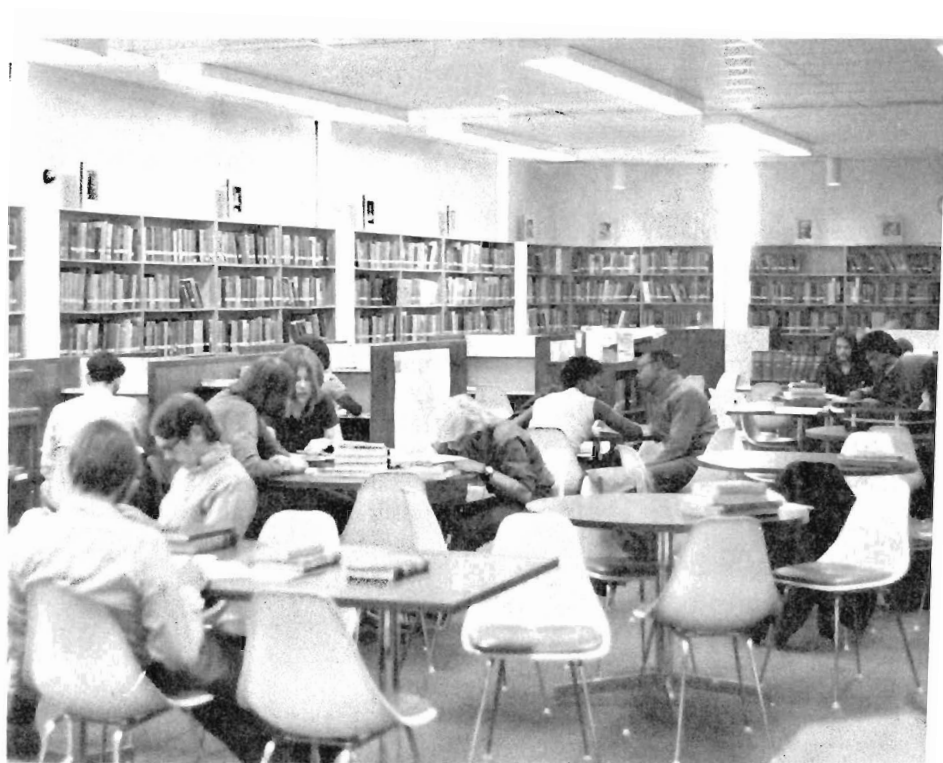


Columbus Technical Institute



1971-72 Bulletin



Curriculum

Communication Skills

1000—*Review of Grammar*

Fundamentals of English grammar and spelling. 2 credits

1001—*Communication Skills I*

Training in reading and listening, with emphasis on retention and comprehension of printed materials, and on overcoming barriers to listening. Vocabulary, including study of exact meanings of words and word combinations and in the various technologies. 3 Credits

1002—*Communication Skills II*

A course aimed at developing skills in writing clear, concise exposition. Emphasis on the paragraph and the essay. 3 Credits

1003—*Communication Skills III*

A continuation, in part, of Communication Skills 1002, expanded to include argumentation and persuasion, summaries, and letters. 3 Credits

1004—*Technical Writing*

Forms and procedures for making technical reports. Practice in writing technical papers and establishment of patterns for reports required at school or in industry. 2 Credits

1005—*Effective Speaking*

Public speaking employing principles of effective oral communications in a variety of practical speaking situations. 1 Credit

1014—*Communication Skills IV*

Emphasis on business communication skills, including business letters and other business forms. Dictation and telephone techniques, business etiquette, and oral and written reports. 3 Credits

1015—*Research, Chemical Literature*

Practical research of chemical literature and preparation of abstracts of chemical literature. 2 Credits

1016—*Intensive Business English*

This course emphasizes learning to write business letter by doing. Grammar and mechanics of writing are integrated with instruction and practice in writing business letters. For students whose technology programs have provided previous experience with business letters, telephone technique, and business etiquette. † 1003 or 1014. 3 Credits.

1021—*Journalism*

An introduction to mass media, centered on the newspaper. Lab work on the TECHNIGRAM in one or more of the following: reporting, news writing, feature writing, editings, make-up, and critical writing. 3 Credits

1024—*Speech*

A study of the elements of good speech, with emphasis on persuasion. Techniques for addressing large and small meetings. Technology oriented. 2 Credits

1031—*Introduction to Literature*

An introduction to three major areas of literature: drama, short fiction, and poetry. An introduction to and practice in the basic techniques of literary criticism and analysis. 3 Credits

1095—*Development Reading*

The development of the ability to select the reading method in relation to the study objective and type of material being read. The development of the ability to read rapidly through the use of more efficient patterns of eye movements. The development of the ability to comprehend the material being read at a satisfactory level determined by the purpose of the reading. 1 Credit *Class hours - 3*

Mathematics Department

1100—*Review of Algebra—I*

A development of arithmetic to algebra including elementary algebraic operations. An introduction to set notation and set relations; linear equations and inequalities plus problem solving by equation. 4 Credits. *Class hours - 5*

1101—*Mathematics For B.D.P.—I*

A study of the definitions, symbols, and operations of set theory. Basic algebraic operations. Linear equations and inequalities in one and two variables. Relations and functions. Trigonometric ratios and right triangle trigonometry. 4 Credits.

1102—*Mathematics For B.D.P.—II*

Exponential, Logarithmic, and Trigonometric Functions. An introduction to the Theory of Equations. A comparison of base 10 and octal, hexadecimal, and binary number systems. Determinants and determinant solutions of simultaneous systems of equations. 4 Credits.

1103—*Mathematics For B.D.P.—III*

Matrix solutions of linear systems. Linear programming solutions by graphing, algebraic, matrix, and simplex methods. Series, sequences, arithmetic and geometric progressions. Boolean Algebra, basic circuits and Boolean properties. 4 Credits.

1104—*Mathematics For B.D.P.—IV**

Analytic geometry including straight line properties, conic sections, and polar coordinates. Third and fourth degree equations and curves. 4 Credits.

1105—*Calculus For B.D.P.**

An introduction to differential and integral calculus. Limits, derivatives, linear motion. Maxima and minima, application to curves. Related rates. Integrals, and the integral as an area, linear motion. 4 Credits.

1110—*Introduction to Technical Mathematics*

A review of special products and factoring; algebraic fractions; exponents, radicals, and complex numbers; quadratic equations and inequalities; graphing and systems of equations and inequalities. 4 Credits. *Class hours - 5*

1111—*Technical Mathematics I*

Solution of linear equations in one, two, and three unknowns. Solution of formulae, ratios, proportions, and variations. Functional relationships and an introduction to graphing. Geometry, trigonometric functions. 4 Credits.

1112—*Technical Mathematics II*

Vectors, imaginary and complex numbers. Logarithms, trigonometry of fundamental identities. Solution of oblique triangles. Determinants and higher degree equations. 4 Credits.

1113—*Technical Mathematics III*

Plane and solid analytic geometry, including the straight line, the circle, conic sections, curves and surfaces in three-dimensional space. 4 Credits.

1114—*Technical Mathematics IV*

Calculus, limits, and differentiation, and integration of algebraic and trigonometric expressions. Successive differentiation, maxima and minima, differentials and definite integrals. 4 Credits.

1120—*Slide Rule Operation*

Multiplication and division. Squares, cubes, roots. Trigonometric functions, logarithms, complex numbers and vectors. 1 Credit.

1124—*Calculus For Electronics I**

Practical application of differential calculus to electronic circuitry. Functions, limits, algebraic differentiation, differentials, higher derivatives, maxima and minima, and introduction to integrals. 3 Credits.

1125—*Calculus For Electronics II**

A continuation of Calculus for Electronics I. Definite integrals, trigonometric functions, logarithmic and exponential functions, hyperbolic functions. 3 Credits.

1126—*Calculus For Electronics III**

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. 3 Credits.

1131—*Business Mathematics*

Fundamental arithmetic processes emphasizing common and decimal fractions. Percentage methods are applied to cash and trade discounts, commissions, markup and depreciation. Simple interest on promissory notes and unpaid balances. Bank discount, compound interest, tables and formulas. Payroll computations. Income statement and balance sheet analysis. Statistics and graphs. Stocks and bonds. 4 Credits.

1134—*Statistics*

Graphical representation of statistical data, measures of central tendency and variability, and elementary probability. An application of: tests of hypothesis; regressions and correlation analysis; normal, chi-square, and "t" distributions. 4 Credits.

1171—*Public Service Mathematics*

The review of arithmetic includes definitions, laws, common and decimal fractions, percentage, ratio, proportion, powers and roots. Basic algebra includes notations, definitions, operations, equations and fractions. Geometry includes triangles, circles, cylinders, spheres and other figures. Trigonometry includes right triangles and vectors. 4 Credits.

Electronics Engineering Technology

1201—*Electronic Drafting**

An elementary course. Fundamentals of drawing and drafting. Use of templates, including lettering and electronic templates. Electrical circuit drawing, terms, symbols, and standards. 2 Credits.

1211—D C Fundamentals

An introduction to dc fundamentals, electronic physics, current and voltage. Work, power, series and parallel resistances. Network theorems, magnetic circuits, electrical measurement devices, inductance and capacitance. 4 Credits.

1212—A C Fundamentals

Analysis of alternating-current fundamentals. Reactance, complex algebra, and impedance. Networks and power. Transformers, coupled circuits, and polyphase systems. † 1112, 1211, 1261. 4 Credits.

*1213—Introductory Electronic Devices**

Introduction to electron devices. Vacuum tubes and transistors. Auxiliary components. Rectifiers, filters, and regulators. Basic amplifiers. 1212, 1261. 4 Credits.

*1214—Electronic Devices Circuit Analysis**

Analysis of vacuum tube and transistor circuits. Small-signal and large-signal methods. Amplifiers and coupling. Special amplifiers, feedback, and oscillators. 1213, 1262. 4 Credits.

*1215—Communications Electronics I**

Communication circuits and systems. Power supply, transducers, transmission. AM & FM transmitters and receivers. Television. Single side band and multiplex. 4 Credits.

*1216—Digital Computers**

Digital computer operations and applications. Boolean algebra. Logic circuits and design. Computer systems.* All first year courses, 1214, 1225, 1234 respective labs. 4 Credits.

*1225—Pulse and Logic Circuits**

Nonsinusoidal circuits. Pulse amplification and wave-shaping. Multivibrators. Time-base and logic circuits. Transient analysis. † All last year courses, 1213, 1234. 4 Credits.

*1226—Industrial Electronics**

Industrial devices and utilization concepts. Timers, welders, photoelectric devices and ultrasonics. Magnetic systems, rotary devices, and servo and synchro systems. † 1214, 1233. 4 Credits.

*1234—Modern Semiconductor Devices**

Field effect transistors, integrated circuits, operational amplifiers, opto-electronics, and miscellaneous electronic devices. 4 Credits.

2135—*Computer Programming**

An introduction to computer programming. Computer language. A Digiac 3080 computer is made available for student use throughout the program. 1 Credit.

2136—*Communications Electronics II**

A continuation of Communications I. Ultra-high frequency, transceiver, microwave, principles and systems, and antennas. † 1215. 3 Credits.

1246—*Analog Computers**

Fundamentals of analog computers covering circuits and equipment. 2 Credits.

1261—*DC Laboratory*

Laboratory study of DC fundamentals, electrical measurement devices, network theorems. 2 Credits.

1262—*AC Laboratory*

Laboratory study of signal sources, Oscilloscopes, reactance, AC networks, transformers, and filter circuits. † 1112, 1211, 1261. 2 Credits.

1263—*Introductory Electronic Devices Laboratory**

Laboratory study of thermionic emission, vacuum tube characteristic and amplifiers, and transistors characteristics and amplifiers. 1212, 1262. 2 Credits.

1264—*Electronic Devices Circuit Analysis Laboratory**

Laboratory study of amplifiers, oscillators, special purpose devices, response, and feedback. 2 Credits.

1265—*Communications Laboratory**

Laboratory study of communication circuitry, AM, FM, commercial systems. 2 Credits.

1266—*Digital Computer Laboratory**

Laboratory study of complete systems utilizing logic trainers, memory core trainers, the Digiac 3080 and SCM 7816 computers. 2 Credits.

1274—*Modern Semiconductor Devices Circuit Laboratory*

Laboratory study of the FET, integrated circuit and other modern devices.

1276—*Pulse And Logic Laboratory**

Laboratory study of pulse, wave shaping circuits, logic circuits, and transients. 2 Credits.

* Technical Courses

† Prerequisites

Basic Sciences Department

1300—*Introduction To Chemistry*

A general survey of basic inorganic chemistry with emphasis on atomic structure, nomenclature of compounds, balancing equations, and calculations of products formed in pounds or grams. 3 Credits. *5 class hours*

1311—*Basic Inorganic Chemistry*

An introductory course in fundamental chemical concepts and laboratory techniques. Atomic structure, periodic classification of elements, chemical equations, chemical calculations, solutions, acids and bases, oxidation-reduction reactions, and the gas laws. 5 Credits.

1312—*Introduction To Organic Chemistry*

A course in fundamental organic chemistry. The study of carbon compounds: aliphatic hydrocarbons, alcohols, ethers, aldehydes, ketones, organic acids, esters, amines, and aromatic compounds. An introduction to carbohydrates, lipids, and proteins. Related laboratory. 5 Credits.

