

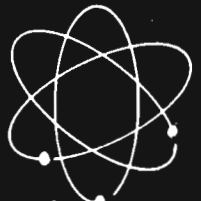
ENTRANCE OFFICE  
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**COLUMBUS**



**AREA**



  
*Technician*

**SCHOOL**



**BULLETIN '66-'67**



BULLETIN OF THE  
COLUMBUS AREA  
TECHNICIAN SCHOOL  
1966 - 1967

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VOLUME I - 4th Edition

## COURSE DESCRIPTION BY DEPARTMENT

Courses offered by the Columbus Area Technician School are coded by a four digit number. The first two digits indicate the department of the Technician School in which the course is taught. This list of digits and departments also is given below. The final pair of digits is the course number for a particular department, and distinguish this course from others in the department. Generally, the final digit in a course number corresponds to the quarter of a student's career that the course is offered. Exceptions are found when a course is offered in different quarters for different curricula.

### COURSE CODING SYSTEM

#### First and Second Digits - Department

- 10 - Communication Skills
- 11 - Mathematics
- 12 - Electronics
- 13 - Drafting
- 14 - Chemistry and Physics
- 15 - Humanities
- 16 - Engineering Mechanics
- 17 - Business Data Processing
- 18 - Business Management
- 19 - Metallurgy
- 20 - Food Processing
- 21 - Architectural Drafting
- 22 - Food Service

#### Third and Fourth Digits - Course Number

01-99 - Department Course Number

## COMMUNICATION SKILLS

- 1001 - COMMUNICATION SKILLS I - 5 class hours  
Reading improvement with emphasis on comprehension. Use is made of recently developed techniques and instruments.
- 1002 - COMMUNICATION SKILLS II - 5 class hours  
Basic English usage. Emphasis is on sentence structure, punctuation, paragraphing, and spelling. Application of the principles of English usage to the various forms of written expression. Analysis is made of each student's strengths and weaknesses.
- 1003 - COMMUNICATION SKILLS III - 5 class hours  
Business and social communication is practiced. Oral presentation is started with emphasis on group presentation. This course includes leadership training in conferences and parliamentary groups.
- 1004 - TECHNICAL WRITING - 2 class hours  
Techniques of collecting and presenting scientific data. Informal and formal reports along with special types of technical papers. Forms and procedures for technical reports are studied and a pattern is established for all formal reports to be submitted in this and other courses.
- 1005 - EFFECTIVE SPEAKING - 2 class hours  
Public speaking with principles of effective oral communication and application of these principles in a variety of practical speaking situations.
- 1014 - COMMUNICATION SKILLS IV - 5 class hours  
Emphasis on business communication skills, including business letters and other business forms. Also, dictation and telephone techniques, business etiquette, and oral and written reports are required.
- 1015 - RESEARCH OF CHEMICAL LITERATURE - 2 class hours  
Designed specifically for practice of techniques in research in the chemical literature. Abstracts, handbooks, current publications. Students become familiar with the advanced methods of classification of chemical literature.

## MATHEMATICS

- 1101 - MATHEMATICS FOR B.D.P. I - 5 class hours  
Number system; algebraic equations, linear equations, negative numbers, negative exponents. Arithmetic of computers; octal, binary and duodecimal systems. Introduction to set and group theory. Emphasis is placed on problem solving.
- 1102 - MATHEMATICS FOR B.D.P. II - 5 class hours  
Graphs, vector spaces, trigonometry.
- 1103 - MATHEMATICS FOR B.D.P. III - 5 class hours  
Continuation of number systems; decimal, binary, octal and conversions. Solving equations of higher degree with two unknowns; fixed and floating point numbers. Matrices and determinants, limits.
- 1104 - MATHEMATICS FOR B.D.P. IV - 5 class hours  
This course is to acquaint the student with the type of logic that a computer uses in its operation. Linear programming, more number systems. Traditional logic and uses in its operation. The memory and circuitry of the machine will be covered. Boolean algebra of propositions with application to switching circuits.
- 1105 - MATHEMATICS FOR B.D.P. V - 3 class hours  
A continuation of Boolean Algebra and symbolic logic with application to data machines.
- 1111 - TECHNICAL MATHEMATICS I - 5 class hours  
The choice of topics and the order in which they are presented integrate mathematics with the technical courses in the curriculum to their mutual benefit. The course includes: solution of linear equations in one, two, and three unknowns, solution of formulae, and ratio, proportion, and variation. This is followed by functional relationships and an introduction to graphing. The conclusion of the course is a review of plane geometry, introduction to the trigonometric functions, and the graphs of the trigonometric functions.
- 1112 - TECHNICAL MATHEMATICS II - 5 class hours  
A continuation of Technical Mathematics I to include vectors and imaginary and complex numbers. Logarithms are introduced and then applied to trigonometry. Trigonometry is expanded to include the study of fundamental identities and the solution of oblique triangles. Determinants are discussed in relation to the solution of simultaneous linear equations. The course concludes with a discussion of quadratics and higher degree equations.
- 1113 - TECHNICAL MATHEMATICS III - 5 class hours  
A continuation of Technical Mathematics II to include plane and solid analytic geometry. The study includes the straight line, circle and conic sections. Algebraic methods are applied to the study of curves and surfaces in three-dimensional space.

- 1114 - TECHNICAL MATHEMATICS IV - 5 class hours  
A continuation of Technical Mathematics III to include graphical calculus, limits, and differentiation and integration of algebraic and trigonometric expressions frequently encountered in technical literature. Successive differentiation, maximum and minimum, differentials, and definite integrals as applied to engineering fields are studied.
- 1124 - CALCULUS FOR ELECTRONICS I - 5 class hours  
The practical application of the differential calculus to the field of electronic circuitry. Functions, average notes, limits, algebraic derivatives, implicit differentiation, differentials, higher derivatives, maximum and minimum.
- 1125 - CALCULUS FOR ELECTRONICS II - 5 class hours  
A continuation of Calculus for Electronics I. Integrals, Definite Integrals, Trigonometric Functions, Logarithmic and Exponential Functions, Hyperbolic Functions.
- 1126 - CALCULUS FOR ELECTRONICS III - 5 class hours  
A continuation of Calculus for Electronics II. Partial Derivatives, Integration Techniques, Double Integrals, Maclaurin's Series, Taylor's Series, Fourier Series, Introduction to Differential Equations.
- 1131 - BUSINESS MATHEMATICS I - 5 class hours  
Training in the mathematical skills required by modern business. Some units help gain speed in making basic calculations. Other units will train in business operations or business forms that call for special application of mathematical skill. Topics studied include: fundamental arithmetic operations, fractions, decimals, percentage.

