the cells, and the functions of the various tissues, organs, and systems. The circulatory system, the respiratory system, and the gastro-intestinal system.

S91 ANATOMY AND PHYSIOLOGY II. Four credit hours.
Fundamentals of the thoracic and abdominal viscera, including the endocrine glands. The organs of the special senses. The urinary system, the endocrine glands, metabolism, the reproductive system, and muscle and nerve physiology.

S92 HISTOLOGY AND EMBRYOLOGY. Three credit hours.
The structure and function of tissues which are studied under the microscope. Embryology and microscopic anatomy of the teeth.

S99 LABORATORY AND FIELD PROCEDURES. Three credit hours.
The techniques basic to research. Laboratory sanitation, slide preparation, use of instruments and equipment of biological research, library research, rearing of laboratory animals, application of pesticides for insects, disease and weed control, and visits to biological research laboratories.

S100 RESEARCH PROCEDURES I. Two credit hours.
The nature of research and research methods. Planning, conducting and recording experiments in the laboratory and field. Each student selects a research problem to investigate and report on. The problem should involve some phase of biology and may be supervised by any instructor in the biology division.

S101 RESEARCH PROCEDURES II. Two credit hours.
A continuation of Research Procedures I including introductory biometrics and experimental design.

S102 RESEARCH PROCEDURES III. Two credit hours.
A continuation of Research Procedures II with emphasis on data interpretation and scientific report writing.
S103 MICROTECHNIQUE. Three credit hours.
The preparation of materials for microscopic examination. Slide making including the embedding, sectioning, and staining of tissues and organs.

S104 MYCOLOGY AND PLANT PATHOLOGY. Three credit hours.
The study of fungi, their culture, and identification. The techniques of isolating, growing, and examining plant disease-producing organisms. Life history of typical plant diseases.

S105 NEMATOLOGY. Three credit hours.
The nature, identification, isolation, injury and control of nematodes associated with plants.

S106 MEDICAL ENTOMOLOGY. Two credit hours.
The study of insects and other arthropods that transmit diseases of man and animals: their identification, life history, and control.

S107 PESTICIDES. Two credit hours.
Insecticides, fungicides, rodenticides, and weed killers, from the standpoint of formulas, manufacture, formulations, characteristics, costs, effectiveness and safety. Calculations involved in preparing spray solutions and dust mixtures.

T1 STENOGRAPHY I. Three credit hours.
The basic theory of Gregg Shorthand Simplified. Proficiency in the reading and writing of basic theory of Gregg Shorthand.

T2 STENOGRAPHY II. Three credit hours.
The course completes instruction in the theory of Gregg Shorthand Simplified. Mastery of brief forms and phrases.

T3 STENOGRAPHY III. Three credit hours.
The development of a stenographic vocabulary; rapid reading and writing of stenographic notes from dictation.

T4 TYPEWRITING I. Two credit hours.
Mastery of keyboard in touch typewriting, stressing basic techniques. Most of the emphasis is on accuracy; however, some speed work is reached. Practice and knowledge to put the typewriter to good personal use.

T5 TYPEWRITING II. Two credit hours.
Continuation of Typewriting I. Improvement of speed and accuracy. Various forms of business letters, tabulations, some office forms and procedures; manuscript writing procedures.

T6 TYPEWRITING III. Two credit hours.
Continuation of Typewriting II. Speed building with sustained accuracy. Production work and typing projects to develop a high degree of skill and proficiency at typewriter.
T18 TECHNICAL LECTURES I. One credit hour.
Visual aids, guest lectures, and specialists give a better understanding of the industrial world. Films and film strips in the fields of economics, business, employee relationships, selling, and industrial materials and processes.

T19 BUSINESS CORRESPONDENCE. Two credit hours.
Modern forms of business letters. Review of the essentials of English, grammar, spelling, and punctuation, for writing the business letter.

T21 POWER EQUIPMENT. Two credit hours.
The identification and function of the components of the modern motor car. Office work in a sales-service organization. Explanations of diesel, gas-turbine, and steam turbine units.