1320—*Introduction To Biological And Physical Sciences I*

The course stresses the fundamental principles of scientific methodology as applicable to any science but especially to the biological sciences. Major topics include measurement (stressing accuracy and precision), significant numbers, exponents, logarithms (pH), elements of importance to living organisms, and the structure and properties of matter needed to explain chemical interactions in the living organism. 4 Credits.

1321—*Physiology And Anatomy I*

Explanation of the basic functioning mechanisms of bacteria and viruses, animal tissues, organs, and systems. 4 Credits.

1322—*Physiology And Anatomy II*

This course familiarizes the health technology student with the various systems of the body. Systems covered in this course include skeletal, muscular, circulatory, respiratory, urinary, nervous, digestive, and reproductive. 4 Credits.

1330—*Introduction To Biological And Physical Science II*

The course stresses the fundamental principles of scientific methodology as applicable to any science but especially to the biological sciences. Major topics include solutions, colloids, buffers, enzymes, oxidation and reduction (energy production), principles of electricity as applied to the neuromuscular system, and cell anatomy and physiology. 4 Credits.

1351—*Biological And Physical Sciences I*

Relevant content from various areas of the natural sciences, physics, chemistry, microbiology and genetics, integrated around a core of anatomy and physiology. 7 Credits.

1352—*Biological and Physical Sciences II*

A continuation of 1351. 7 Credits.

1353—*Biological And Physical Sciences III*

A continuation of 1352. Attention directed toward the inter-relationships of all systems of the body. 7 Credits.

1380—*Introduction to Physics*

A discussion of physical principles stressing the experimental basis of physical law and the mathematical description of natural phenomena. Lectures, discussions, problem solving, and demonstrations. Independent reading is encouraged. 3 Credits.

1381—*Physics (Mechanics)*

A course in the fundamentals of mechanics and an introduction to the mathematical formulation of physical theory. Laboratory exercises are designed to illustrate and to assist the ideas presented in the lectures, as well as to develop in the student a disciplined approach toward his work. Major topics include particle motion, Newton's laws of motion and of universal gravitation, equilibrium of rigid bodies, work and energy, conservation principles, and rotational motion. 4 Credits.

1382—*Physics (Electricity and Magnetism)*

A course in the fundamentals of electricity and magnetism. Major topics include electric charge and fields, capacitance and resistance, currents, DC circuits, magnetic forces and fields, magnetic properties of matter, induced electromotive force, and alternating current. Related laboratory and demonstrations. 4 Credits.

1383—*Physics (Heat, Sound, Light)*

A course in the fundamentals of heat, sound, and light. Major topics include temperature and thermal expansion, heat, capacity, heat transfer, ideal gases, thermodynamics, wave motion and sound, diffraction, reflection and refraction of light, mirrors and lenses. Related laboratory and demonstrations. 4 Credits.

1392—*Basic Physics*

An examination of the basic principles of physics stressing the relationship between theory and experiment. The understanding of the role of experiment in the development of physical theory is reinforced by laboratory exercises and demonstrations. Topics are selected from mechanics, heat, sound, light, electricity and magnetism, and atomic physics. 3 Credits.

Chemical Engineering Technology

1401—*Chemistry For Engineering Technologies I**

Atomic theory, the nature of matter, the mole concept, and other unifying principles of chemistry. Basic inorganic and physical chemistry. Lectures supplemented by laboratory or demonstrations. † 1111†, 1300 or H.S. Chemistry. 5 Credits.

1402—*Chemistry For Engineering Technologists II**

Metals: processes for obtaining pure metals from ores and compounds. Non-metals: industrial processes and compounds. † 1381, 1401. 5 Credits.

1403—*Inorganic Qualitative Analysis**

A systematic survey of the properties of the various elements and their compounds. Laboratory work in the identification and confirmation of the radicals in the mixture containing three cations and three anions. Writing of chemical equations, basic stoichiometry, and basic equilibrium calculations. † 1112, 1402. 4 Credits.

1404—*Inorganic Quantitative Analysis**

Methods and techniques used in the quantitative analysis of substances. Preparation of standard acids, basic and redox reagents; the gravimetric and volumetric determination of sulfates, chlorides, and metals. Some complex gravimetric and volumetric procedures. † 1113, 1403. 5 Credits.

1414—*Organic Chemistry I**

Fundamental organic chemistry. A study of carbon compounds: aliphatic hydrocarbons, alcohols, ethers, aldehydes, ketones, organic acids, esters, and amines. An introduction to complex organic compounds such as alkaloids. Concurrent laboratory work for qualitative determination of organic compounds. † 1414. 5 Credits.

1415—*Organic Chemistry II**

Continuation of 1414, with special emphasis on aromatic compounds. Solution of problems dealing with the establishment of the structure of organic compounds. Laboratory analysis leading to the separation and identification of simple organic mixtures. † 1414. 5 Credits.

1416—*Organic Quantitative Analysis**

Quantitative analysis of organic compounds via functional groups. Preparation of organic compounds and the study of associated techniques. † 1404, 1415. 5 Credits.

1424—*Industrial Chemistry — Inorganic**

A study of the commercial methods of manufacturing inorganic chemicals. Field trips to local plants manufacturing inorganic chemicals. Chemical plant instrumentation. † 1113, 1403. 3 Credits.

1425—*Industrial Chemistry—Organic**

A study of the commercial methods of manufacturing organic chemicals. † 1423. 3 Credits.

1426—*Basic Unit Operations—Chemical Plant Instrumentation**

An introduction to basic chemical engineering theory and practice, with emphasis on the solution of engineering problems. † 1424. 3 Credits.

1436—*Instrumental Chemical Analysis**

A study of the methods of instrumental analysis, including the spectrophotometric analysis of metals and other substances, the determination of sulfur and carbon in steel by the r-f induction heating method, the determination and uses of pH and gas chromatograph and polarograph. † 1382, 1383, 1404, 1415, 1425. 5 Credits.

1445—*Physical Chemistry**

An introduction to physical chemistry. Study of the gaseous, liquid, and solid states. Atomic structure of elements, basic thermodynamics, thermochemistry, and solutions. Laboratory experiments to supplement the theoretical treatment. † 1382, 1383. 4 Credits.

1446—*Physical Chemistry II**

A continuation of 1445. The study of chemical equilibrium, entropy, and free energy, ionic equilibria, and buffer action. † 1445. 4 Credits.

1456—*Precise Analysis**

The systematic gravimetric and volumetric analysis of organic or inorganic unknown samples. † 1404, 1415, 1425 and 1445. 4 Credits.

Behavioral Sciences

1501—*Beginning Philosophy*

A definition of philosophy and its historical development. Survey of the great thinkers, logic and scientific method. Modern revolution in philosophy. Brief survey of Existentialism. 3 Credits.

1505—*General Economics*

An introductory course designed to help the student improve his understanding of how a market economy operates, acquire an understanding of the major tools or principles that have proved useful in making economic decisions or solving economic problems, and to acquire skill in using these tools or principles to conduct economic analysis. 2 Credits.

1514—*Sociology*

An introductory course which draws heavily from the mainstream of empirical literature incorporating the use of sociological method and logic with emphasis on obtaining knowledge about what *is*. Emphasis on fundamental concepts of human society and factors affecting its development. 3 Credits.

1515—*Human Behavior*

Awareness of human behavior patterns. Interpersonal communication methods. Realization of self and interaction with others. 2 Credits.

• 1516—*Political Science*

An introductory course encouraging a view of the American political system as one among many. Analytic concepts that have been elaborated in the general field of comparative politics are applied to the United States. The material of the course is organized around the theme of "systems analysis." 2 Credits.

1522—*Psychology*

An introductory course demonstrating application of the scientific method in coverage of the traditional topics as well as the presentation of research procedures and modern findings in the fields of general psychology. 3 Credits.

1523—*Child Psychology*

A course encouraging the student to examine and experience psychological aspects of the development stages of childhood and adolescence. Attempts to bring together the results of significant research of how children develop from infancy through adolescence. While "normal" development is emphasized, a wide range of behavior is included in the concept of normality. 4 Credits.

1524—*Adult Psychology*

A course encouraging the student to examine and experience psychological aspects of the development stages of adulthood from young adulthood through old age. Attempts to bring together the results of significant research of how adults develop from youthhood through the aged, terminal stage and death. While "normal" development is emphasized a wide range of behavior is included in the concept of normality. 4 Credits.

1531—*Child Development I*

Study of the development patterns of children with emphasis on physical, social and emotional maturation with emphasis on the early years; environmental influences and guidance will be discussed. Observation of children will be an integral part of this course. 3 Credits.

1532—*Child Development II*

Study of the growth and development of children from six through adolescence with emphasis on developmental patterns and individual differences. Observation will be an integral part of this program. 3 Credits.

1533—*Physical Handicaps*

Orientation to the most common disabling conditions from infancy through aging. Included will be the study of etiology, physical manifestations, and basic rehabilitation concepts; available community resources and procedures for referral; basic A.D.I. (Activities of Daily Living) modifications that can be made within the home to assist the rehabilitation process. 3 Credits.

1534—*Developmental Disabilities*

Specific instruction in prevention, and remediation of developmental disability in children. Included will be the study of etiology, basic assessment, and concepts of remediation techniques. 3 Credits.

1535—*Speech and Audiology*

Psychology of the ear and how it functions. Malfunction of the ear. How to recognize hearing impairment. Distinctions between speech and language. Normal course of speech sound development. Recognition of "different" versus "deficient" speech patterns. What constitutes language. Normal course of language development. Recognition of "different" versus "deficient" speech patterns.

Mechanical Engineering Technology

1600—*Introduction To Drafting**

Fundamentals of drafting: line work, lettering, orthographic projection, and isometric drawing. 2 Credits.

1601—*Mechanical Drafting I**

A beginning course including principles of orthographic, isometric, and oblique projection. Dimensioning, sectioning, and applied descriptive geometry. Emphasis on making complete detail and assembly drawings. † 1600 or H.S. drafting. 2 Credits.

* Technical Courses

† Prerequisites

1602—*Mechanical Drafting II**

A continuation of Mechanical Drafting I, including advanced drafting practices, industrial standards, and the drawing of machine elements. † 1601. 2 Credits.

1603—*Materials Of Industry**

A study of the mechanical and physical properties of the materials of construction. Emphasis on the use of reference data and calculations for applying these materials to the best practical and economic advantage. Standard testing procedures used to evaluate these materials, which include steel, cast iron, wood, brick, cementing materials, concrete, rubber and plastics. † 1112. 3 Credits.

1604—*Basic Mechanisms**

A study of the basic mechanisms used in the construction of industrial machinery, such as linkages, cams, and gear trains. † 1113, 1602. 3 Credits.

1605—*Machine Design**

A study of the design of machine elements: beams, bearings, shafts, gears, clutches, power screws, and fasteners. Emphasis on loading and stress considerations in the design. † 1113, 1602. 4 Credits.

1606—*Tool Design**

A study of the principles of design of production tooling, including jigs, fixtures, and various types of dies. † 1113, 1602. 4 Credits.

1611—*Machine Tools**

A study of the operation of the basic machine tools and the related theory. Cutting tool materials, cutting tool geometry, machining time, indexing, and helical milling. 5 Credits.

1612—*Manufacturing Processes I**

A course in the basic manufacturing processes used in production of machine parts. Study of the extraction and refinement of metals, production machining methods and production machine tools, precision dimensional inspection methods, hot-forging methods, cold-working methods, metal stamping and foundry methods. † 1111. 5 Credits.

1613—*Manufacturing Processes II**

continuation of Manufacturing Processes I. Laboratory work in welding and visits to manufacturing plants. Further study of cast metals. Welding equipment and procedures, welds, and weld inspection. Injection molding and powdered metals † 1112, 1612. 2 Credits.

* Technical Course † Prerequisite

1615—*Statistical Quality Control**

An elementary course in statistical techniques and their application to quality control in manufacturing. † 1112. 3 Credits.

1616—*Design Problem**

An advanced project in which the student uses his knowledge and initiative to analyze a problem in machine design; gathers data, makes sketches, calculations, and working drawings, and checks his work. † 1113, 1602. 4 Credits.

1626—*Hydraulics And Pneumatics**

A course in the elementary theory of fluid flow and power transmission in hydraulic machine. Emphasis on the design, the principles of operation, and the use of hydraulic components in hydraulic and pneumatic circuits. † 1113. 5 Credits.

1634—*Fortran IV**

Elementary computer science concepts. The language rules of Fortran. Writing programs. Testing on the IBM 360/40. † 1113. 3 Credits.

1635—*Numerical Control**

A fundamental course, including principles of numerical control, operation sheets, transfer of references, programming manuscript, tape preparation, and basic numerical control systems. Programming of a machine part requiring a point-to-point application, and production of the part on the numerical control machine tool. Programming and production of a more complex machine part on the numerical control machine. An introduction to the APT program. Numerical control aspects of tooling. Computer programming. Study of advanced applications of numerically controlled manufacturing equipment. † 1634. 4 Credits.

1644—*Strength Of Materials I**

A review of statics followed by a study of stresses caused by externally applied loads. Center of gravity, moment of inertia, thin-walled cylinders and spheres, riveted joints, welded joints, torsion, shear diagrams, and bending-moment diagrams. † 1113. 4 Credits.

1645—*Strength Of Materials II*

A continuation of Strength of Materials I, including stresses in beams, deflections of beams, statically indeterminate beams, columns, eccentrically applied loads, combined stresses and stress concentration. † 1644. 4 Credits.

Business Data Processing Technology

1701—*Unit Record Equipment*

An introduction to the card punch, sorter, interpreter, reproducer, collator and 407 Accounting Machines. Lab exercises are completed on each based on class lectures. 4 Credits.