## ELECTRONICS

- 1211 - BASIC ELECTRICITY, D.C. - 5 class hours, 6 lab hours  
Basic physics of the electron, electric units, and Ohm's Law. Resistance combinations. Meter connections. Magnetism and magnetic circuits. Electric power. Characteristics of electric conductors. Inductance and capacitance. Use of common measuring and metering equipment.
- 1212 - BASIC ELECTRICITY, A.C. - 5 class hours, 6 lab hours  
Characteristics of alternating current waves and time varying circuits; analyzing the behavior of alternating current components; phase and power factor; power measurement in delta and wye connected systems; two-phase and three-phase systems; application of vector algebra in the analysis of series and parallel combinations of impedance.
- 1213 - ELECTRONICS I - 5 class hours, 6 lab hours  
Atoms, electrons, and current flow; two-element electron devices; three-element electron devices; multigrid tubes; special transistors; auxiliary components in electric circuits; A-C circuits in electronics; decibels and sound; the cathode ray oscilloscope.
- 1214 - ELECTRONICS II - 5 class hours, 6 lab hours  
Rectifiers, the vacuum-tube amplifier; the transistor amplifier; transformers and transformer-coupled amplifiers; resistance-capacitance--coupled amplifier; special amplifiers; push-pull and phase inversion; class C amplifiers; feedback.
- 1215 - ELECTRONICS III - 5 class hours, 6 lab hours  
Feedback oscillators; negative-resistance oscillators; miscellaneous sine wave oscillators; nonsinusoidal oscillators; high frequency amplifiers; modulation; detection; audio elements.
- 1216 - FUNDAMENTALS OF DIGITAL COMPUTERS - 5 class hours, 4 lab hours  
Digital computer operations and applications, programming instructions, number systems. Operations and conversions. Logic circuit schematics; Boolean Algebra logic; construction of the computer arithmetic element; data storage devices; input-output units; the control and sequencing element.
- 1224 - TRANSMITTERS AND RECEIVERS - 5 class hours, 6 lab hours  
Introduction to radio circuits and systems; power supply circuit analysis; basic amplifiers, loudspeakers; microphones and phonograph pickups; basic oscillator circuits; r-f amplifiers; the transmitter; transmission of r-f waves; reception and detection of r-f waves; the radio receiver and special receiver circuits; f-m transmitter principles; f-m receiver principles; transistor application to basic circuit; single-sideband communications principles.

- 1225 - ADVANCED ELECTRONIC CIRCUITS - 5 class hours, 6 lab hours  
Introduction; nonsinusoidal waveshapes; multivibrators, blocking and shock-excited oscillators; waveshaping circuits; limiters, clampers, and counters; sweeper-generator circuits; special power supply considerations; development of circuit systems; transistor application to pulse-type circuits; television transmitters and receivers.
- 1226 - INDUSTRIAL AND MICROWAVE CIRCUITS - 5 class hours, 6 lab hours  
Generators and motors; syncros and synchro control systems; servo control devices and systems; industrial electronics; ultrasonics and sonar; introduction to microwaves and microwaves and microwave oscillators; microwave transmitters; microwave duplexers and antennas; special amplifiers and microwave mixers; microwave receivers, multiplexing; radar system principles.
- 1235 - INDUSTRIAL ELECTRONICS - 3 class hours, 2 lab hours  
Designed primarily for mechanical engineering students, this course covers the electron tube, rectifiers and filters, time constants, transistors and diodes, semiconductor theory, amplifiers, gas tubes, ignitron contractor, thyratrons, resistance welding controls, solid-state circuits, magnetic amplifiers, control systems, servo systems, and electronic service instruments.
- 1236 - ELECTRONIC RESEARCH PROJECT - 1 class hour, 4 lab hours  
Individual assignment to the development of apparatus of special interest to the student with the instructor's approval. A written report of the work will be made. Frequent conferences between the student and an advisor will serve to guide the student's progress and the preparation of his report. This course may consist of library research, dealing with the field of special interest to the student and approved by the instructor. The report should follow an accepted form of presentation.



## MECHANICAL DRAFTING

### 1301 - MECHANICAL DRAFTING I - 6 lab hours

This is a beginning course for students who have had little or no previous experience in drafting. The principal objectives are: basic understanding of orthographic projection; skill in orthographic, isometric, and oblique sketching and drawing; ability to produce accurate and complete detail and assemble working drawings; understanding of principles and appropriate applications of descriptive geometry; experience in using handbooks and other resource materials; elementary understanding of design principles in machine parts used as drawing projects; and use of simplified drafting practices in industry. A.S.A. standards are stressed. Interpretation of industrial sketches and prints is introduced when feasible to emphasize accepted drawing practices.

### 1302 - MECHANICAL DRAFTING II - 6 lab hours

A continuation of Mechanical Drafting I. The instructional units provide additional understanding of drafting problems, skills and techniques that are essential to the work of the draftsman; emphasize design applications and the depth of background knowledge needed to carry out drafting and design functions; and introduce several specialized drafting areas that are equally valuable in preparation for the design and production options.

### 1303 - MECHANICAL DRAFTING III - 6 lab hours

A continuation of Mechanical Drafting II. Emphasis is placed on interpretation of industrial prints, familiarity with simplified drafting practices, ability to use handbooks and other source materials, adherence to American Standards for drafting; and the development of skill in sketching. The units dealing with design parts; such as gears, cams, jigs, and fixtures pave the way for greater depth of instruction in the second years design courses.

### 1311 - DRAWING INTERPRETATION - 4 lab hours

An elementary course designed for students having limited drawing experience. Use of templates, including lettering templates; fundamentals of drawing and drafting room practices. Freehand sketching. Principles of descriptive geometry.

### 1312 - ELECTRONIC DRAFTING - 8 lab hours

An elementary course designed for students having limited drawing experience. Fundamentals of drawing and drafting. Use of templates, including lettering and electronic templates. Electrical circuit drawing, terms, symbols, and standards.

## CHEMISTRY AND PHYSICS

- 1401 - GENERAL CHEMISTRY I - 5 class hours, 4 lab hours  
Chem Study curriculum. Unifying principles of chemistry are developed, using laboratory experiment as providing the basis. Atomic theory, nature of matter, and mole concept are discussed. Principles considered include: energy, rate and equilibrium characteristics of reactions, periodicity, molecular interaction in gases, liquids, and solids.
- 1402 - GENERAL CHEMISTRY II - 5 class hours, 4 lab hours  
Continuation of General Chemistry I, with topics of descriptive chemistry in which applicability of chemical principles discussed earlier are seen. Laboratory work continues as the basis for the course.
- 1403 - QUALITATIVE ANALYSIS - 5 class hours, 4 lab hours  
Course offers opportunity to review writing of chemical equations, stoichiometric and equilibrium calculations. Develops the relationship between structure and properties of the elements and their compounds by stressing the systematic group separations and specific confirming tests for the common cations and some anions. The study of chemical reactions and of chemical equilibria is made.
- 1404 - QUANTITATIVE ANALYSIS - 5 class hours, 6 lab hours  
A course for study of the methods used in quantitative chemical analysis. The formation and properties of precipitates the theory of neutralization are discussed. Basic laboratory procedures of gravimetric and volumetric analysis are included.
- 1414 - ORGANIC CHEMISTRY I - 3 class hours, 6 lab hours  
A systematic study of the compounds of carbon and hydrogen and their substituted products. The course includes the study of the important organic compounds including their uses and their chemical behavior. Subject compounds discussed include: alcohols and phenols, halogen compounds, ethers, aldehydes and ketones, carboxylic acids, nitor compounds, amines and diazonium compounds, and sulfur compounds.
- 1415 - ORGANIC CHEMISTRY II - 3 class hours, 6 lab hours  
A continuation of Organic Chemistry I. The emphasis in this course is on some of the more complex areas of organic chemistry. Topics include: organic acid and derivatives, substituted acids, stereoisomerism, carbohydrates, and macromolecules.
- 1416 - ORGANIC QUANTITATIVE ANALYSIS - 4 class hours, 6 lab hours  
Identification and quantitative analysis of organic compounds using traditional and instrumental methods. Course trains the student to think in terms of fundamental organic reactions, particularly reactions of functional groups.