T22 PLAN READING AND SKETCHING. Two credit hours.
An interpretation of architectural working drawings, with emphasis on visualization and nomenclature. An introduction to structural steel fabrication and detailing. An introduction to surveying methods, equipment, and problems.

T23 CONSTRUCTION METHODS I. Two credit hours.

T26 INDUSTRIAL MATERIALS. Two credit hours.
The origin and development into purchasable form of such materials as forest products, non-metallic minerals, iron and steel, non-ferrous metals, and rubber, plastics, and paints. Laboratory tests demonstrate physical and chemical properties of these materials.

T29 MECHANICAL EQUIPMENT. Two credit hours.
The auxiliary items required in setting up manufacturing: water supply and waste disposal, heat, refrigerating, and air conditioning. Manuals are used for simplified study of heat losses and psychrometry.

T30 MECHANICAL PRODUCTION. Two credit hours.
Methods of manufacturing and fabricating metals and plastics. Hot and cold working, casting, and machining. Typical manufactured articles are analyzed for method of production and inspection procedures.

T31 DESIGN I. Two credit hours.
The elements and principles of design with application to advertising.

T32 LETTERING. Two credit hours.
The evolution and variations of the Roman alphabet, and the modern styles used in advertising. The technique of lettering for reproduction, with good letter form and spacing.

T33 ADVERTISING PRODUCTION I. Two credit hours.
The various reproduction processes used in the graphic arts. Color separation drawings for line and half-tone engraving. Visits to photoengraving, printing, lithography, and rotogravure plants.

T34 ADVERTISING PRODUCTION II. Two credit hours.
The study of plate making for various methods of printing, typography, and the kinds of paper used in advertising. Practical work in setting type and operating the proof press, in silk screen printing, and in making velox prints.

T35 ADVERTISING I. Two credit hours.
The advertising business—its history, organization, principles, practices,—for the advertising secretary.

T36 ADVERTISING II. Two credit hours.
Designed primarily to lead the advertising secretary to think in terms of the overall picture of advertising and the advertising business. A requirement is the successful completion of an advertising presentation.

T37 OFFICE MANAGEMENT. Three credit hours.

T42 BANKING AND FINANCE. Two credit hours.
The major credit and banking institutions and their effect on the business economy. Financial services, facilities, literature, and policies contribute to a deeper understanding of contemporary economic problems.

T44 OFFICE MACHINES. Two credit hours.
Projects on the adding, listing, calculating, and key-driven machines. The complete duplicating process on mimeograph and spirit machines. Proficiency on dictating and transcribing units.

T46 COST ACCOUNTING. Three credit hours.
Job order, process, and standard costs; material, labor and factory expense control; general administrative and distribution cost control; cost planning.

T47 SALESMANSHIP. Two credit hours.
Creative selling: product study, analysis of buying motives, organization of the sales effort, and the development of the sales personality. Individual sales presentations are required.

T48 ADVERTISING COPYWRITING. Three credit hours.
The styles and techniques of copywriting used in modern advertising. A systematic approach to writing copy for various kinds of advertisements.

T49 MARKETING INDUSTRIAL PRODUCTS. Two credit hours.
Prerequisite, T65 Principles of Marketing.
Major trade channels, use of commodity exchanges, market analysis, buying policies, pricing fundamentals, and governmental regulations. Merchandising and product development.

T51 INDUSTRIAL MANAGEMENT I. Two credit hours.
The management and control of manufacturing activities. Product selection and development, physical facilities—plant and equipment; production planning and control. Basic techniques of industrial management.
T52 INDUSTRIAL MANAGEMENT II. Three credit hours.
Materials planning and control, maintenance of quality, traffic management, and overall managerial control problems and techniques.

T53 SURVEY OF BUSINESS. Three credit hours.
The business universe: ownership, organization forms, risk and risk-bearing, finance and the financial system, marketing and transportation, and the effect of government on business.