1712—*Systems Analysis I**

An introduction to the use of flow charting techniques to describe and define accounting activities. Use of these tools in developing data processing applications. 1 Credit.

1713—*Systems Analysis II**

A continuation of Systems Analysis I, analyzing and improving accounting systems. Automated data processing systems. † 1712. 1 Credit.

1715—*COBOL Programming*

Extensive work is done on COBOL programming techniques and debugging methods. Lab problem are used in conjunction with lectures. 2 Credits.

1716—*Compiler Languages*

Theories and techniques of FORTRAN, RPG, and PL/1 are examined in lectures and lab programs. 6 Credits.

1723—*Source Document Machines*

This course includes methods of using semiautomatic machines and their programming plus lectures on telecommunications and data transmission. Specific machines are used on lab projects in these areas. 1 Credit.

1724—*Data Systems I**

The first in a three-quarter sequence in basic systems analysis, functions, and principles. Organization, manuals, data and forms, systems concepts, and systems writing. Work projects and preparation of a systems manual. † 1713. 2 Credits.

1725—*Data Systems II**

A continuation of Data Systems I. Systems writing, systems analysis and procedures, systems manuals, records, and techniques. Work projects and updating and expansion of the systems manual begun in the first quarter. † 1724. 2 Credits.

1726—*Data Systems III**

The final course in the three-quarter sequence. Team projects requiring application of all principles studied in the two previous courses. † 1725. 2 Credits.

1731—*Introduction To Programming I*

Computer theories and Assembler Language Coding are introduced and lab exercises are completed on the IBM/360 Model 40 computer. † 1701. 5 Credits.

1732—*Introduction To Programming II*

Methods of data organization and file processing are presented in lectures and aided by lab programs. † 1702. 6 Credits.

1734—*Programming I*

Advanced methods of file design and programming are presented with an introduction to Index Sequence methods. 5 Credits.

1735—*Programming II*

Methods of creation and maintenance of Index Sequential files are examined in lab programs. Direct access methods are also presented. † 1734. 5 Credits.

1744—*Cost Accounting**

The nature and purpose of cost accounting. Accounting for materials and labor. Factory overhead expenses. The job cost system, process cost, and standard cost accounting. Other costing problems. † 1844. 1 Credit.

1755—*Computer Applications Laboratory**

A laboratory course supplementing 1735. Practice in programming techniques and symbolic coding on a computer installed in the technical institute. † 1734. 3 Credits.

1756—*Computer Exotic Applications**

Selection and executive of a creative, challenging programming project of the student's choice. † 1735. 3 Credits.

1781—*Introduction To Data Processing**

An introduction to data processing. Terminology, applications to business problems, and limitations. 2 Credits.

Business Management Department

1801—*Marketing*

A study of marketing fundamentals, consumption and consumer behavior, retailing and wholesaling structures. The functions performed in marketing, marketing policies, and a critical appraisal of the field of marketing. 5 Credits.

1802—*Economics*

Concepts basic to an understanding of business economics. Subjects covered are scarcity, specialization, competition, monetary and fiscal operations, employment, international trade, comparative economic societies, stabilization of the economy, economic growth, and economic distribution. 4 Credits.

1803—*Personal Finance**

The organization and function of our modern economic society with emphasis on personal investing, insurance programs, capital requirements for business, and return on invested capital. 2 Credits.

1811—*Personal Selling*

A study of selling, including preparation for selling, sales processes, and an introduction to sales management. 3 Credits.

1812—*Government And Business*

A study of various government legislation and regulations and how they effect business, the consumer, and society as a whole. 2 Credits.

1813—*Management*

A realistic approach to the principles and practices of management. 2 Credits.

1814—*Non-Personal Selling*

Advertising and sales promotion as it applies to retail, industrial, and other types of business establishments. Included is market research as applied to promotional activities. 2 Credits.

1821—*Introduction To Business*

A general introduction to business activities, the capitalistic system, and business terminology. Personnel, finance, managerial controls, law, regulated industries, and taxation are included. 3 Credits.

1823—*Business Law I*

A survey of the legal framework of business, including contracts, agency, sales, negotiable instruments, bankruptcy, partnerships, and corporation law. 3 Credits.

1824—*Business Law II*

A continuation of Business Law I, covering government regulations, trust, and insurance. 3 Credits.

1832—*Personnel Management**

The philosophy, principles, and methods of personnel management: organizational structure, areas of responsibility and authority, policy making, procurement and placement, training, evaluation, wage and salary administration, and benefit programs. 2 Credits.

1835—*Industrial Relations**

A survey of industrial relations, including the history of the labor movement, labor legislation, collective bargaining, daily contract administration, and grievance procedures. 2 Credits.

1841—*Accounting*

Basic bookkeeping principles. Interpretation and use of accounting data and financial reports for managerial decisions and administrative control. Methods of evaluating alternative courses of action, planning for the future, and controlling current operations. Application of the data card system concept. 4 Credits.

1843—*Accounting I*

The interpretation and use of accounting data and financial reports in making managerial decisions and exerting administrative control. Methods of evaluating alternative courses of action, planning for the future, and regulating current operations. 3 Credits.

1844—*Accounting II*

Application of the data card system concept as carried out on data processing machines. Emphasis on accounting rather than bookkeeping skills as a source of data management control. 3 Credits.

1851—*Principles Of Transportation*

Introduction to modes of transportation as related to the economy and to culture. Adaptability of various types of transportation. Possible growth and development. Ecological implications. 3 Credits.

Metallurgical Engineering Technology

1901—*Fundamentals Of Metallurgy I**

A study of the crystal lattice structure of metals, alloy systems, solidification and equilibrium diagrams. 2 Credits.

1902—*Fundamentals Of Metallurgy II**

A study of the mechanical properties of metals, plastic deformation, hardening mechanisms, annealing, hot working grain size, the iron-carbon diagram, and plain carbon steels † 1111, 1901. 2 Credits.

1903—*Fundamentals Of Metallurgy III**

A study of the function of alloying elements in steels, alloy steels, surface treatment of steels and cast ferrous metals. † 1902. 3 Credits.

1904—*Heat Treatment Of Metals**

A study of the hardenability of metals including isothermal transformation diagrams, Jominy end-quench curves, quenching media, furnace atmospheres, grain size, carbonizing, nitriding, and precipitation hardening. Industrial production and heat treating are also studied † 1111. 5 Credits.

1905—*Fundamentals Of Metallurgy IV**

A study of non-ferrous metals and alloys, corrosion of metals, powder metallurgy, and a brief survey of extractive metallurgy. † 1903. 3 Credits.

1906—*Tool Steels**

A study of tool steels, their classification, microstructure, mechanical properties, hot-working characteristics, machinability and heat treatment. Typical applications of tool steels and their service wear characteristics. † 1112, 1904. 2 Credits.

1911—*Metallurgical Laboratory Methods I**

A course in mechanical testing procedures, including tensile tests, use of the extensometer and recorder, compression tests, transverse rupture tests, hardness tests, impact tests, torsion tests, fatigue tests, and the Jominy End-Quench Test. † 1112. 3 Credits.

1912—*Metallurgical Laboratory Methods II**

A course in laboratory metallographic methods, including the construction and use of metallurgical microscopes and the metallograph. Emphasis on the preparation and analysis of metallurgical samples and photomicrographs. † 1911. 3 Credits.

1913—*Metallurgical Laboratory Methods III**

A brief introduction to electron microscopy and x-ray diffraction techniques. Primary emphasis on the study of non-destructive testing methods, including radiograph, magnetic particle inspection, fluorescent penetrant inspection, and ultrasonic inspection. † 1912. 2 Credits.

1914—*Chemical Metallurgy**

A study of the chemistry laboratory methods of analyzing steels and cast irons. Concentrated work in the accurate determination of carbon, sulfur, manganese, and silicon. † 1111, 1402. 3 Credits.

1921—*Welding Metallurgy**

Welding methods and their effects upon the metal in the weld-affected zone. Temperature distribution in welds, microstructures in the well-affected zone, shrinkage in welds, preheating, postheating, fluxes and slags. Metallurgical problems associated with welding. † 1904. 5 Credits.

1922—*Metal Castings**

Instruction in the production of metal castings and cast metals, including mold making, core making, melting, casting design, casting defects, and foundry sand. † 1901, 1904. 5 Credits.

1924—*Principles Of Metallurgy*

An introduction course in physical metallurgy emphasizing relationship between micro-structure and physical-mechanical properties of metals. Studies of crystal formation, grain structure, hot and cold working, heat treatment, and control of mechanical properties. Selection of materials. † 1381. 3 Credits.

1925—*Metallurgical Instrumentation**

A study of the basic principles of environmental measurements, such as temperature, pressure, displacement, fluid flow and strain. Special emphasis on pyrometry, including recording instruments, strain gages, and strain-gage techniques. † 1111, 1382, 1383. 5 Credits.

1926—*Spectroscopy**

A study of the nature of light, the electromagnetic spectrum, and spectrographic equipment. Qualitative and quantitative spectrographic analysis of alloys. † 1111, 1382, 1383. 3 Credits.

Architectural Drafting

2101—*Architectural Graphics I**

Fundamentals of lettering, linework, orthographic projections, isometric and oblique drawings, elementary descriptive geometry, and preliminary drawing techniques used in the architect's office. Field trips. 5 Credits.

2102—*Architectural Graphics II**

Fundamentals of detailing, note organizations, line techniques, referencing, titling, poche, and arrangement. Advanced descriptive geometry. Field trips. 5 Credits.

* Technical Courses

† Prerequisites

2103—*Architectural Graphics III**

Site development requirement including coordination with local government authorities for right-of-way, utilities, zoning and codes checking, development of topography and meets and bounds of property. Introduction of construction surveying and the use of the level and transit on the construction site. Field trips. † 1112, 2102. 5 Credits.

2104—*Architectural Graphics IV**

Perspective line presentation, working drawing layout techniques for various plan types and sizes. Evaluations and reference techniques. Field trips. 5 Credits.

2105—*Architectural Graphics V**

Selected details which involve several trades such as curtain wall construction, elevator construction, roof structure and craneway construction. Multiple floor and wall finish details, coordination of details with working drawing of projects. Working drawing organization and specification notes. Field trips. 5 Credits.

2106—*Architectural Graphics VI**

Complete working drawing project with office procedures and requirements emphasized. Detailed coordination with consultants' drawings and manufacturers' literature. Independent use of office product files and technical information. Field trips. 5 Credits.

2111—*Materials Of Construction I**

The manufacture, distribution, fabrication and job assembly of wood, cement and concrete, masonry, steel, nonferrous metals, gypsum, glass, bituminous materials, and building papers. Field trips. 3 Credits.

2112—*Materials Of Construction II**

The manufacturing, distribution, fabrication and job assembly of building board, plastics, exterior wall materials, thermal insulation, flooring, roofing, sound insulation, interior wall finishes, sealants, caulking, protective and decorative coatings. Field trips. 3 Credits.

2114—*Mechanical Systems (Heating and Ventilating)**

Fundamentals of comfort conditioning. Methods of heating, ventilating, and air conditioning; coordination with the elements of the building. Job construction techniques, detailing, schedules, trade association recommendations, shop drawings. Conventional symbols and nomenclature. Economic evaluations and research forecasts. Field trips. † 2103. 4 Credits.

2115—*Mechanical Systems (Electrical Equipment)**

Fundamentals of lighting, electrical systems equipment for buildings. Essentials of electrical code and association standards. Conventional symbols, nomenclature and layouts. Coordination of electrical work with the elements of the building, computer techniques fixture and equipment schedules, electrical work economics, and research forecasts. Field trips. † 2103. 4 Credits.

2116—*Mechanical Systems (Plumbing and Sanitation)**

Plumbing codes and standards, layout techniques, conventional symbols and nomenclature, coordination with other elements of building, schedule, details, shop drawings, economics, research forecasts, and computer techniques. Field trips. † 2103. 3 Credits.

2121—*Survey Of Architecture**

A survey of architecture in America from 1600 to present. The men and ideas that shaded construction. Emphasis on modern construction. 3 Credits.

2122—*Structural Systems I (Wood)**

Wood construction techniques and detailing of conventional, post and beam, panel, prefabrication, light and heavy truss, millwood and laminated plywood systems. Shop drawing techniques and checking. Field trips. 3 Credits.

2123—*Structural Systems II (Steel)**

Drafting room use of steel construction handbook and steel detailing. Structural plan layout, details, schedules, shop drawing techniques and checking, coordination of steel elements with other parts of building. Computer techniques in structural work, and economics of steel construction. Field trips. † 1112. 3 Credits.

2124—*Structural Systems III (Concrete and Masonry)**

Drafting room use of concrete reinforcing steel handbook and masonry handbook. Fundamentals of construction details and detailing, shop drawings, shop and job fabrication. Job layout and construction techniques. Coordination with other elements of the building, computer techniques, and economics of concrete construction. Field trips. 3 Credits.

2125—*Estimating**

Building cost estimating methods, detailed materials and labor takeoff methods, contractors' overhead costs, wage-withholding and payroll deduction. Insurance, tax, bond, and economics of construction costs. Cost control in the architect's office and on the job. † 2111, 2112. 2 Credits.

* Technical Courses † Prerequisites

2126—*Specifications, Contracts, Office Procedures**

Types and organization of offices, consultants, contract documents, construction documents, construction supervision. Specification elements: general and special conditions, organization of trade, sections, details of specification requirements for government-agency and private work, computerized specifications. † 2111, 2112. 3 Credits.