- 1424 - INDUSTRIAL CHEMISTRY I - 3 class hours  
A study of unit operations used in industrial chemistry. Distillation, vacuum separations, and crystallization methods are described. The mathematics of industrial stoichiometry is developed. A study of mass and energy balance is of major importance. The chemical processes: nitration, sulfination, chlorination, bromination, and thermo-cracking are studied.
- 1425 - INDUSTRIAL CHEMISTRY II - 3 class hours  
A continuation of Industrial Chemistry I with discussion of the application of principles to particular chemical industries. Flow sheets of common industrial chemical processes are studied. Tours of industrial plants are included.
- 1426 - BASIC UNIT OPERATIONS - 3 class hours, 6 lab hours  
The course is designed to present fundamental concepts of chemical engineering and to acquaint the student with chemical process equipment, its use, and its application. Laboratory will include basic machine shop and operations needed for fabrication of chemical process apparatus.
- 1435 - CHEMICAL INSTRUMENTATION I - 3 class hours, 6 lab hours  
The methods of instrumental analysis are discussed with emphasis on applications, limitations, and common errors. Maintenance and service of common laboratory instruments is studied. The course includes: introduction to instrumental methods, colorimetry and spectrophotometry, flame photometry, emf measurements and potentiometric titrations, pH meter, and polarography.
- 1436 - CHEMICAL INSTRUMENTATION II - 3 class hours, 6 lab hours  
A continuation of Chemical Instrumentation I. The course includes the theory and use of instruments for mass spectroscopy, infrared and ultraviolet spectroscopy, chromatography and gas chromatography, and X-ray analysis.
- 1445 - PHYSICAL CHEMISTRY I - 3 class hours, 2 lab hours  
The physical behavior of matter is discussed in relation to structure with application to the gas laws, basic principles of thermodynamics and laws of solution are explained. Physical chemical laboratory procedures.
- 1446 - PHYSICAL CHEMISTRY II - 3 class hours, 2 lab hours  
A continuation of Physical Chemistry I. The course includes a study of the second law of thermodynamics, the concept of free energy, chemical equilibrium, and reaction rates.
- 1455 - MATERIALS OF CONSTRUCTION - 3 class hours  
The chemical composition of construction materials and their industrial use is discussed. Resistance of materials to corrosion, and methods of avoiding detrimental corrosion during process conditions is described.

- 1456 - POLYMER CHEMISTRY - 3 class hours, 2 lab hours  
The course comprises the study of the properties, structure, production, and use of organic polymers.
- 1466 - BASIC CONTROLS - 2 class hours, 4 lab hours  
A study of the theory of process control is made. The instruments used for measurement and control purposes in chemical plants are described. Methods of quality control in small and large quantity production are discussed.
- 1481 - PHYSICS (MECHANICS) - 3 class hours, 4 lab hours  
Basic measuring systems, methods and conversions, calculations for physics. Properties of solids, liquids, and gases. Statics and motion. Friction. Work, power, and energy. Simple machines. Course involves laboratory and demonstrations related to lecture.
- 1482 - PHYSICS (ELECTRICITY) - 3 class hours, 4 lab hours  
An introduction to electric circuitry and equipment with emphasis on the concepts of electrical physics. Treatment of this subject as a mathematics based science provides a basis for further study. Nature of magnetism and electrostatics; electrical units. Basic direct current circuits; Ohm's Law; electrical measurement. Sources and effects of electrical current; cells. Electric power and energy. Electromagnetism and electromagnetic induction. Properties and simple circuits of alternating current. Generators and motors.
- 1483 - PHYSICS (HEAT) - 3 class hours, 4 lab hours  
The development of an understanding of the basic principles of heat. Heat engines, refrigeration, and air conditioning.
- 1493 - PHYSICS (HEAT, LIGHT, SOUND) - 3 class hours, 4 lab hours  
The development of an understanding of the fundamental properties and basic principles of heat, light, and sound.

## HUMANITIES

- 1512 - ECONOMICS I - 3 class hours  
A study of the organization and functions of modern economic society with emphasis on production, exchange, and maintenance of production.
- 1513 - ECONOMICS II - 3 class hours  
A continued study of the organization and functions of modern economic society with emphasis on stabilizing of the economy, economic growth, economic distribution and comparative economic societies.
- 1514 - SOCIOLOGY - 3 class hours  
This course analyzes the relationship of the individual and the group to social institutions; and cultural background of our civilization; collective behavior, human ecology and social change. Emphasis is given to the social effects of modern technology and the adjustments of man to his culture.
- 1515 - HUMAN BEHAVIOR - 2 class hours  
This course serves as a basis for the consideration of human behavior problems and understanding oneself. Psychological techniques and principles in present day industry; analysis of modern socio-industrial society.
- 1516 - SUPERVISORY TRAINING - 3 class hours  
The course is designed to introduce the student to examples of inter-departmental conflicts, personnel problems, production problems, problems faced by the supervisor, and some labor and management implications.
- 1522 - GENERAL PSYCHOLOGY - 3 class hours  
An introductory course in general psychology using the application of the scientific method of behavior. Topics include learning, motivation, perception, and personality.
- 1526 - ECONOMICS - CONSTRUCTION - 2 class hours  
Cost estimating with labor and material factors, industry economics, seasonal characteristics, relationship of construction industry with rest of economy, effect of construction industry on rest of economy, strikes within and without, job economics, reference to design techniques, detailing and drawing clarity and completeness.

## ENGINEERING MECHANICS

### 1601 - MANUFACTURING PROCESSES I - 3 class hours

An understanding of present-day manufacturing processes is of extreme importance to students in this technology. This course is designed to provide a background of knowledge covering the various manufacturing materials and the fundamental types of manufacturing methods as employed in cold working processes. Through lecture, demonstration, and practical applications the student is given the opportunity to become familiar with the various types of machine tools, tooling, measuring, and inspection procedures. Automation is introduced.

### 1602 - MANUFACTURING PROCESSES II - 3 class hours

This course is designed to provide background of knowledge covering the various manufacturing materials and the fundamental types of manufacturing methods as employed in hot working processes. Through lecture, demonstration and discussion the student becomes familiar with the various types of welding processes and their applications, with special machining operations such as ultrasonic, electrical discharge, electroarc, and chemical milling, and with some bonding practices and the use of adhesives in modern manufacturing. Some emphasis is also given to metallurgical practices and procedures.

### 1603 - MATERIALS OF INDUSTRY - 4 class hours

Modern industry utilizes a variety of engineering materials with which the student in mechanical technology must be familiar. A study is made of the five general classifications of materials and their application to industrial uses. Special emphasis is given to new materials which have been developed through technological advances.

### 1604 - BASIC MECHANISMS - 2 class hours, 6 lab hours

A review of courses 1301, 1302, and 1303 is given the first week of the fourth quarter, to refresh the students concerning the subjects previously covered. The course also deals with the nomenclature of items used in the design of jigs, fixtures, and machinery. Course 1604 acquaints the students with catalogs, workbooks, and handbooks necessary for use in design work. The students are shown the difference in the application of standard components compared to non-standard components for the design of jigs, fixtures, etc. Practical applications of loads, stresses, weld symbols, finishes, and fasteners relevant to design work are discussed.