T54 PERSONNEL MANAGEMENT. Three credit hours.
Personnel functions in business and industry: policies, practices and operating procedures in the areas of employment, training, safety and medical, job evaluation, wages and salary administration, and employee benefits.

T55 MANAGEMENT ACCOUNTING. Three credit hours.
Vertical and horizontal financial statement analysis; material inventories; employee performance; fixed asset additions or replacements; inventory turnover; working capital; trends in departmental operation; cost-volume-profit relationships; break even point; budgeted planning.

T56 INDUSTRIAL ORGANIZATION AND MANAGEMENT. Three credit hours.
The principles and practices of business management. Business operations by major functional groups: organization, finance, production, and marketing.

T57 ADVERTISING PSYCHOLOGY AND RESEARCH. Two credit hours.
The application of the psychological principles of advertising to practical research methods. Problems connected with the objectives of advertising, the determination and presentation of appeals, and measuring of the effect of advertising.

T58 ECONOMIC GEOGRAPHY. Three credit hours.
A study of man in his environment and the effect of geographic factors, national or world wide, on his economic activities.

T59 PRINCIPLES OF MARKETING. Two credit hours.
An overview course of the problems and backgrounds of distribution in a capitalistic, consumer oriented environment: marketing functions, retailing, and wholesaling techniques and the manufacturer's distributive approach.

T60 SALES MANAGEMENT. Three credit hours.
The major problems of sales management in the distribution of products and services: the selection, recruitment, and training of salesmen; measurement of the effectiveness of salesmen; supervision and compensation of salesmen; sales quotas and budgets.

T61 ADVERTISING PRINCIPLES. Three credit hours.
The techniques and procedures used in modern advertising. The selecting of appeals, writing copy, selecting media, fundamentals of layout and typography, and planning advertising campaigns.
STATE UNIVERSITY OF NEW YORK
Central Administrative Office: Albany 1, N. Y.

LIBERAL ARTS COLLEGE
Harpur College at Endicott

MEDICAL COLLEGES
Downstate Medical Center in Brooklyn (New York City)
Upstate Medical Center in Syracuse

COLLEGES OF EDUCATION
College of Education at Albany
College of Education at Brockport
College of Education at Buffalo
College of Education at Cortland
College of Education at Fredonia
College of Education at Geneseo
College of Education at New Paltz
College of Education at Oneonta
College of Education at Oswego
College of Education at Plattsburgh
College of Education at Potsdam

OTHER PROFESSIONAL COLLEGES
College of Forestry at Syracuse University
Maritime College at Fort Schuyler
College on Long Island at Oyster Bay
College of Ceramics at Alfred University
College of Agriculture at Cornell University
College of Home Economics at Cornell University
School of Industrial and Labor Relations at Cornell University
Veterinary College at Cornell University

AGRICULTURAL AND TECHNICAL INSTITUTES
Agricultural and Technical Institute at Alfred
Agricultural and Technical Institute at Canton
Agricultural and Technical Institute at Cobleskill
Agricultural and Technical Institute at Delhi
Agricultural and Technical Institute at Farmingdale
Agricultural and Technical Institute at Morrisville

COMMUNITY COLLEGES
(Locally-sponsored two-year colleges under the program of State University)
Auburn Community College at Auburn
Bronx Community College at New York City
Broome Technical Community College at Binghamton
Corning Community College at Corning
Dutchess Community College at Poughkeepsie
Erie County Technical Institute at Buffalo
Fashion Institute of Technology at New York City
Hudson Valley Technical Institute at Troy
Jamestown Community College at Jamestown
Mohawk Valley Technical Institute at Utica
Nassau Community College at Mineola
New York City Community College of Applied Arts and Sciences
Orange County Community College at Middletown
Queensborough Community College at New York City
Rockland Community College at Suffern
Staten Island Community College at New York City
Suffolk County Community College
Ulster County Community College
Westchester Community College at Valhalla