2135—*Fine Arts, Freehand Drawing I*

Sketch techniques with pencil, charcoal, pen and ink, and felt pen. Drawings of basis forms, and elementary composition of drawings. Office sketch techniques. 1 Credit.

2136—*Fine Arts, Freehand Drawing II*

Architectural subjects, color mediums, outdoor sketching, and advanced techniques for architectural presentation. † 2135. 1 Credit.

Food Service Technology

2201—*Survey Of Food Service Industry**

An introductory course in the management of restaurants and of institutional food services. The purpose of the course is to present the student an overview of the entire food industry and to develop the skills, abilities, and interests necessary to insure success. The following areas are covered: restaurant, hospital, school, nursing home, industry, and dormitory. Field trips provide a general background of the organization, operation, and management. 2 Credits.

2202—*Food Service Equipment I**

A study of the equipment that is vital to the successful operation of a restaurant facility. Mechanical equipment: food preparation machines and cleaning equipment. Cooking equipment: dry heat, fryers, steam. Serving equipment: counter, hot and cold food equipment. Refrigeration equipment. 5 Credits.

2203—*Bar Management and Wine Technology**

Design, operations, and control of the modern bar. Classification, history, and control of wines and spirits. The laws and regulations of alcohol control. Service and wine menu. 4 Credits.

2205—*Records and Cost Control**

Records needed in quantity food service operations and their importance in budgeting and financial control. Consideration of tools used to affect savings in food costs: waste prevention, efficient purchasing, special techniques of standardizing portions and security measures. Relationship of management to labor cost control by means of simplification of tasks, and effective use of employee time. 3 Credits.

*2211—Food Preparation I**

A laboratory course in basic food preparation including: basic chemistry and physics of foods, definitions and terminology of food preparation, use of standardized recipes, detailed study of protein foods — egg, milk and dairy products, meats, seafoods and poultry — and fats, and preparation of small quantities of a variety of foods in order to master basic skills required for all types food preparation. 5 Credits.

*2212—Food Preparation II**

A laboratory course in quantity food preparation. The course includes: detailed study of fruits, vegetables, starches, baked goods and desserts; use of equipment required for quantity food production; preparation and evaluation of quality of standardized quantity recipes; estimation of raw material needs and management of the lab. 5 Credits.

*2213—Food Preparation III**

A laboratory course in experimental cookery. The course includes: reactions of foods under changes in conditions of preparation, substitution of ingredients, development of standardized quantity recipes from home recipes. † 2212. 5 Credits.

*2214—Gourmet Cooking**

The principle and preparation of gourmet foods and classical cuisine. International specialties. † 2213. 5 Credits.

*2216—Restaurant Management Education**

A study in the use of research and educational facilities applied to restaurant management. Professional organizations at the local, state, and national levels. Opportunities for further formal study in restaurant management at the university level. The future of the restaurant industry. 3 Credits.

2222—Sanitation And Safety

Detailed study of the control of bacteria in the food service industry. 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. 3 Credits.

*2223—Food, Purchasing and Specifications**

USDA codes, grading, regulations, and classifications of meats, produce, and dry-goods. The development of uniform specifications of food and supplies for individual operations. Discussion of the restaurant supply industry. Guest speakers and field trips. Methods of receiving and storing foodstuffs. 3 Credits.

* Technical Courses † Prerequisites

2224—*Management Of Food Service Establishments**

Supervisory techniques applied to restaurant management. Job descriptions, job procedures, reports, schedules, oral and written directions. Recruitment and interviewing techniques. Communication with employees, employee training. 3 Credits.

2225—*Restaurant Menu Planning**

Historical background of menus. Principles of menu making. Sample menus. Merchandising the menu. Food, labor, and overhead costs in determining prices. Customer market in pricing. 3 Credits.

2226—*Restaurant Public Relations**

Keys to successful advertising. Advertising media. Handling customers. 2 Credits.

2236—*Restaurant Layout**

Restaurant layout, planning and analysis. Space requirements. Layout planning charts. Receiving and storage facilities. Food production layout. Serving facilities. House-keeping and sanitation considerations. Office area, and facilities for guests and employees. Selection of material for floor, walls, utilities, and ventilation. † 2202. 5 Credits.

2252—*Basic Nutrition*

Students are introduced to sufficient nutrition information that they may be able to screen for nutritional adequacy in a household situation. This course is designed to cover the general areas of nutrient needs, foods to accomplish nutrient needs, food money budgeting, cultural food practices, and mealtime feeding behavior as well as obvious signs of nutritional deficiency. The students also are given overall instruction in the area of feeding the infant and the young child. 3 Credits.

2253—*Nutrition I*

A study of normal nutrition and its role in promoting good health. Includes composition and functions of foods and digestion. Nutritional needs throughout the life cycle. 5 Credits.

2264—*Menu Planning**

Principles and practices of menu planning related to schools and industries, hospitals and health care institutions. Consideration of costs, utilization of employees, equipment, purchasing, inventory, and storage. 3 Credits.

2266—*Seminar**

Preparation of the student for taking his place in the working society. Ethics of the dietetics profession, role of the food technician, cooperation with other departments, importance of continuing education. Individual student problems. † 2275. 2 Credits.

2274—*Food Service and Distribution**

Determination of the kinds of food services best adapted to the needs of various types of institutions and commercial food services. Physical layouts, flow of food from preparation to consumer, and effective merchandising. 4 Credits.

2275—*Diet Therapy**

Emphasis on ways in which variations in caloric content, consistency and nutrient composition may be employed to meet individual dietary requirements. Related medical terminology and abbreviations are studied. Special diet meals prepared and tasted. † 2254 4 Credits.

2281—*Food Service Internship**

Participation in actual working situations requiring 40 hours per week on varying shifts in affiliated hospital food services for patients and personnel, public school, college, nursing home, retirement center, or industrial cafeteria food facilities. This supervised experience is designed to provide practical application of principles learned. Two hours per week of formal class at the hospital supplements on-the-job training to acquaint the student with organizational procedures and assignments. Student performance is rated jointly by the supervisor at the affiliated institution and by the Institute coordinator. 40 hours per week and 13 Credits.

2285—*Special Problem in Food Service Administration**

A problem of special interest to the student, requiring library and/or on-the-job study will be selected and reported on by the student with advice from a faculty member. 3 Credits.

Civil Engineering Technology

2301—*Engineering Graphics—I*

Use of basic drafting instruments. Line work and lettering. Formal and informal construction drawings. Graphical methods for solution of mathematical problems. 3 Credits.

2302—*Engineering Graphics—II*

Advanced drawing procedures for detail and formal use. 3 Credits.

2304—*Structural Drafting**

Preparation of working drawings for fabrication, assembly, and erection of structural members. † 2302. 3 Credits.

2305—*Descriptive and Projective Geometry*

Elements of graphic procedures for preparation of precise three-dimensional data on two-dimensional surfaces. 4 Credits.

2306—*Construction Methods and Estimating**

Computation of basic quantities, material and procedures for cost analysis. Preparation of bills of material. Measurement of quantities for acceptance and payment. † 2302. 3 Credits.

2311—*Surveying I**

Collection of field data and incidental mathematical procedures for preparation of maps, plats, and topographic drawings. Representation of survey data by appropriate drawings, sketches, and other illustrations. Control of dimensions for new construction. † 1111. 4 Credits.

2312—*Surveying II**

Advanced surveying and mapping problems. Legal property descriptions. Basic geodetics. Photogrammetry. † 1111. 4 Credits.

2313—*Materials and Testing**

Basic uses of construction materials. Techniques of strength and quality testing. Elementary statistical analyses. Review of common materials standards. † 1111. 4 Credits.

2314—*Municipal Structures**

Pavements, drainage, water supply, sewage collection systems and appurtenances. Conventional construction procedures. † 2302. 3 Credits.

2315—*Highway and Railroad Construction**

Introduction to elements of right-of-way location, construction materials and procedures. Surveys, traffic counts, construction standards. Coordination of factors affecting public interests. † 2312. 4 Credits.

2316—*Elementary Hydraulics**

Elements of gravity and low pressure flow. Conduits for water supply, sewage, and drainage. Construction of pipelines and flumes. Pressure and velocity criteria. † 2314. 3 Credits.

2325—*Town Site and Landscape Engineering**

City and subdivision planning, calculations and preliminary cost considerations. Public regulation and private interest. † 2302, 2312. 4 Credits.

2326—*Office Practice and Legal Procedures**

Economics of engineering office procedures. Coordination techniques, supervision, time schedules. Standard operating methods. Legal responsibilities and contract documents. †
† 1003, 1004. 4 Credits.

2336—*Structural Systems**

Computation of elementary forces and reactions in individual members of structures. Comparisons of advantages and disadvantages of alternate arrangements of materials to perform a specific task. † 2304. 5 Credits.

Traffic Engineering Technology

2361—*Introduction to Traffic Engineering**

This course offers a general overview of the field of traffic engineering technology and provides an insight to related career opportunities. It relates human factors and driver characteristics to the vehicle, roadway and environment. Traffic characteristics are defined in terms of speed, design, speed zoning, density, gaps and lags, and traffic volume. The course serves as an introduction for traffic engineering technology students and as a survey course for students majoring in other related fields. The laboratory is used for problems, experiments, and field trips. 4 Credits.

2362—*Principles of Traffic Administration and Safety**

By studying traffic administration and safety, the student learns how budget, public relations, interagency problems, and other systems operations affect traffic engineering. Stressing traffic safety as a basic consideration for all technical aspects of the field, the student is shown that field traffic surveys, control devices, geometric design, traffic studies, traffic laws, and urban transportation planning constitute the major subject areas of traffic engineering technology. 4 Credits.

2363—*Field Traffic Surveys**

By collecting actual field data, the student solves problems relating to accident reporting, collision diagraming, intersection surveys, pedestrian volumes, and parking studies related to control, financing, design, demand characteristics, meters, terminals, vehicle dimensions, signs and parking. Emphasis will be placed on the methods and equipment required for the collection of field data, the writing of reports and the formulation of recommendations to solve these related problems. 7 Credits.

2364—*Control Devices**

In the general context of design maintenance and placement, the course emphasizes sign (illumination, lettering, response time, type and design), signals (cycle lengths, phases, offsets, equipment and maintenance), markings, lighting (highways, intersections, special areas), and delineation. 7 Credits.

2365—*Roadway Design**

Horizontal, vertical, and transitional curves, vertical curves, super elevation, pavement grip, widening, curb radii, shoulders, acceleration and deceleration lanes, channelization, stopping, distance, reaction in braking time, sight distances and channelization combine with other considerations in the geometric design of roadways in rural, urban, and downtown areas. The design laboratory is used for the geometric layout and the preparation of geometric design plans for the solution of practical field problems. 5 Credits.

2373—*Traffic Laws and Regulations**

A thorough study of federal, state, and local laws, regulations, standards, and specifications provides the legal framework to be used in geometric design, vehicle characteristics, wheel loads, bus stops, parking, signs, signals, markings, pedestrian and driver characteristics, warrants, and general traffic law enforcement. The Ohio Manual of Uniform Traffic Control Devices is studied. 4 Credits.

2375—*Traffic Studies**

Using actual field problems, the student is taught how to plan and execute traffic engineering studies. Studies concerning with illumination, origin and destination, speed and volume stress the basic concepts of counting procedures, counting equipment, ADT, cordons, flow maps, short counts, peak hour, platoon flow, composition, thirtieth HV, and other traffic concepts. Emphasis is also placed on the use of data processing and statistics to reduce bulk data and analyze results. 5 Credits.

2376—*Urban Transportation Planning**

This course combines new concepts in benefit, cost, economic analysis, traffic forecasting and needs studies with the fundamental concepts learned in previous courses to plan large scale transportation systems. Although a traffic engineering technician would probably not be involved in such a large scale undertaking early in his career, he is shown how small segments of a project are carefully woven into a master planning concept. 6 Credits.

Graphic Arts Communications Management

2401—*Printing Orientation**

A comprehensive study of the development of the printing industry from the invention of movable type to the present. Applications of present production processes. A survey of books and periodicals pertaining to the industry. 3 Credits.

2402—*Printing Related Industries**

A discussion of the structure, purposes, and problems of advertising agencies, art studios, publishing houses, paper and ink supply firms, and related industries. 3 Credits.

2403—*Production Operations**

A detailed study of the individual operations in producing printed matter. † 2411. 4 Credits.

2404—*Printing Production Management**

A comprehensive study of management, practices, and procedures, including a study of plant layout, printing processes, expediting, and correlating. An analysis of job components from layout department to bindery and traffic section of the plant. † 2403, 2413, 2423. 4 Credits.

2405—*Estimating**

Principles and procedures in estimating the cost of printing by letter press and offset lithography. Analysis of specifications, determination of materials, and application of production data in determining time for men and machines and estimating paper stock. A discussion of common errors of estimating and ways to avoid them. Actual estimating of a representative series of jobs. † 2415. 4 Credits.

2406—*Production Planning**

An analytical study of the means of achieving an efficient production system. The theory and practice of production and control and scheduling, including availability of equipment, outside purchases, and materials handling procedures. † 2404. 5 Credits.

2411—*Printing Processes**

A basic course in printing techniques of letter press, offset, gravure, silk screen and duplicating processes and their applications. 4 Credits.

2412—*Copy Preparation**

An introduction to typographic techniques. Kinds and functions of types. Point sizes. Hot and cold processes, plate making, and reproduction proofs. Methods of analyzing readability, visibility, and legibility of type faces; marking proofs and proof reading. 4 Credits.