### 1605 - MACHINE DESIGN - 1 class hour, 8 lab hours

A course in which the design principles of machine elements are taken up and calculations are made in determining the size and shape of various machine parts. It includes factors which influence the selection of the materials to be used in designing such elements as beams, bearings, clutches, brakes, shafts, bushing, screws, rivets, gears, belts, and flywheels. Attention is given to various types of loading conditions, stresses, deformations, fits, finishes, and other factors which must be considered in the design of machine elements.

- 1606 - TOOL DESIGN - 1 class hour, 8 lab hours  
Lectures, classroom discussion, and actual drawing board work are combined to help the student gain knowledge and experience necessary to design tools commonly used in modern manufacturing. The work consists of designing and laying out cutting tools, gauges, simple jigs, fixtures, and dies. Mass production methods are discussed so that the student may apply the information gained in the practical work to tool designing.
- 1611 - MACHINE TOOLS - 1 class hour, 4 lab hours  
The student gains knowledge and practical experience by using machine shop equipment. Some of the machines are: drill press, shaper, lathe, and milling machine. Speeds, feeds, tool shapes and cutting action are studied.
- 1612 - MACHINE TOOLS II - 1 class hour, 4 lab hours  
A continuation of Machine Tools I. Includes dividing heads and other milling machine attachments; types of grinding machines and the principles governing the selection of grinding wheels; tool grinder operation; use of coolants and lubricants; carbide tools; production machine tools.
- 1613 - MACHINE TOOLS III - 1 class hour, 4 lab hours  
A continuation of Machine Tools I and II.
- 1614 - STRENGTH OF MATERIALS - 3 class hours, 4 lab hours  
Study is made of the internal stresses and deformation of elastic bodies resulting from the action of external forces. The application of the principle of strength of materials is considered fundamental in the design of structures and machines. Emphasis is given to the analysis of the simple and combined stresses and properties of materials to meet the functional requirements in design. In this course, strength of such elements as riveted joints, beams, columns, shafts, and keys are determined.
- 1615 - STATISTICS AND QUALITY CONTROL - 5 class hours  
An elementary approach to the statistical techniques used in the control of the quality requirements of manufactured articles. The course is primarily intended for those who have had no previous experience, although its content is broad enough so that students with some experience will find it both valuable and engaging. The entire course is woven around a core which consists of the application of formulas and control charts.
- 1616 - DESIGN PROBLEMS - 1 class hour, 6 lab hours  
Opportunities in advanced drafting room practice are offered in this course. The student applies his knowledge of mathematics, science, and drawing to practical problems while he is designing complete machines or component parts of machines. He analyzes the problem, gathers data, sketches ideas on paper, does all necessary mathematical calculations, makes working drawings, and finally checks his work. Throughout the course he is encouraged to use his judgment and work on his own initiative.

- 1625 - INDUSTRIAL INSTRUMENTATION - 5 class hours  
This course will touch on the basic physical concepts pertaining to the theory of the types of instruments used in industry. Some of these are pyrometers, thermocouples, expansion, resistance, optical radiation, etc., pressure measurements, manometers. Fundamentals of automatic controllers. Electrical testing devices, the oscilloscope. Lab includes calibration and use of these instruments.
- 1626 - HYDRAULICS AND PNEUMATICS - 4 class hours, 3 lab hours  
A study of the basic components of hydraulic and pneumatic systems and how they are combined to build up various circuits. The emphasis is on the use of hydraulics and pneumatics for power transmission and for control purposes. Both subject areas are treated as basic sciences with emphasis on mathematical analysis and the scientific method. It is recommended that individual term problems requiring a significant amount of handbook design be required for this course.
- 1634 - NUMERICAL CONTROL I - 1 class hour, 2 lab hours  
Number systems, their use, construction, and conversions. Fixed point arithmetic. Tools paths. Equations defining a straight line. Point to point program for automated shop equipment. Machine a simple project. Shop proving. Familiarization with calculators and computers. Systems specifications. Dimensions, speeds, and feeds. Block diagram analysis; tape and card readers.
- 1635 - NUMERICAL CONTROL II - 1 class hour, 2 lab hours  
Use of plane analytic geometry. Practice in solving problems on calculators and computers. Explore systems of different manufacturers. Program test parts for automated shop equipment, machine top surface, drill and bore holes, cut linear grooves and conics from engineering type drawing. Prepare layout drawing defined by series of coordinate points from production type engineering drawing.
- 1645 - MACHINE SHOP - 1 class hour, 4 lab hours  
The use of high speed and tungsten carbides as cutting tools, the advantages and disadvantages of each; their future use and influence on production and machine tool design. The use and operation of milling machines and grinders; the purpose of special and multi-tooled machines, and their relation to modern production methods.



## BUSINESS DATA PROCESSING

- 1701 - UNIT RECORD EQUIPMENT - 5 class hours, 4 lab hours  
Instruction in the theory of card punch and paper punch equipment, with lab exercises involving panel wiring and operations of the following machines: key punch, sorter, interpreter, reproducing punch, collator, accounting machine, and electrical accounting machines. Practical exercises will be typical of those performed in existing installations.
- 1702 - UNIT RECORD EQUIPMENT APPLICATIONS - 3 class hours, 10 lab hours  
Students are required to make complete case studies. Presentations include card forms, flow charts, schedules, systematic problem solving, etc.
- 1703 - COMPUTER SYSTEMS AND PROGRAMMING - 5 class hours, 6 lab hours  
This course will give the student the background that is necessary in understanding unit record and computing machines. All computer systems regardless of size, type, or basic use have certain common fundamental concepts and operational principles. This course is not an introduction to any specific machine but is intended to provide a background for future detailed study of specific systems. The remainder of the quarter will be devoted to introductory programming. A problem with loader will be written in machine language. Autocoder for the computer will then be presented as an introduction to processors and additional problems will be written in this synthetic language.
- 1711 - SYSTEMS ANALYSIS I - 2 class hours  
An introduction to the use of flow charting techniques to describe and define accounting activities and the use of these tools in developing data processing applications.
- 1712 - SYSTEMS ANALYSIS II - 2 class hours  
A continuation of Systems Analysis I.
- 1715 - INTRODUCTION TO COBOL - 2 class hours  
An introduction to COBOL, a compiler language. This programming language has an English vocabulary and grammar. No actual computer running will be done in this course.
- 1716 - COBOL - FORTRAN - 5 class hours, 2 lab hours  
Actual machine experience in COBOL will be practiced.

FORTRAN - Fortran is a higher level programming language which enables the programmer to state his problems in an algebraic form. Although this language is oriented toward scientific applications, the increasingly quantitative approach to forecasting, inventory control, and other business processes, makes the use of this language necessary.