* Technical Courses † Prerequisites

2413—*Layout and Design**

A study of the theory of layout and design for production of the printed product. Development and practice of efficient procedures for solving typical layout problems in commercial printing. Analysis of problems of use, production, and interpretation of specifications. Preparation of roughs, working layouts, and comprehensives. † 2412. 4 Credits.

2414—*Printing Sales*

The course is designed to have the student apply the general salesmanship concepts he has learned with the knowledge of his field. This course will supplement his knowledge of how to sell with what to sell, how much to sell, and how to supervise and train others to sell in the printing industry. 2 Credits.

2415—*Cost Finding**

Theory and practices in cost determination in the graphic arts industry. Use of standard cost-finding systems. Fundamentals for establishing hourly rates. Cost budgets and budgeted hourly rates. † 2403. 3 Credits.

2416—*Printing Management Education**

A study of the use of research and educational facilities as applied to the Graphic Arts Communications Management Technology. A discussion of services available from organizations. 3 Credits.

2423—*Printing Papers**

A study of the basis for selecting paper used in particular printing operations: sizes, colors, characteristics, limitations, packaging. Field trips to a paper mill and a paper distributor. 2 Credits.

2425—*Printing Markets**

Study of markets for printed products, including advertising, publications, and business forms. † 1811. 2 Credits.

2426—*Supervision of Personnel**

Supervisory techniques applied to printing management. The use of job descriptions, job procedures, reports, schedules, oral and written directions, and conference leadership. Methods of job instruction effective in teaching and motivating employees. † 1832, 2404. 3 Credits.

2435—*Techniques of Production**

A study of the utilization of available equipment, with emphasis on the advantages of proper scheduling. Consideration of cost factors. † 2403. 3 Credits.

2445—*Seminar on Production**

Conference sessions with production managers of both large and small printing establishments, followed by discussion meetings and written reports. 1 Credit.

2446—*Seminar on Management**

Extended conferences with business managers of large and small printing firms for a study of estimating, sales, and related matters. Discussion periods and written reports. 1 Credit.

Aviation Technology

2501—*Aviation Theory*

Basic science for the aviation maintenance, technician including aerodynamics of lifting and control surfaces, conditions for flight stability, weight and balance: effects, center of gravity limits, reports, Federal Air Regulations. 4 Credits.

2502—*Basic Aviation Maintenance*

Fabricating and installing fluid lines and fittings. Selecting and performing non-destructive testing methods. Aircraft cleaning and corrosion control. 5 Credits.

2503—*Basic Aviation Technology*

Basic electricity for the aviation maintenance system including reading and interpreting electrical circuit diagrams utilized in troubleshooting aircraft electrical systems. Performing ground operation and servicing of aircraft. Understanding maintenance publications, forms and records. 5 Credits.

2504—*Aircraft Construction and Design*

Blueprint reading and interpretation, fundamentals of drawing, draw sketches of aircraft repairs and alterations. Identify and select hardware and materials used in construction of aircraft. 3 Credits.

2505—*Aircraft Structures I (Welding)*

A course designed to develop sufficient proficiency for the A and P technician's license. Practice in oxyacetylene welding and analyzing welding faults during routine inspection of airframe components. 3 Credits.

2506—*Aircraft Structures II (Sheet Metal, Wood, Dope and Fabric)*

Instruction in the identification of aircraft metals and plastics, properties of aircraft metals, heat treatment of fabricated parts, layout from blueprints, bending and bending allowances, protective finishes, identification, selection and use of rivets, fabrication of riveted joints and structures. Select, inspect, and repair wood structures, maintenance and repair of fabric and fiberglass. 10 Credits.

2507—*Aircraft Electrical Systems*

Review of fundamentals of electricity. Generators: types, construction, overhaul, testing, troubleshooting. Generator control systems. Direct current motors. Electrical engine starting systems: types, inspection, maintenance, overhaul, troubleshooting. Aircraft batteries: types, construction, servicing, testing, charging. Review of basic alternating-current principles. Alternating-current motors. Alternating-current instrument systems. Reading electrical blueprints. Wiring practices, bonding, shielding. Electrical systems. Electrical power units. Radio installation and inspection. 10 Credits.

2508—*Aircraft Environmental Control Systems*

Inspect and repair cabin atmosphere control systems; inspect check, troubleshoot, service and repair ice and rain control systems. Maintenance of aircraft fire control system. 3 Credits.

2509—*Aircraft Hydraulics and Pneumatics*

Basic hydraulic and pneumatic principles. Basic hydraulic systems. Brake systems. Hydraulic lines, fittings, fluids, pumps, and actuating devices. Inspection, troubleshooting, repair. Vacuum systems: maintenance, inspection, and repair. Aircraft fuel systems. 9 Credits.

2511—*Aircraft Rigging, Assembly and Inspection*

Airplane nomenclature. Disassembly and assembly sequence and procedure. Alignment procedures. Airplane overhaul. Fundamentals and methods of rigging. Stability in flight, control surfaces. Control cables: inspection, installation, splicing. Landing gear assembly: types, maintenance, repair. Fuel systems. Aircraft appliances and miscellaneous equipment. Servicing and handling of aircraft. Heating, pressurization, and other internal systems. Instrument installation and inspection. Weight and balance review. Inspection of complete aircraft. FAA report forms. Helicopter theory and maintenance. Aerodynamics of the helicopter. 4 Credits.

2512—*Powerplant Theory and Maintenance (Reciprocating Engines)*
Principles, development, and design of internal combustion engines. Engine maintenance, repair, and overhaul. Inspection and troubleshooting. Identification of aircraft materials, parts, and components. Calibration of tools and testing equipment. Engine run-in, testing, and maintenance. Hazards of aircraft engine operation. Lubrication systems. 10 Credits.

2513—*Powerplant Theory and Maintenance (Turbine Engine)*
Principles, development design and classification of turbine engines. Engine inspection, maintenance, repair and overhaul. Installation and removal of turbine engines. 3 Credits.

2514—*Magnetos and Ignition Systems*
Basic electrical principles in ignition systems. Magneto theory, construction, operation, overhaul. Review of combustion principles. Types of magnetos, distributors. Magneto timing: internal and external. Harness construction, inspection, overhaul, and testing. Booster systems. Low-tension ignition systems. Battery ignition systems. 8 Credits.

2525—*Carburetion and Fuel Controls*
Float carburetors: theory, construction, operation, troubleshooting, maintenance, and overhaul. Pressure injection carburetors: theory, construction, inspection, maintenance, and troubleshooting. Direct-pressure injection systems. Fuel systems and requirements: gravity and pressure systems. Induction systems and supercharging. 5 Credits.

2516—*Propellers*
Aerodynamic principles of propellers. Propeller types, construction and materials. Inspection, repair, and troubleshooting. Installation, removal, tracking and balancing. Control-able propellers. Constant-speed governor control: construction, operation, maintenance, adjustment, troubleshooting. Reversible propellers. Hazards of propeller operation. 5 Credits.

2517—*Powerplant and Powerplant Systems Inspection*
A practical condensation and coordination of previously accumulated knowledge. Inspection of powerplants and powerplant systems, use of inspection equipment and aids. Procedure for returning aircraft to active service. 8 Credits.

2521—*Aviation Fundamental I (Basics)**

Physical laws affecting aerodynamics, aircraft structure, control surfaces, stability, power, aircraft instruments, identification of general aviation aircraft and airline aircraft. 6 Credits.

2522—*Aviation Fundamentals II (Meteorology)**

Air circulation patterns, fronts, turbulence. Weather charts, teletype reports. U.S. Weather Bureau: organization and services. 5 Credits.

2523—*Aviation Fundamentals III (Flight Planning)**

Flight computer and plotter, navigation charts and symbols, station identifiers. Dead reckoning and computation of weights and balance for aircraft loading. 6 Credits.

2524—*Aviation Fundamentals IV (Air Navigation)**

Radio navigation systems and instruments. Time and fuel estimates. VFR and IFR flight rules. Major air routes. Study of *Airman's Informational Manual*. 6 Credits.

2525—*Aviation Physiology**

Physical responses to flight - construction of the inner ear, vertigo, pressure changes, oxygen, alcohol and tobacco. Study of NASA and FAA Aero-Space Medical Department reports. 4 Credits.

2526—*Aviation Law**

The Federal Aviation Administration (FAA) of the United States: functions and structure. Study of applicable regulations. The International Civil Aviation Organization (ICAO) structure, membership, powers, problems, accomplishments, jurisdiction. 3 Credits.

2527—*Aviation Phraseology**

Jargon, radio communication, aviation abbreviations. Use of microphone and tape recorder. Conversation with aircraft on ground and in flight. Conversation with pilots. Taking orders from pilots. Giving directives to crews and employees. 2 Credits.

2528—*Aviation Public Relations**

A study of the aviation "image" Advertising, meeting the customer, salesmanship. Participation in civic affairs. Responsibilities when making public appearances. Meeting the competition. Participation in trade organizations. Meeting the press. Handling complaints and claims. 3 Credits.

2529—*Air Traffic**

Organization of air traffic compared to traffic departments, in industries. Sales solicitation, passenger handling, ticketing, refunds. Baggage regulations and handling. Travel plans, tours and routing. Air traffic control (FAA), explanation of towers, centers, radar facilities and services, separation of traffic, flight service stations and controllers. 2 Credits.

2531—*Air Transportation I (Development)**

Survey of early types of aircraft. Present state of aircraft. Development of airports, airway system, growth of airlines. Development of federal acts and their effects on air transportation. Survey of present passenger and cargo traffic. 4 Credits.

2532—*Air Transportation II (Airlines)**

Departmental structure, duties and responsibilities. Coordination for efficient, profitable operation. Employed personnel: conditions of employment and progression. Government controls. Handling of passengers, baggage and cargo. Major air routes. First, second and third level carriers. 6 Credits.

2533—*Air Carrier Operations**

Organization: operating costs and revenues, equipment, services and capabilities of general aviation and airlines. Significance of costs and profits. 3 Credits.

2534—*General Aviation**

Flight schools, FAA regulations, supplies, charter activities. Repair and maintenance. Line service, sales, leasing. Aircraft financing, loans, interest payments. Dealerships. Business-man-owner. Management problems and obligations. 4 Credits.

2535—*Air Cargo Management**

Efficient and economic handling of cargo, air mail, air express and air freight. Related problems in marketing, research, advertising and utilization. Survey of scheduled, non-scheduled, charter and contract operations. Flight equipment, storage, tie-down facilities, proper loading, insurance, tariffs. Government regulations. Personnel. 3 Credits.

2536—*Airport Management**

A comprehensive study of a typical community in relation to an airport - influence on business - study of the wealth of a community, land values, geographical characteristics, meteorological characteristics. Political influences. Airport construction: costs, facilities, clearing, grading, drainage, turf-paving, lighting, fuel provisions, field buildings and lounges, hangars, communication facilities, field markings. Maintenance. 3 Credits.

* Technical Courses

2537—*Aviation Financial Management**

Recording a breakdown of expenses and profits of an aviation operation - analysis of accounts, deficit operation, break-even point and profits. Decision making techniques. Cost accounting related to aviation. 5 Credits.

2581—*Aviation Administration Internship**

Supervised on-the-job application of knowledge and skills acquired in the classroom. 13 Credits.

2586—*Special Problems in Aviation Administration**

Taken concurrently with internship. Selection is made of a particular problem or area of the job to be studied and reported. 2 Credits.

Consumer Finance Mid-Management Technology

2801—*Introduction To Consumer Credit**

This course includes a study of the history of consumer credit and social institutions, social aspects of consumer credit, institutions of consumer credit, customer relations in consumer credit, and operational aspects of consumer credit. 3 Credits.

2803—*Money and Banking**

Control and operation of banking and monetary systems with emphasis on supply and demand and governmental control † 1802. 4 Credits.

2804—*Office Organization and Management**

Economics of the consumer finance office: overhead, salaries, and direct costs. Discipline in the office, coordination techniques, job supervision, time schedules. Standard for operating procedures. † 2883, 2887. 3 Credits.

2807—*Operation of a Consumer Credit Institution**

Family credit counseling. The "Informative" contribution to sound credit. Restrictive and regulatory obstacles to consumer credit. Regulations of finance charges on consumer installment credit. How and where finance companies obtain their funds. 3 Credits.

2811—*Customer Relations**

Basic principles and practices to obtain and retain current and long-term customer potential. A survey of customer attitudes and motivations. 2 Credits.

2813—*Credits and Collections**

An analytical study of credit risk, credit control, and management of collections. 3 Credits.

2814—*Personal Financial Management**

Methods of counseling the financially over-extended client, and recognizing danger signals in granting credit. Credit, borrowing, budgeting, relationships with financial institutions, savings, insurance, real estate and taxation. † 2883, 2887. 4 Credits.

2823—*Corporation Finance**

A study of business organization. Means of financing, financial management of working capital, administration of income, expansion and merger, reorganization, receivership, and dissolution. † 1802. 3 Credits.

2824—*Consumer Finance Seminar**

Preparation of the student for taking his place in the profession. Seminars will cover the following topics: ethics, supervisory responsibilities, continuing education, human relations, and business promotions. † 2883, 2887. 1 Credit.

2881—*Consumer Finance Internship I**

Supervised on-the-job application of knowledge and skills acquired in the classroom. 13 Credits.

2882—*Consumer Finance Internship II**

A continuation of 2881. † 2881. 13 Credits.

2883—*Consumer Finance Internship III**

A continuation of 2882. † 2882. 13 Credits.

2884—*Consumer Finance Internship IV**

A continuation of 2883. † 2883. 13 Credits.

2885—*Special Problems in Consumer Finance I**

The first of four courses taken concurrently with the work experience. Selection of a particular problem or area of the job to be studied and reported on. 2 Credits.

2886—*Special Problems in Consumer Finance II**

A continuation of 2885. † 2885. 2 Credits.

2887—*Special Problems in Consumer Finance III**

A continuation of 2886. † 2886. 2 Credits.

2888—*Special Problems in Consumer Finance IV**

A continuation of 2887. † 2887. 2 Credits.

Retail Mid-Management

2901—*Introduction to Retailing**

Principles and methods of retail management, including organization, policy making, location, operation, selling services, records inventory, expense control, insurance, and the coordination of a store. 3 Credits.

2902—*Sales Promotion**

A study of the various sales promotion activities, including advertising, retail display and the coordination of an effective sales promotion program. † 1801, 1811. 4 Credits.

2904—*Retail Store Operations and Control**

The operation and control of retail establishments: Receiving stock, marking, warehousing, repair and alteration. Packing, delivery, and customer services. Maintenance. Accounts payable and receivable, credit and collection. Inventory control, auditing, cash and payroll and statistical analysis. The course uses case studies of all types of retail problems including merchandising, personnel, sales promotion, operations and control, † 1841, 2913. 4 Credits.

2913—*Retail Buying I**

A study of the nature, functions, and terminology of merchandising, merchandise information, and decisions required in buying. † 2901, 2902. 4 Credits.

2914—*Retail Buying II**

A study of the buyer's methods of handling special merchandise and working with the other divisions within a retail organization. † 2913. 4 Credits.

2981—*Retail Internship I**

Supervised on-the-job application of knowledge and skills acquired in the classroom. 13 Credits.

2982—*Retail Internship II**

A continuation of 2981. † 2981. 13 Credits.

2983—*Retail Internship III**

A continuation of 2982. † 2982. 13 Credits.

2984—*Retail Internship IV**

A continuation of 2983. † 2983. 13 Credits.

2985—*Special Problems in Retailing I**

The first of four courses in which the student applies his practical knowledge of retailing to specific areas on his job and submits reports to his coordinator-supervisor. 2 Credits.

* Technical Course † Prerequisite

- 2986—*Special Problems in Retailing II**
A continuation of 2985. † 2985. 2 Credits.
- 2987—*Special Problems in Retailing III**
A continuation of 2986. † 2985. 2-4 Credits.
- 2988—*Special Problems in Retailing IV**
A continuation of 2987. † 2913, 2985. 2-5 Credits.

Wholesale Mid-Management Technology

- 3001—*Wholesaling Specialties**
Course designed to provide technical information about the line of goods marketed by the student's employer. Individual study utilizing programmed teaching materials, films, and reference books. † 3002, 3081. 3 Credits.
- 3002—*Wholesaling Principles**
An analysis of the historical development of wholesaling. Trade vocabulary. Technological changes and their impact upon traditional methods of wholesaling. The economic, social, and legal environment within which wholesaling operates. 4 Credits.
- 3003—*Wholesale Case Studies**
The application of scientific methods of case studies for the solution of managerial problems. Decision making at the managerial level. Establishing, evaluating, and recommending plans of action. † 1813. 2 Credits.
- 3004—*Wholesale Operation and Control**
A study of the scientific management of a wholesale enterprise. Locating, financing, and organizing a wholesale establishment. Inventory control, warehousing, and sales management. † 3002, 3083, 3087. 5 Credits.
- 3081—*Wholesale Internship I**
Supervised on-the-job application of knowledge and skills acquired in the classroom. 13 Credits.
- 3082—*Wholesale Internship II**
A continuation of 3081. † 3081. 13 Credits.
- 3083—*Wholesale Internship III**
A continuation of 3082. † 3082. 13 Credits.
- 3084—*Wholesale Internship IV**
A continuation of 3083. † 3083. 13 Credits.

3085—*Special Problems in Wholesaling I**

The first of four courses in which the student applies his practical knowledge of wholesaling to specific areas of his job and submits reports. 2 Credits.

3086—*Special Problems in Wholesaling II**

A continuation of 3085. † 3085. 2 Credits.

3087—*Special Problems in Wholesaling III**

A continuation of 3086. † 3086. 2-4 Credits.

3088—*Special Problems in Wholesaling IV**

A continuation of 3087. † 3087. 2-5 Credits.

Sales Marketing Technology

3101—*Salesmanship I**

Philosophy of selling to assist the buyer in supplying his wants and needs. Basic selling methods. Prospecting. Sales call planning. Introduction to sales approach. Sales presentation. Answering buyer objections. Organization of sales presentation. Salesman grooming, personal bibliography, interview action. 5 Credits.

3102—*Intangible Sales**

This course emphasizes the approach and technique required in the sale of an idea or service. Four areas of intangible sales will be discussed: Computer, bookkeeping, and forms systems; security sales and estate planning; radio and television, newspaper, magazine and yellow pages advertising; banking and financial services. † 3101. 4 Credits.

3104—*Salesmanship II**

A course divided into two parts: professional salesmanship and territorial operations. Topics include: salesman's role, and marketing objective; developing and insight into customer's needs; structuring the sales presentation; science of persuasion; communications in sales; motivation; analysis of territorial activity; techniques for achieving corporate goals. † 3128. 5 Credits.

3108—*Sales Case Studies**

Teaches the student to make temporal decisions by a six-step method and long term decisions by an alternative method. Actual industrial problems are discussed. † 1813 or 1832. 3 Credits.

3111—*Technical Selling**

Survey of various techniques employed by professional salesmen. These include techniques employed by "big-ticket" salesmen, wholesale and industrial salesmen, and those salesmen involved with intangibles. 1 Credit.

3115—*Sales Promotion and Advertising**

A course designed to develop an understanding of the techniques of advertising and related to the buying and selling processes. The analysis of the success or failure of such programs related to costs and results. The development of sales brochures, displays, dealer meetings. The development of point of sale material. The use of slides and photography. 4 Credits.

3117—*Sales Management**

A course to acquaint the student with the total marketing and sales effort. Included is: selection of personnel, leadership, use of records and reports, planning the sales effort, the sales function in the structure of a company, the sales manager's basic duties and personal relationships, training programs, management goals and programs, motivation of sales personnel, compensation plans, sales call reporting, accounting for expenses, territory analysis, selling management on new ideas, and market research. † 3125. 4 Credits.

3118—*Effective sales meetings**

Techniques of good instruction. The organization of sales meetings including location, time, props and promotion. Each student will organize product and service presentations, and develop the lesson plans and visual aids necessary for the various presentations. 4 Credits.

3125—*Real Estate**

Real estate theory and practice value of residential income and natural property, industrial, farm, income, and residential, brokerage, downtown office, storeroom, residential leasing, property management and appraisal, eminent domain and sub-division of property. † 3217. 4 Credits.

3127—*Insurance I**

The place of insurance in business including general principles of life insurance, fire, marine, allied lines, liability, and casualty. 4 Credits.

3128—*Buyer-Seller Relations**

To develop an understanding of the human relations involved in selling. Establishment of rapport with the prospective customer. The development of desirable personality traits and qualities with emphasis on courtesy. † 3102. 4 Credits.

3131—*Insurance II**

Course designed to help prepare student to pass the State Examination for multiple line agent's license. † 3127. 4 Credits.

3132—*Insurance III**

Course designed to help prepare student to pass the State Life Insurance Agent's examination. It will also include a brief summary of estate planning, and mutual fund investment principles and planning. † 3131. 5 Credits.

3181—*Sales Internship I**

Supervised on-the-job application of knowledge and skills acquired in the classroom. 13 Credits.

3182—*Sales Internship II**

A continuation of 3181. † 3181. 13 Credits.

3185—*Special Problems in Sales I**

The first of two courses in which the student applies his practical knowledge of sales to specific areas of his job and submits reports. 2 Credits.

3186—*Special Problems in Sales II**

Continuation of 3815. 2 Credits.

Secretarial Science Technology

3331—*Typing (Beginnng)**

Introduction to the touch typewriting system, with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and forms. 2 Credits.

3332—*Typing (Intermediate)**

Emphasis on the development of speed and accuracy and the mastery of correct typing techniques used in producing tabulations, manuscripts, reports, and business forms; and in preparing materiels for duplication. † 1 year High School typing of C or better or 3331. 3 Credits.

3333—*Typing (Advanced)**

Emphasis on developing the student's ability to function as an expert typist producing mailable copy. Application of typing ability to producing technical reports, minutes, drafts and business correspondence. † 3332. 3 Credits.

3334—*Office Machines**

A general survey of office and business machines designed to give a working knowledge of the ten-key and full keyboard adding machines, calculators, duplicators, and transcription machines. † 3333. 3 Credits.

3305—*Secretarial Internship I**

A work experience providing application of all phases of the theory taught in the secretarial science program: taking dictation and transcribing routine composition, duplicating processes, record and file maintenance, telephone service, reception, reservation responsibilities, itinerary maintenance, handling of expense accounts and bank accounts, follow-up systems, research of special projects, taking minutes, screening and routing mail, and procuring supplies. Four hours daily on the job and two hours weekly in seminar. † 3324. 8 Credits.

3306—*Secretarial Internship II**

Similar to 3305. Student participation in a work situation four hours daily plus a two-hour weekly seminar. † 3305. 8 Credits.

3314—*Records Management**

A course in filing designed for secretaries needing a knowledge of the filing procedures commonly used in business and industry. Indexing and filing rules for the alphabetic, subject, numeric, Kardex, and geographic systems. Library organization and numbering systems. 3 Credits.

3315—*Special Problems in Shorthand and Transcription**

A course offered concurrently with Secretarial Internship I. Opportunity to overcome individual weaknesses in shorthand theory and speed, in transcription from shorthand notes and dictating machines, and in language skills. † 3344. 3 Credits.

3316—*Special Problems in Typing**

A course to accompany Secretarial Internship II. Preparation for typing responsibilities of the executive secretary through long, interrelated, undefined problems. Chance to specialize in a given interest area. Drills individualized to remedy specific weaknesses in typing. † 3333. 3 Credits.

3317—*Legal Typing**

Emphasis on developing the ability to produce rapidly and correctly legal documents, including both fill-in forms and typed papers. Instruction in deriving legal information from one document for inclusion or abstraction in another. Work in spelling legal terminology and using it appropriately. † 3333. 3 Credits.

3318—Legal Terminology and Transcription*

This course provides the student practical experience in taking and transcribing legal dictation at an employable speed rate. Practice in the preparation of legal documents, including pleadings, forms, and brief work. To provide knowledge and understanding of legal terminology. † 3344. 3 Credits.

3322—Personal Development*

Guidance into an individual program of self-improvement emphasizing the physical, intellectual, emotional, and social dimensions of personality. 2 Credits.

3324—Secretarial Responsibilities*

A study of the daily responsibilities of a secretary. Discussion of office skills other than machine operation: receptionist duty, telephone techniques, teletype operation, handling telegrams and travel information, keeping office records, purchasing supplies, organizing a desk, using reference materials, and getting along with people. Emphasis on developing understanding through case studies. † 3333, 3344. 4 Credits.

3326—Office Management and Supervision*

A presentation of the elements involved in the sound and efficient management and supervision of the office. A study of the management of equipping, servicing, and staffing the office. Emphasis on controlling office costs and on leadership and human relations. Case studies of problems of office supervision and management. † 1813, 1832. 3 Credits.

3327—Legal Office Procedures*

This course provides instruction in procedures unique to law offices, including library management, legal research, and legal filing. The special considerations, problems, and ethics involved in dealing with clients are also discussed. A general background of information about the American court system is provided. † 3324. 3 Credits.

3341—Shorthand (Beginning)*

A foundation course in shorthand theory with emphasis on phonetics, word families, brief forms and phrases, and penmanship. Practice for speed and accuracy. 3 Credits.

3342—Shorthand (Intermediate)*

A course designed to perfect basic shorthand theory, with emphasis on phonetics, word families, brief forms and phrases, and penmanship. Practice for speed and accuracy. † 1 Year High School Shorthand Grade of C or Better or 3341. 4 Credits.

3343—*Shorthand (Advanced)**

A continuation of shorthand (Intermediate) intended to build accuracy and speed. Shorthand theory in several technical areas. Introduction to typewritten transcriptions. † 3342. 4 Credits.

3344—*Dictation and Transcription**

A continuation of Shorthand (Advanced) intended to build shorthand speed and accuracy with major emphasis on typewritten transcription of unfamiliar material in mailable form. Experience with office-style dictation. † 3343. 4 Credits.

Accounting Technology

3701—*Principles of Accounting**

An introductory course in accounting to include: the meaning and purpose of accounting, accounting statements, balance sheet and profit and loss statements; the theory of debits and credits, ledger accounts and the trial balance; journalizing and posting; adjusting entries; statement preparation; accounting records; adjusting and closing entries; accounting for sales, purchases, and cash; the use of special journals; accounting for notes and interest; and accounting for prepaid, unearned, and accrued items. These fundamentals are applied to corporation accounting. 5 Credits.

3702—*Principles of Accounting II**

A continuation of course No. 3701, including discussion of: the evaluation of receivables and merchandise inventory; valuation of fixed assets and depreciation; accounting procedures; the voucher system; accounting for taxes (payroll, property, and sales). The course concludes with application of accounting principles to sole proprietorships and partnerships. † 3701 or 1843 & 1844. 5 Credits.