COBOL - Common Business Oriented Language

FORTRAN - Formula TRANslator

- 1721 - PRINCIPLES OF B.D.P. ACCOUNTING I - 5 class hours  
The interpretation and use of accounting data and financial reports for managerial decisions and administration control. Methods of evaluating alternative courses of action, future planning and control of current operations.
- 1722 - PRINCIPLES OF B.D.P. ACCOUNTING II - 3 class hours  
Applies in depth to the data card system concept as performed on data processing machines. The emphasis is accounting as a source of data management control rather than on bookkeeping skills.
- 1723 - SOURCE DOCUMENT MACHINES - 2 class hours  
This course will teach the "programming" of the class of semiautomatic writing machines introduced in Systems Analysis.
- 1724 - DATA SYSTEMS I - 3 class hours  
A three quarter sequence that presents the systems and procedures function, including the analysis, design and control of management information and data communications systems. The economics of manual, electro-mechanical and electronic data processing. The advantages and limitations of computer, communication and information retrieval systems as tools of managerial control. Feasibility study techniques and the evaluation of equipment. Installation, organization and operation of a computing facility.
- 1725 - DATA SYSTEMS II - 3 class hours  
A continuation of Data Systems I.
- 1726 - DATA SYSTEMS III - 3 class hours  
A continuation of Data Systems II.
- 1734 - PROGRAMMING I - 5 class hours, 4 lab hours  
This sequence of two courses is designed to give the student a complete knowledge of computers. Specifics will be taught such as machine coding, languages, utility programs, table hook up, address modification, program switches, program checks, subroutines, etc.
- 1735 - PROGRAMMING II - 5 class hours, 4 lab hours  
A continuation of Programming I.
- 1755 - COMPUTER APPLICATIONS LABORATORY - 2 class hours, 4 lab hours  
Provides training in programming techniques and symbolic coding for a computer installed in the Technician School. Scientific, business, and engineering problems as they would be programmed on the computer will be taught. Binary computers; the highly sophistic computers; how they differ from other computers and the roles they play in modern computer installations.
- 1756 - COMPUTER EXOTIC APPLICATIONS - 2 class hours, 2 lab hours  
A course in advanced techniques of programming systems. This course is designed to keep the student abreast of the rapidly moving field of programming.

1765 - SYSTEMS OBSERVATIONS AND OPPORTUNITIES - 1 class hour

Visiting lecturers and field trips. Survey of industrial laboratories and job opportunities will take the students to different computer installations in the area to study and observe actual programs being processed relative to organization and application.

1766 - CASE STUDY OF SYSTEMS SELECTIONS - 20 lab hours

Advanced systems design carried on with minimum detailed direction from the instructor. Whenever possible this will be on-the-job work at some installation in or near Columbus.

## BUSINESS MANAGEMENT

- 1801 - PRINCIPLES OF MARKETING I - 3 class hours  
A study of marketing fundamentals, consumption and consumer behavior and retailing and wholesaling structures.
- 1802 - PRINCIPLES OF MARKETING II - 3 class hours  
A continued study of marketing with emphasis on the functions performed in marketing, marketing policies and a critical appraisal of the field of marketing.
- 1803 - WHOLESALING I - 3 class hours  
An introduction of the place wholesaling has in the American economy.
- 1804 - WHOLESALING II - 3 class hours  
A study of the scientific management of a wholesale enterprise.
- 1811 - SALESMANSHIP I - 3 class hours  
A study into the field of selling. Preparations necessary for selling, sales process and introduction into the sales management field.
- 1813 - MANAGEMENT I - 3 class hours  
The basic aim of this course is to supply the student with a realistic overview of the principles and practice in the management area.
- 1814 - MANAGEMENT II - 3 class hours  
A continuation of Management I with an insight into the psychological areas of management.
- 1820 - COOPERATIVE EMPLOYMENT PROGRAM, WHOLESALING - 20 credit hours  
Full time employment with a wholesale establishment.
- 1821 - INTRODUCTION TO BUSINESS I - 3 class hours  
This course is designed to give a description of business, to develop an awareness of the economic framework that constitutes our capitalistic system and to increase the student's business vocabulary.
- 1822 - INTRODUCTION TO BUSINESS II - 3 class hours  
An introduction to personnel, finance, managerial controls and law. Regulated industries and taxation.
- 1823 - BUSINESS LAW I - 4 class hours  
This course presents a legal framework of business for beginning students.
- 1824 - BUSINESS LAW II - 4 class hours  
A continuation of Business Law I with a coverage of government regulations, trust, and insurance.

- 1831 - INTRODUCTION TO RETAILING - 3 class hours  
Principles and methods of retail management including: organization, policy making, location, operations, selling, services, records, inventory, expense control, insurance, coordination of a store.
- 1832 - PERSONNEL MANAGEMENT - 3 class hours  
Principles and methods of line and staff executive personnel management responsibilities including: organization, policy making, procurement and placement, supervision, training, evaluation, wage and salary administration, benefit programs, labor relations.
- 1833 - CASE STUDY I - 3 class hours  
Case Study I will allow the student to apply the training he has received both on the job and in the classroom in a practical manner. It allows the student to become acquainted with many of the wholesaler's managers.
- 1834 - CASE STUDY II - 3 class hours  
This course follows the same format of Case Study I. The student will work with a classroom instructor and different wholesalers.
- 1842 - SALES PROMOTION - 3 class hours  
A study of the various sales promotion activities including advertising, retail display, and coordination of an effective sales promotion program.
- 1843 - ACCOUNTING I - 3 class hours  
A study of the principles and practices of elementary accounting. Designed to give a broad knowledge of accounting in its practical application.
- 1844 - ACCOUNTING II - 3 class hours  
A continuation of Principles of Accounting I. This course allows the student to put his accounting skills to practical work.
- 1853 - CREDITS AND COLLECTION - 3 class hours  
The growth and development of the credit function as it pertains to retailing institutions and the problems of the collection accounts.  
Retailing institutions and the problems of the collection accounts
- 1854 - RETAILING BUYING - 3 class hours  
A study of the merchandising function of retailing, the buyer's role and how he fulfills it.
- 1864 - RETAIL CASE STUDY - 5 class hours  
This course allows the student to apply the training he has received on the job and in the classroom in a practical manner.
- 1874 - RETAIL STORE OPERATIONS - 3 class hours  
A study of the operating function in retailing. Covers receiving, marking, stock warehousing, merchandise repair and alteration, packing, delivery, customer services, maintenance of the physical plant and other operating functions.

1881, 1882, 1883, 1884 - COOPERATIVE EMPLOYMENT PROGRAM, RETAIL

10 hours

During the four quarters of the Retail Mid-Management curriculum, the student is placed on a full time (30 hours or more) job in a retail establishment to aid him in learning the use of the knowledge and skills introduced to them in class. The cooperating employer is responsible to offer a broad educational experience in retailing. At least two times each quarter the instructor-coordinator receives a formal rating on the progress of each student. A grade is given for this work based upon the quality of learning as evidenced by the instructor-coordinator.

1885, 1886, 1887, 1888 - SPECIAL PROBLEM IN RETAILING - 2-5 hours

This course is one in which the student utilizes the knowledge gained from his work experience in course 1881, 1882, 1883, 1884 respectively. This course is taken at the time the student is participating in the work experience.

## METALLURGY

### 1901 - FOUNDRY PRACTICES - 1 class hour, 2 lab hours

A course in elementary foundry practice; molding of simple aluminum castings; crucible furnace operation; preparation of synthetic molding sands; sand testing and application to other materials; theory of sand control and interpretation of graphs; introduction to investment casting; match plate making and production; core making and core blowing; sand additives; shell molding.