3703—*Intermediate Accounting I**

A continuation of accounting theory. An in-depth study of the accounting process and accounting records; the nature and content of accounting statements—balance sheet, income statement, and surplus statement; analysis of working capital; analysis and methods of valuation and statement presentation of the following items: cash and temporary investments, receivables, and inventories. † 3702. 5 Credits.

*3704—Intermediate Accounting II**

A continuation of course No. 3703 to include: analysis and methods of valuation and statement presentation of the following items: current liabilities—contractual and contingent items; investments in plant, and equipment—their acquisition, use, retirement, depreciation and depletion, and revaluation; intangible assets and deferred charges and long-term liabilities. † 3703. 5 Credits.

*3705—Money and Banking**

Organization, operation, and economic significance of our monetary and banking system are discussed with special reference to current conditions and problems. † 1802. 2 Credits.

*3711—Basic Business Machines**

Instruction and practice in operation of office machines, including rotary calculators, key driven calculators, electronic calculator, 10-key to full keyboard adding and listing machines. Familiarization with the operation of office reproducing machines. 1 Credit.

*3712—Accounting Machines**

Operation of accounting machines; posting methods for accounts receivable, accounts payable, and payrolls. 2 Credits.

*3713—Data Processing For Accountants**

A survey of unit record systems, computer systems, programming theory, hardware and software systems, conversions, computer service centers. † 3712. 3 Credits.

*3714—Cost Accounting I**

A study of the field of job order cost accounting; the cost cycle; methods of handling materials, labor costs, and manufacturing overhead expenditures (controllable and uncontrollable) † 3703. 5 Credits.

*3715—Cost Accounting II**

Process cost accounting; by-products and joint products; fundamental cost-volume-profit relationship (break-even analysis); flexible and standard costs. † 3714. 5 Credits.

*3716—Auditing**

Independent and internal audits, professional ethics, legal liability, internal control, auditing standards and procedures. Evidential matter, auditors approach and techniques, reports, statistical sampling, management advisory services. † 3725. 4 Credits.

3723—Business Finance*

Forms of business organization; corporate securities; financing through securities; sources and management of working capital; administration of income; expansion and combination; reorganization, receivership, and dissolution. † 1821. 3 Credits.

3724—Systems Analysis*

Developing, organizing, and using accounting data, analyzing and improving accounting systems, systems reviews, flow process charting, structural flow charting, internal check, internal control, forms and paper flow analysis. † 3713. 3 Credits.

3725—Financial Statement Analysis*

Tools of analysis, percentages, comparisons — past performance, industry standards. Basic ratios - equity, current, quick, working capital, return on equity. Turnovers - inventories, receivables. † 3704. 3 Credits.

3726—Office Management and Procedures*

Organization of the office, managerial considerations, office furniture and equipment, office machines, working conditions, office layout, records and reports, personnel and training, office manuals, budgets and costs. † 3724. 3 Credits.

3735—Taxation I*

Payroll taxes, withholding and reports. Unemployment, industrial insurance contributions, workmen's relief funds. Franchise taxes. Personal property taxes. Classified and intangible taxes. City income taxes. Sales and use taxes. Real estate taxes. Vehicle and other taxes. † 3702. 3 Credits.

3736—Taxation II*

Individual income taxes - returns, income exemptions, deductions, gains and losses, rates, adjustments. Problems of proprietorship, partnerships, corporations—inventories, depreciation, accounting, installment and deferred sales tax rates. Filing requirements, payments, refunds, claims. Tax planning techniques. † 3735. 4 Credits.

3746—Accounting Practice*

This course provides a detailed study of accounting systems as applied to specific industries. Industries to be studied include retailing, construction, utilities, and government. Material from all previous courses is applied in this course. Accountants from local firms are invited to present and discuss problems with the class. † 3715. 3 Credits.

Public Service Department

• 7021—*Community Affairs I—Local Government*

The role of local government in the community; its structure, organization, and responsibility. Local government politics and the community. Methods and principles of local budgeting. Urban, suburban, rural and community structure. 3 Credits.

• 7022—*Community Affairs II—Public Relations*

The psychology of relations between public service employees and the general population. Policies and practices of community relations as they apply to public service agencies. Current national and local community problems. 3 Credits.

• 7023—*Community Affairs III—Trends and Planning*

An introduction to the basic principles and methods in analysis of population changes as they are used to examine their social, political, and economic implications. The emphasis is placed on the impact of such shifts on long range departmental planning.

7024—*Supervision of Public Service Personnel*

Supervision techniques applied to public service personnel. The study of the need for job descriptions and job procedures, civil service requirements, report, oral and written directions, work evaluation, and conference leadership. Methods of instruction effective in teaching and motivating personnel. 3 Credits.

• 7025—*Constitutional Law*

A study of Federal and State Constitutional Law and the Bill of Rights with emphasis on the rights to due process of law, equal protection of the law, jury trial, and assistance of counsel. Interpretation of the Constitution by the United States Supreme Court as given in their decisions. 4 Credits.

7033—*Adaptive Behavior I**

An overview of the anthropology, genetics, sociology and psychology of man's learning to cope with the natural and social demands of his environment. The course includes discussions on coping processes from birth through infancy, childhood, adolescence, adulthood and geriatrics. 3 Credits.

7034—*Adaptive Behavior II*

An overview of problems of exceptionaligy, defect and maladaptive as reflected by the failure to develop appropriate coping strategies. The course includes discussion on behavior modification and rehabilitation for all age groups. 3 Credits.

* Technical Courses

7501—*Public Health Services**

This course relates to the organization of the Public Health Department and the services it provides to the community. The relationship of the technician to the Department is explored. 3 Credits.

7502—*Occupational Services**

This is a specific course related to the development of vocational information and career development information. This will also involve the development of kits with necessary application forms, etc., and there is specific instruction on how the technician can help families complete these forms and transmit them to the appropriate people. 3 Credits.

7503—*Family Planning Services**

This course involves instruction in the broad lines of family planning with special emphasis on development of resource personnel and resource information and the giving of immediate help to families who seem to present immediate problem areas. Broad lines of this course will be directed primarily through representatives of family planning agencies. 3 Credits.

7506—*Mental Hygiene Services**

This course includes specific instruction in the recognition and early identification of mental hygiene problems with special emphasis on general counselling aides and ways of transmitting the information to appropriate mental health resources for early intervention. 3 Credits.

7507—*Social Ecology**

This is a general course of instruction on recognition of high risk situations, general housing problems and the general patterns of the relationship between specific living conditions and the family in question. 3 Credits.

7511—*Community Services Organization**

This course outlines the general structure of the community; the various agencies involved in health, education and welfare work within the community; and overall instruction as to how citizens can be brought into a more participating role in community activities and particularly into those community activities which touch upon their own personal needs. This is the basic orientation course for the whole program and is designed to inform the technician how to in-

* Technical Courses

struct the families as to their rights of participation, the agencies to contact and the general lines of community activity. 3 Credits.

7516—*Home Nursing Services**

This course includes specific instruction in recognition, prevention and remediation of nursing and hygiene problems in the home. Included will be patterns of recognition of potential areas of difficulty and sanitation risks as well as lines of long range prevention to maintain control of disease and undesirable living conditions. 3 Credits.

7521—*Interview Techniques**

This course provides specific instruction in how to interview, how to use a previously prepared check list in gaining specific information, the types and kinds of questions to ask, the types of observations to make concurrent with the interview and the general techniques for gaining rapport and confidence of the families being contacted. 3 Credits.

7522—*Family Counseling I**

This course is the first of a two-course sequence and involves the broad lines of how one advises families to deal with specific problems. Following directly from the information gained in the Community Organization Course, the students will have various kinds of information, resource booklets, etc., and depending on the types of problems presented, they will be able to counsel the families concerning resources in the area. † 7521. 3 Credits.

7523—*Family Counseling II**

This course is the second of a two-course sequence and involves the broad lines of how one advises families to deal with specific problems. Following directly from the information gained in the Community Organization course, the students will have various kinds of information, resource booklets, etc., and depending on the types of problems presented, they will be able to counsel the families concerning resources in the area of need. The courses cover the techniques used with special emphasis on how one gains specific information, and how it can be carried back to the supervising individuals working with the technician to get the necessary professional help. The courses cover the whole procedure from the initial contact with the family, through the learning of the problem or problems, the submission to other agencies and processes of followup. † 7522. 3 Credits.

7581, 7582, 7583, 7584, 7585, 7586*

Community Services Internship I, II, III, IV, V, VI

The internship program involves the student in applying his classroom studies in the field. Groups of five or six students are assigned to supervisors. Supervisors are individuals trained primarily in social work or nursing. The supervisors are responsible to a faculty committee which establishes the course material, advises the supervisors, and, in general, directs the internship program. Instruction and field work are in the geographical area where the technicians will be employed. Classroom facilities are available in Model Cities and CMACAO neighborhood centers for meetings of the supervisors and their student groups. † 7581, 7582, 7583, 7584, 7585. 3 Credits.

7587—*Community Services Internship VII**

This course is primarily an intensive form of internship whereby the student carries a specific case load, but where they have to report to their supervisor and work out in specific detail the exact procedures to be followed with this case load. This represents very intensive instruction which comes at the end of the whole program. † 7586. 6 Credits.

Law Enforcement Technology

7801—*Introduction To Law Enforcement**

A survey of law enforcement—its role, history, and development—English Common Law. An introduction to modern police practices and the functions of other agencies involved in the administration of criminal justice. Law enforcement officer ethics. An introduction to local, state, and federal court procedure. 3 Credits.

7802—*Crime Prevention Techniques**

Introduction to deviant behavior and current criminological theories with emphasis on crime prevention and the phenomena of crime. Effective methods and techniques for control and prevention of crime, including education, enforcement, patrol and security. 3 Credits.

7803—*Traffic Administration**

General orientation to highway traffic administration. History of traffic development and duties of agencies responsible for highway traffic administration and planning. Causes of accidents and traffic congestion. Basic principles of traffic law enforcement, accident investigation, direction of traffic, and traffic patrol. 3 Credits.

7804—*Juvenile Procedures**

Organization, functions, and jurisdiction of juvenile agencies. Processing and detention of juveniles. Statutes and court procedures relating to juveniles. Police services for juveniles and neglected children. Rights and liabilities of minors and their parents. 4 Credits.

7805—*Ohio Criminal Code**

The study of the statutes of Ohio relating to crime and criminal procedures with emphasis on the specific elements necessary to constitute individual crimes. An introduction to civil law as it relates to the law enforcement officer. 4 Credits.

7811—*Criminal Evidence and Procedures I**

Analysis of statutes and court decisions on the accumulation, presentation, and admissibility of criminal evidence. The origin, development, and philosophy of the rules of evidence. Laboratory includes the recognition, collection, and preservation of evidence and its preparation for court presentation. An introduction to fingerprinting and its classifications. 5 Credits.

7812—*Criminal Evidence and Procedures II**

Tests for admissibility of evidence and types of evidence. Arrest, search, entrapment, and opinion testimony. Laboratory includes an introduction to identification procedures for firearms and bullets, tool marks, blood and hair analysis and photography. † 7811. 5 Credits.

7816—*Case Preparation**

A study of the necessary reports, review of case and conference with prosecutor, witnesses and technical reports. Proper submission of physical evidence, psychology of courtroom testimony. Participation in mock trials followed by actual courtroom trial visitations. 4 Credits.

7824—*Investigation and Interviewing**

Introduction to criminal investigation procedures, including theory of investigation, case preparation, note taking and crime scene recording. Departmental crime report writing. Preparation of an interview. Types of interviews. Interviewing techniques and their psychological application to the goal of eliciting accurate information and admissible statements. 4 Credits.

7826—*Police Administration**

The contemporary law enforcement agency, its organization, functions, and management. Principles of staffing, budgeting, controlling, coordinating, planning, and research in law enforcement. Implications of generalized and specialized units. 3 Credits.

7831—*Police Photography**

Photography at specific crime scenes. Photography of criminal evidence. Micro and macrophotography. Preparing the court exhibit. Darkroom techniques. Use and care of photographic equipment. 3 Credits.

7832—*Fingerprinting**

A study of fingerprinting recognition and classification procedures. Analysis of distinguishing features of fingerprint patterns. Instruction in photography of latent prints prior to listing. Proper methods of lifting and preserving as evidence will be included. 3 Credits.

7833—*Police Department Intelligence**

The collection and evaluation of information dealing with security and safety of the municipality. Methods of observation of criminal and subversive organizations, checking on rumors, intra-police communications, and the use of informants. 3 Credits.

7834—*Police Department Organization**

An introduction to the principles governing the organization and administration of law enforcement organizations. Included for study are the following: functions and activities, development of policy, significance of community relations in effective police work, and training and control of police forces. 3 Credits.

7836—*Juvenile Delinquency**

This course describes the philosophy and methods of police programs for prevention and control of juvenile delinquency and youth crime. Emphasis will be placed on specific techniques and consideration of the issues and problems to be resolved by police, desirable principles and practices based upon prevailing professional thinking, public policy, existing law, juvenile rights and knowledge of current delinquent behavior theories. 3 Credits.

7837—*Police Communications**

Analysis of various communication devices. Care and proper use of equipment. Types of information needed and proper procedures for transmission. 3 Credits.