### 1902 - ELEMENTS OF METALLURGY - 2 class hours

This course serves as a basic introduction to the field of Metallurgy. The fundamentals of metal refining, chemical composition, grain structure, heat treating, properties and mechanical testing of alloys are studied.

### 1903 - METALLURGY I - 3 class hours, 2 lab hours

An introduction to physical and process metallurgy. The structure of pure metal and alloy characteristics. Basic phase diagrams and metal structures. Refining processes. Production processes for iron and steel, copper, and aluminum.

### 1904 - METALLURGY II - 5 class hours, 4 lab hours

Review of basic metallurgical structures and phase diagrams including the iron-iron carbide system. Structures and properties of annealed carbon steels. Isothermal and continuous cooling transformations of austenite. Effects of low alloy content on the iron-iron carbide phase diagrams, steel structure and properties, Jominy Hardenability. Laboratory portion of course includes cutting, mounting, polishing, etching, and microscopic study of metallurgical specimens. Metallographs are used with complete utilization of photographic plates and polaroid cameras.

### 1905 - METALLURGY III - 5 class hours, 4 lab hours

Surface hardening of steel. Effects of high alloy content on the iron-iron carbide phase diagram and the structure and properties of the resulting stainless steels, tool steels, and cast irons. Copper, aluminum and magnesium base alloys including phase diagrams, structures and properties. Laboratory includes surface hardening of production steels. Heat treatment of high alloy ferrous materials including stainless steels, tool steels, and cast irons. Solution treatment and precipitation hardening effects demonstrated with aluminum alloy.

### 1906 - METALLURGY IV - 5 class hours, 4 lab hours

Metallurgical aspects and typical equipment for casting, welding, forging, stamping, and powder metallurgy in finished parts production. Machinability. Furnace atmosphere and effects. Corrosion and corrosion protection by cleaning, plating and painting, and conversion coatings. Laboratory includes practice and/or observations of the process of casting, welding, forging, stamping, powder metallurgy, and furnace atmospheres with respect to resulting structures and hardness. Corrosion and corrosion protection. Spark tests and spot testing.

1913 - HEAT TREATMENT OF METALS - 3 class hours, 4 lab hours

This course serves as a study of all phases of heat treatment of metals, both theoretical and practical. The process of heat treat, the equipment, the results of alloying elements, the properties obtained, the grain structure and growth, surface treatments, diffusion of material, and mechanical testing methods and practice are studied. Through the use of lectures, demonstrations, and practical application the student is given the opportunity to become familiar with the phases of heat treatment.

1914 - METAL CASTINGS - 1 class hour, 4 lab hours

Sand testing and control in core making and core blowing; sand additives; investment making; shell molding; match plate engineering for tensile bars; melting with, and control of, electric arc and induction furnaces; alloy gating and risering practice.

1916 - NON-DESTRUCTIVE INSPECTION - 3 class hours, 4 lab hours

Non-destructive testing such as x-ray, penetrant, ultrasonic, and magnetic detection of structural defects in ferrous and non-ferrous and non-metallic materials in the cast, welded, stamped, or molded forms. Application and function of equipment components.

1924 - PRINCIPLES OF METALLURGY - 3 class hours, 2 lab hours

An introductory course in physical metallurgy emphasizing the relationship between micro-structure and physical mechanical properties of metals. Course work includes studies of crystal formation, grain structure, hot and cold working, heat treatment, and control of mechanical properties. Practical examples of selection of materials are given.

1926 - SPECTROSCOPY - 3 class hours, 4 lab hours

Nature of light and electromagnetic spectrum; study of spectrographic equipment. Theory and practice of photography of the spectrum and film calibration. Study of qualitative procedure by emission spectra. Quantitative analysis laboratory work consists of spectrographs and photographic calibration. Qualitative and quantitative analysis of alloys.

1946 - METALLURGY OF INDUSTRY - 2 class hours, 2 lab hours

This course is designed to cover many phases in recently developed metallurgical techniques such as, welding and weld design; powder metallurgy; induction heating; die casting; automatic casting; continuous casting; rolling mills; new metal and alloy production. Plant visitation.



## FOOD PROCESSING

- 2001 - INTRODUCTION TO FOOD PROCESSING - 3 class hours  
History of man and food. The nature of food. Development of food processing industries. Modern methods of processing. Legal aspects of the food industry.
- 2002 - FOOD INSPECTION AND GRADING - 3 class hours  
The study of the principles on which quality of food is based. The attributes of quality and the identification of these attributes. General considerations concerning the production of foods of acceptable quality. Study of the United States Standards concerned with this subject.
- 2003 - PHYSICS FOR FOOD TECHNOLOGY - 5 class hours, 8 lab hours  
A study of the principles of mechanics, light, heat, sound, radiation and electricity and their application in food industry.
- 2004 - FOOD CHEMISTRY - 5 class hours, 4 lab hours  
Chemical analysis of Food Products. Laboratory procedures and methods of the industry.
- 2005 - MICROBIOLOGY - 5 class hours, 4 lab hours  
Microbiological laboratory techniques. Role of molds, yeasts, bacteria in foods.
- 2014 - FOOD PROCESSING EQUIPMENT AND PLANT OPERATION I - 3 class hours, 10 lab hours  
Operation and maintenance of food processing plant equipment. Unit operations and integrations of operations.
- 2015 - FOOD PROCESSING EQUIPMENT AND PLANT OPERATION II - 3 class hours, 10 lab hours  
Operation and maintenance of food processing plant equipment. Unit operations and integrations of operations. Plant layout, services, supplies.
- 2016 - FOOD PROCESSING EQUIPMENT AND PLANT OPERATION III - 3 class hours, 10 lab hours  
Operation and maintenance of food processing plant equipment. Unit operations and integrations of operations. Plant organization, personnel, and supervision.
- 2024 - AGRICULTURAL PRODUCTS PROCUREMENT - 3 class hours  
Assembly of raw material for processing. Organization of and quality assurance of supplies.
- 2025 - FOOD PRODUCT EVALUATION - 3 class hours, 6 lab hours  
Examination of food products. Interpretation of quality factors. Process operations as they influence quality.

- 2026 - QUALITY CONTROL - 3 class hours, 4 lab hours  
Fundamentals of quality assurance in process operations. Quality control as an economic tool. Organization and operation of a quality control department.
- 2035 - MARKETING OF PROCESS PRODUCTS - 3 class hours  
Principles of and practice of distribution of processed food products.
- 2036 - FOOD PLANT SANITATION - 3 class hours, 2 lab hours  
Industrial house keeping. Buildings, grounds, equipment and personal cleanliness. Federal, state and municipal regulations. Economic aspects.
- 2046 - USE OF TESTING INSTRUMENTS - 3 class hours, 2 lab hours  
The use and maintenance of instruments and devices used in food processing operations and in evaluating processed food products.
- 2056 - SEMINAR - 4 lab hours  
Discussion of topical aspects of the food industry.

## ARCHITECTURAL DRAFTING

- 2101 - ARCHITECTURAL DRAWING I - 5 class hours, 16 lab hours  
A course designed to give the beginning student a foundation in the graphic presentation of objects. Concepts include linework, lettering, orthographic projections, isometric, and oblique drawings, and an introduction to the drafting techniques and practices of architectural work. Use of perspective projections and shades and shadows.
- 2102 - ARCHITECTURAL DRAWING II - 5 class hours, 16 lab hours  
An introductory course to architectural working drawings. The study and development of plans, sections, elevations, and details and the preparation of a set of working drawings for a small structure.
- 2103 - ARCHITECTURAL DRAWING III - 5 class hours, 20 lab hours  
A continuation of Architectural Drawing II. Consideration of mechanical inclusions in structures (heating, plumbing, electricity, air conditioning, etc.); continuation in the preparation of working drawings with respect to commercial and industrial type structures of steel and masonry construction. Instruction in the selection of framing systems and material usage.
- 2104 - ARCHITECTURAL DRAWING IV - 4 class hours, 14 lab hours  
The course deals with the design and checking of suitable steel sections to be used as beams, girders, lintels, columns and struts, the design of simple frames, the use of bar joists and open web long span joists, the design of timber beams, girders, columns and wood floors. Different types of fasteners are discussed and vector diagrams are employed to solve for the loads on the various members of a frame. In addition to static loads, wind and impact loads are dealt with.
- 2105 - ARCHITECTURAL DRAWING V - 5 class hours, 16 lab hours  
Students prepare complete working drawings for a moderate-sized building type. A school, community center and church are typical problems.
- 2106 - ARCHITECTURAL DRAWING VI - 5 class hours, 16 lab hours  
Preparation of complete working drawings for a large-sized building type such as an apartment house, office building, department store or multi-story building.
- 2111 - MATERIALS OF CONSTRUCTION I - 3 class hours, 4 lab hours  
Introduction to Materials of construction. Nomenclature, manufacturing tolerances, jointing methods, stress characteristics, indications at various scales (plan and elevation), shop drawing organization, layout and requirements, methods of measurement, job tolerances and techniques and specification requirements.
- 2112 - MATERIALS OF CONSTRUCTION II - 3 class hours, 4 lab hours  
A continuation of Materials of Construction I.

- 2114 - MECHANICAL SYSTEMS I (HEATING AND VENTING) - 2 class hours, 4 lab hours  
Introduction to various methods and systems of heating and venting, conventional indications and nomenclature, coordination of heating and venting plans with rest of building. Association Handbooks, construction techniques, tolerances of design and construction of job, schedules and detail requirements, trade relationships and coordination required, (between Electricity, Mechanical and Structural), shop drawings, and research forecasts.
- 2115 - MECHANICAL SYSTEMS II (ELECTRICITY) - 3 class hours, 4 lab hours  
Association Handbooks, trade literature, conventional indications and nomenclature, coordination of electrical system with structural, architectural and other mechanical systems, schedules, detail requirements (essential notes, etc.), shop drawings, and research forecasts.
- 2116 - MECHANICAL SYSTEMS III (PLUMBING) - 3 class hours, 4 lab hours  
Association Handbooks, trade literature, conventional indications and nomenclature, coordination with building design and other trades, schedules, detail requirements, shop drawings, and research forecasts.
- 2121 - SURVEY OF ARCHITECTURE I - 2 class hours  
Lecture series with outside reading required. Introduction to major architectural styles, proportion characteristics, materials characteristics, technical advances in construction, application to modern techniques of design and construction, and appreciation of the esthetic of the various styles.
- 2122 - SURVEY OF ARCHITECTURE II - 2 class hours, 4 lab hours  
A continuation of Survey of Architecture I.
- 2123 - STRUCTURAL SYSTEMS I (STEEL) - 3 class hours, 4 lab hours  
All Steel Construction Handbook use in drafting room for other than design. Schedules required, plan layouts, details and notes required, coordination of steel drawings with building plans, joint and connection details, shop drawing organization, layout and checking, modern construction techniques and research forecasts.
- 2124 - STRUCTURAL SYSTEMS II (CONCRETE AND MASONRY) - 3 class hours, 4 lab hours  
The use of Association Handbooks of all related trades and materials, schedules required, plan layouts, details and notes required, coordination of details and structural plans with architectural and mechanical layouts, joint and connection details, shop drawing organization, layout and checking, modern construction techniques and research forecasts.

- 2125 - STRUCTURAL SYSTEMS III (WOOD) - 5 class hours  
The use of Association Handbooks of all related trades, schedules required, wood truss systems, post and beam techniques, types of construction, plan layouts and notes, detail notes and requirements, coordination of details with rest of architectural, structural and mechanical layouts, shop drawing organization of structural and finish millwork, modern plywoods and laminates, modern techniques of construction and research forecasts.
- 2126 - SPECIFICATIONS AND CONTRACTS PROBLEMS - 3 class hours  
A study of some of the regular and business aspects of the law pertinent to the engineering profession with special emphasis on various types of contracts used in the construction industry. Instruction also is afforded in the field of bidding procedures and the availability of surety bonds and insurance. Specifications are analyzed from the standpoint of construction features.
- 2135 - FREEHAND DRAWING I - 1 class hour, 4 lab hours  
Sketch techniques for office practice needs with particular emphasis on detail perspectives to better explain complicated elements of construction.
- 2136 - FREEHAND DRAWING II - 1 class hour, 4 lab hours  
A continuation of Freehand Drawing I.
- 2146 - ARCHITECTURAL OFFICE PROCEDURES - 2 class hours  
Economics of architect's office, overhead, salaries, and direct costs, drafting room procedures, discipline in office, coordination techniques, job supervision, time schedules for drawings before construction, requirements of architect's office during construction, procedures of drawing and technical literature, filing, drafting standards of office, standard operating procedures of office.

## FOOD SERVICE

### 2201 - ORIENTATION - 2 class hours

Presentation of the philosophy of institution food service, and covers the development and expansion of feeding practices. An over-all view of opportunities available to trained food service personnel in hospitals, restaurants, schools, nursing homes, and like institutions. Provides general background of organization, functions, and management of dietary departments.

### 2202 - NUTRITION I - 5 class hours

A study of normal nutrition and its role in promoting good health. Includes composition and functions of foods, digestion and metabolism. Nutritional needs throughout the life cycle.

### 2203 - NUTRITION II - 5 class hours, 2 lab hours

Continuation of Nutrition I. Emphasis is on selection of foods in terms of nutrients and menu planning of the basic normal diet.

### 2204 - MODIFIED MENU PLANNING - 5 class hours, 4 lab hours

Ways in which the normal adequate diet can be modified to treat various conditions - variations in caloric content, consistency and nutrient composition. Understanding of related medical terminology and abbreviations. Preparation and tasting of special diet meals.

### 2205 - PERSONNEL MANAGEMENT - 5 class hours

Management of personnel from initial interview and placement through organized orientation and training programs. Evaluating employee performance by the use of rating forms and periodic consultations. Emphasis is on human relations and its effect on the success of the operation as a whole.

### 2206 - MAINTENANCE, CARE AND USE OF EQUIPMENT - 5 class hours, 2 lab hours

Principles and standards for the selection of small and large dietary equipment. A comprehensive study of fabricating materials and quality, sanitation procedures, and preventive maintenance for each type of equipment. Actual usage instruction and practice.

### 2211 - BASIC PRINCIPLES IN FOOD PREPARATION I - 3 class hours, 2 lab hours

Introduction to foods. Development of methods of cookery which result in good appearance, palatability and conservation of nutritive values. Actual preparation of beverages, cereals, meats, other protein entrees, soups, vegetables, salads and salad dressings, and bakery products.

### 2212 - BASIC PRINCIPLES IN FOOD PREPARATION II - 2 class hours, 4 lab hours

Application of food preparation principles to quantity production. Use and holding of foods, recipes, standard products, portion control.

Principles and practices of menu planning as related to school, industrial, hospital, and commercial institutions. Consideration of costs and utilization of employees and equipment. Food purchasing, receiving and storage.

- 2214 - FOOD SERVICE AND DISTRIBUTION - 3 class hours, 4 lab hours  
Determination of the kind of food service best adapted to the needs of various types of institutions. Physical layouts. The flow of related problems and considerations. Effective merchandising. Observation field trips.
- 2215 - FIELD EXPERIENCE I - 4 class hours, 12 lab hours  
Participation in actual working situations. This is a supervised experience designed to provide the practical application of all principles learned in all courses. Affiliation with selected food services include: Hospital (patient and personnel).
- 2216 - FIELD EXPERIENCE II - 4 class hours, 20 lab hours  
Participation in actual working situations. This is a supervised experience designed to provide the practical application of all principles learned in all courses. Affiliation with selected food services includes: One-half quarter in commercial food service, one-half quarter in other food service (non-hospital). May be school lunch or college feeding, nursing home or retirement center.
- 2223 - SANITATION AND SAFETY - 3 class hours, 2 lab hours  
Detailed study of the control of bacteria in the food service industry with good practices in housekeeping, sanitary food handling, and personal cleanliness. Practical problems concerned with protection of health and with prevention of food spoilage and contamination. Importance of safety and accident prevention and how to achieve it.
- 2224 - TECHNIQUES IN SUPERVISION - 5 class hours  
Application of basic psychology of human behavior and technical knowledge to skillful supervision. Interpretation of goals. Methods of communication --job description, procedures, reports, schedules, oral and written direction, and conference leadership. Specific techniques for motivating employees and developing work methods in production management.
- 2225 - RECORDS AND COST CONTROL - 3 class hours, 2 lab hours  
Records needed in quantity food service operations and their importance in budgeting and financial controls. Consideration of "tools" used to effect savings in food costs such as waste prevention, security measures, efficient purchasing, and specific techniques of standardizing portions. Relationship of management functions to labor cost control with work simplification and effective use of employees' time.
- 2226 - SEMINAR - 3 class hours  
Preparation of the student for taking her place in the working society. Coverage of such topics as ethics of the dietary profession, responsibilities of the food service supervisor to management, cooperation with other departments, importance of continuing education, personal qualification, job applications and interviews.

## AEROSPACE

- 2501 - GROUP GUIDANCE AND ORIENTATION - 4 class hours  
This course deals with safety, general overall aspects of the program, and basic counseling to help each student understand his aptitudes, interests, achievement patterns as they relate to his sixth quarter optional choice of an aerospace specialization to build over his A and P licensing.
- 2502 - AIRCRAFT WELDING & MATERIALS - 2 class hours, 4 lab hours  
Is designed to bring the technician's welding skills and use of related materials to the standard of the A and P technician's license.
- 2503 - SCIENCE FOR AEROSPACE VEHICLES - 5 class hours  
A concentrated course of science materials related to this area.
- 2514 - ENGINE OVERHAUL I - 5 class hours  
Is a course designed to give the student basic theory related to reciprocating and jet engines.
- 2515 - ENGINE OVERHAUL II - 17 lab hours  
Is a course designed to give basic understandings in good shop practices, use of manuals, and general application to engine overhaul work.
- 2524 - CARBURETION THEORY - 4 class hours  
Is a course dealing with all aspects of mixing fuels with air or compressed oxygen for power purposes.
- 2525 - CARB LAB - 10 lab hours  
Is a course designed to give the student opportunity to overhaul, test, and trouble shoot various types of carburetors.
- 2533 - FEDERAL AIR REGULATIONS - 3 class hours  
Is designed to acquaint the technician with current federal air regulations regarding aviation maintenance and procedures for the legal requirements associated with A and P's.
- 2542 - AIRCRAFT FABRICATION - 5 class hours, 5 lab hours  
Deals with all types of aircraft construction (materials and processes).
- 2552 - AIRFRAME MAINTENANCE I - 10 class hours  
Is a course designed to give the student a comprehensive knowledge of various types of maintenance as they relate to various aircraft and trouble shooting situations.
- 2553 - AIRFRAME MAINTENANCE II - 17 lab hours  
Is a course designed to give the student an opportunity to apply principles, knowledge, methods and procedures learned in 2552 to real aircraft.



- 2560 - LUBRICATION THEORY - 2 class hours  
Is a course designed to acquaint the students with the various characteristics of lubrication and its application in aerospace vehicles.
- 2561 - LUBRICATION SYSTEMS LAB - 3 lab hours  
Is a course designed to give the student opportunity to work with various lubrication systems and to gain understanding in methods of solving potential lubrication problems.
- 2562 - AIRCRAFT SYSTEMS THEORY - 10 class hours  
Is a course designed to provide theory associated with various aircraft systems not specifically handled elsewhere in this course. For example: warning, hydraulic and pneumatic systems.
- 2563 - AIRCRAFT SYSTEMS LAB - 15 lab hours  
Is a course designed to provide opportunity for the student to work with these various systems and to gain understanding in solving potential problems associated with them.
- 2570 - ELECTRICITY IN AEROSPACE VEHICLES - 5 class hours  
Is a course in AC and DC basic electricity.
- 2571 - IGNITION THEORY - 3 class hours  
Is a course designed to provide theory associated with magnetoes, low tension systems, also jet and rocket engine ignition systems.
- 2572 - IGNITION LAB - 6 lab hours  
Is a course designed to give student opportunity to work on various magnetoes including testing and trouble shooting methods.
- 2573 - ELECTRICITY THEORY - 3 class hours  
Is a continuation of 2570 into more detailed study of aircraft electrical motors, generators, alternators, wiring, and various devices.
- 2574 - ELECTRICITY LAB - 6 lab hours  
Is a course to provide opportunities for the student to work with various electrical components and systems in order to gain understanding in solving potential problems associated with them.
- 2575 - PROPELLER THEORY - 3 class hours  
Is a course designed to acquaint the student with various types of propellers and their principles of operation.
- 2576 - PROPELLER LAB - 6 lab hours  
Is a course designed to provide opportunities for the student to work on various types of propellers and become proficient in various methods of maintenance of these propellers. The student must learn legal limitations concerning repairs for propellers.

- 2593 - GENERAL LAB OR COOP - on - JOB TRAINING - Aircraft license various hours  
Is designed to round out the necessary experience and time requirements  
for each applicant in order to give him sufficient hours to take the federal  
examination.
- 2594 - GENERAL LAB OR COOP - on - JOB TRAINING - Powerplant license various  
hours  
A continuation of 2593.
- 2598 - SEMINAR - 3 class hours  
In advanced electrical circuits, digital computers and microwave circuits  
is a three hour course to familiarize the aerospace student with general  
terminology and principles in these areas. This will terminate his  
electronic aerospace specialization. The student should take an achieve-  
ment examination in this area to assist with potential placement.
- 2599 - SEMINAR IN AIRCRAFT OR POWERPLANT - 1 class hour  
These are courses in either A or P that give general treatment to the  
overall fields.