* Technical Courses

7838—*Vice Squad Operations I**

Methods of law enforcement related to illegal traffic in liquor, gambling, morals, and prostitution. 3 Credits.

7839—*Vice Squad Operations II**

A study of narcotics and hallucinogenics, with emphasis on the addict, the drugs, controls, local, state, and federal and United Nations efforts to control drugs, the illegal sale and use of drugs, and drug addiction. 3 Credits.

7841—*Major Crime I**

Principles and techniques of investigation and prosecution of major crimes. Emphasis is placed on methods involving homicide, suicide, assault, and rape. Human physiology is studied as applied to police investigation. 3 Credits.

7842—*Major Crime II**

Principles and techniques of investigation and prosecuting of major crimes. Emphasis is placed on methods involving auto theft, burglary, and grand larceny. "Methods of Operation" techniques are studied. 3 Credits.

7843—*Personnel Training Methods**

Methods of instruction, application of audio visual equipment, testing, and evaluation, and preparation of materials are introduced. Special emphasis is placed upon planning an organizational training program. Methods of evaluation. 3 Credits.

7844—*Safety Education**

Methods of motivation and instruction of children and adults with emphasis on the subject of safety education. Principles of automobile, bicycle, motorcycle, pedestrian, and firearm safety are studied. 3 Credits.

7845—*Penology**

A study of the admitting, quartering, and releasing of prisoners. Emphasis is placed on city and county systems, for handling prisoners. 3 Credits.

7846—*History of Law Enforcement**

A study of law enforcement from early civilization through the modern police department. Reference is made to notable crimes in history, their particulars, and results in law enforcement procedures change. Scientific advances and their role in law enforcement are studied. The course provides an appreciation for the profession of law enforcement. 3 Credits.

7847—*Police Records**

The necessity, techniques, and details of keeping records in a police department. Criminal records, filing, and cross-reference systems are emphasized. Officer report writing is practiced. 3 Credits.

7848—“*Leads*” and “*Lets*”*

The function, scope, and application of the “Law Enforcement Automated Data Systems” and the “Law Enforcement Telecommunications System” as they apply to the local police department. 3 Credits.

7849—*Crime Laboratory Techniques**

A study of special chemical and physical procedures used in the crime laboratory. The use of specialized instrumentation is emphasized: microscope and micro-photography, x-ray equipment, and spectrophotometers. 3 Credits.

Fire Science Technology

7901—*Introduction to Fire Protection**

Survey of fire protection - the role, history, and development of the fire service. Organization of the fire service. Other topics discussed include fire equipment and apparatus, communications, records, and reports, insurance rating systems, and the law as it pertains to the fire service. 3 Credits.

7902—*Fire Prevention Practices**

A study of buildings and other structures with emphasis upon fire protection procedures and practices. Fire ratings of materials are covered. Inspection practices, explosive flammable storage, and codes and fire ordinances are discussed. 4 Credits.

7904—*Fire Hydraulics**

An introduction to hydraulic theory. Drafting of water, velocity, and discharge, friction loss, engine and nozzle pressure, fire streams and pressure losses in flowing hydrants are studied. Practice is afforded in application of hydraulic principles. Flow and pump testing will be included as well as a study of water distribution systems. † 1171, 1392. 4 Credits. Credits.

7905—*Fire Investigation Methods**

A study of the principles of fire investigations including recognition, preservation, collection, and presentation of arson evidence. Arson laws, interrogation of witnesses, application of photography preparation of reports, and adjustment of insured losses. Estimation of loss due to fire, smoke, and water. 4 Credits.

7906—*Administration of Fire Department**

The contemporary fire protection agency, its functions, structure, and operational techniques. Principles of organization, staffing, budgeting, controlling, coordinating, planning, research in fire protection. The development of maintenance of liason and cooperation between fire and police departments. 3 Credits.

7911—*Fire Fighting Tactics**

Techniques and procedures of fire fighting with emphasis upon the role of the individual fireman. Methods of extinguishing fires, life saving procedures, special fire fighting equipment, salvage, prevention of rekindling and overhauling will be covered. Experienced fire fighters having graduated from a fire department academy, may receive credit for this course upon recommendation by the local fire departments. 5 Credits.

7912—*Fire Protection Systems**

The design and operation of fire protection systems, including water distribution, direction, alarm and watchman services and protection systems for special hazards. Carbon dioxide, dry chemical foam and water spray systems are studied in detail. Standpipes and sprinkler systems and methods of re-establishment after use is presented. Fire protection engineers will serve as guest lecturers. 3 Credits.

7913—*Chemistry of Hazardous Materials**

An analysis of chemical reaction as the causitive agent of fire. Topics discussed include redox reactions, reaction rates, toxic compounds and hazardous combinations of chemicals. Hazards of radioactive materials, poisonous gases and LP gases. Methods of transportation of hazardous materials, ICC regulations and markings. † 1311. 5 Credits.

7914—*Fire Fighting Command I**

Group operations and command strategy at the company officer level. The training of the company to operate as a team. Methods implementing plans developed at the chief level. 4 Credits.

7915—*Fire Fighting Command II**

Group operations and command strategy as the chief officer level. Preplanning of firefighting operations, employment of personnel and equipment. Specific tactical problems are analyzed. Operation and tactics including mutual and outside aid in fire fighting. † 7914. 3 Credits.

7916—*Legal Aspects of Fire Protection**

Introduction to law, civil and criminal actions, and the judicial system. Municipal liability for acts of the fire department and its members. Pensions, salary and compensation, and termination. Duty owed by the public to members of the fire department. The initiation, operation, liability, and legal aspects of mutual aid, primary response contracts, and private contracts. 3 Credits.

7924—*Emergency Rescue Operations**

Advanced first aid. Emergency rescue operations including the heavy rescue unit. Use of special tools and rigging. Study and practice of rescue operations on water, highways, and industrial locations. Relationships of the fire department and civil defense, auxiliary, and volunteer units. 4 Credits.

7925—*Personnel Training Methods**

Methods of instruction, application of audio visual equipment, testing and evaluation, and preparation of materials are introduced. Special emphasis is placed upon planning an organizational training program. Methods of evaluation. 3 Credits.

7926—*Fire Protection Seminar**

Discussions of particular problems related to the fire fighting services. Students do research and report on areas of special interest. Authorities are invited to present special interest programs. 3 Credits.

7931—*History of Fire Protection**

Fire protection methods from early civilization through organization of fire departments. Reference is made to notable fire of history, their cause, course, damage, and results. The course provides an appreciation for the profession of fire fighting. 2 Credits.

7932—*Industrial Fire Protection**

The organizations and operations of in-plant fire companies; purchase of supplies and equipment, special fire fighting tactics, training of personnel, and relations to the municipal fire department. 2 Credits.

7933—*Special Fire Fighting Problems**

Methods of fighting aircraft and marine fires. Methods of fighting fires in industrial processes involving hazardous or unknown materials. 2 Credits.

7934—*Fire Insurance**

The history and principle of fire insurance. The principles and practices of inspection for the purpose of determining premium rates. 2 Credits.

7935—*Building Construction**

An introduction to the present practices of building construction. Local and state building codes and laws as applied to fire protection. The course provides an insight to the contents of concealed space, location of ventilation equipment, and plumbing and electrical cut-offs. Relationships between construction materials and fire damage of a building are made. 2 Credits.

7936—*Recent Developments of Fire Fighting**

A study of recent equipment developments and methods for extinguishing fires. The course surveys new combustible materials and chemicals and methods for their handling. 2 Credits.

Medical Laboratory Technology

8001—*Medical Technology I**

Orientation to the field of medical technology; role of the medical laboratory technician, definition and use of terms, the use of and care of laboratory equipment, reporting methods, charts. A survey of the ethics set forth by the professional groups within the fields of the healing arts. † 1111. 2 Credits.

8002—*Medical Technology II**

Detailed study of the use and care of laboratory equipment including the microscope, incubator, and glassware. The importance of laboratory safety is stressed. Sterilization and titration are discussed. † 8001. 2 Credits.

8003—*Hematology I**

The origin and formation of blood cells, including demonstrations of formed elements of blood in their normal and abnormal stages, are studied. Differential morphology, staining qualities, and recognition are stressed. Techniques of counting red and white blood cells and platelets are discussed and practiced. Different methods of determination of hemoglobin concentration are reviewed. † 1312, 1322, 8002. 5 Credits.

8004—*Hematology II**

A continuation of 8003 concentrating on the mechanisms of coagulation and their evaluations. This includes the study and practice of such procedures as prothrombin time, partial thromboplastin time, bleeding, and coagulation time. Serum prothrombin consumption is discussed. Diseases including anemias, leukemias, and hemoglobinopathy will be presented. † 1312, 1322, 1392, 8003. 5 Credits.

* Technical Courses † Prerequisites

8005—*Blood Banking**

Basic theory including the Mendelian Laws, genotypes and phenotypes is discussed. The collection and processing of blood is stressed. Instruction and practice in typing, cross-matching are given. Titration procedures, discussion of atypical antibodies and similar techniques are related to the recognition of incompatibilities. Practice of blood banking procedures follows the study of this segment of laboratory techniques. † 1312, 1322, 1522, 8003. 6 Credits.

8006—*Histology and Cytology**

Students are taught how to prepare tissue specimens for microscopic examination, including fixation, dehydration, embedding, and cutting tissues, and use and care of tools. Labeling and recording accuracy are stressed. Various mounting and straining procedures are taught and practiced with emphasis on the preparation of permanent slides for pathological diagnosis. † 1312, 1321, 1322, 8024, 8026, 8036. 4 Credits.

8014—*Immunology and Serology**

Antigen antibody classifications, agglutination and titration procedures, and similar techniques are stressed. The students practice flocculation, precipitation, and complement fixation methods related to various diseases. † 1312, 1322, 8003, 8023. 5 Credits.

8015—*Microbiology I**

Host parasite relationships as pertain to laboratory safety. A study of bacteria and bacteriological techniques for cultivation and isolation in pure culture, including primary, enrichment and secondary culture. The student studies microscopic techniques, preparation and sterilization and quality control of culture media and glassware, preparation and use of various stains and certain reagents used in biochemical techniques for identification, effects of physical and chemical agents, anaerobic techniques. Other specialized methods including concentration of mycobacteria, blood cultures, water, milk, and food cultures, and antibiotic sensitivity tests, and collection of human blood specimens for bacterial culture. † 1312, 1322, 1522, 8004, 8024, 8026, 8036. 6 Credits.

8016—*Microbiology II**

Continuation of bacteriological methods. Students are taught protozoological and heminthological methods including staining and flotation or concentration techniques, microscopic examinations, general mycological technique and study of various types of fungi, collection and preservation of specimens for viral examinations, study of various viral agents, and of basic

* Technical Courses † Prerequisites

viral techniques for virus isolation and viral serology. † 1311, 1312, 1321, 1322, 1522, 8004, 8024, 8026, 8036. 6 Credits.

8023—*Urinalysis**

This course studies the complete laboratory procedures, qualitative and quantitative, for routine urine examinations. Various chemical tests are taught and practiced in the laboratory. The theory and application of the kidney function are included in this course. † 8001. 3 Credits.

8024—*Clinical Chemistry I**

This course reviews topics of general chemistry in relation to their applications in the medical laboratory. The student participates in the preparation of solutions and reagents used in biological examinations. Colorimetry, photometry, gasometry, enzyme chemistry, flame photometry, and other hospital chemistry laboratory procedures are studied. Quality control and instrumentation are stressed throughout the course. † 1312, 1322, 1392, 1522, 8014. 6 Credits.

8026—*Clinical Chemistry II**

Continued study of the medical applications of the topics presented in 8024. The study of diagnostic isotopy, steroid determinations, and fluorometry will be introduced. † 1311, 1312, 1321, 1322, 1522, 8004, 8014. 5 Credits .

8036—*Electrocardiograph**

A review of the circulatory system. Orientation to the preparation of the patient, and the operation of the machine. Also included in this course is the theory of basal metabolism and the operation of the metabolism machine. † 1322, 1392, 8004, 8005, 8014. 1 Credit.

8081—*Medical Laboratory Internship I**

Two-quarter internship providing a practical application of the skills and abilities learned during the previous six quarters. The students are assigned to an accredited hospital laboratory as a trainee. Students will apply their talent as members of the laboratory department. The student will be involved for six weeks in both the Hematology and Urinalysis Section and Chemistry Section of the laboratory; four weeks in both the Bacteriology and Serology Section and the Blood Banking Section of the laboratory; and will elect a two-week period in the Histology Section, the Isotopy Section, or the Special Chemistry Section of the laboratory. † All Medical Lab Courses. 13 Credits.

8082—*Medical Laboratory Internship II**

Special Problem in Medical Laboratory Internship I and II. Two-quarter internship providing a practical application of the skills and abilities learned during the previous six quarters. The students are assigned to an accredited hospital laboratory as a trainee. Students will apply their talents as members of the laboratory department. The student will be involved for six weeks in both the Hematology and Urinalysis Section and Chemistry Section of the laboratory; four weeks in both the Bacteriology and Serology Section and the Blood Banking Section of the laboratory; and will elect a two-week period in the Histology Section, the Isotopology Section, or the Special Chemistry Section of the laboratory. † All Medical Lab Courses. 13 Credits.

8085—*Special Problem In Med. Lab. Tech. I**

During the internship period, the student will keep a monthly log indicating scope and degree of activity in the laboratory. A copy of this work will be filed with the hospital and a copy filed with the Institute. A problem of special interest to the student, requiring library and/or laboratory study will be selected by the student and the faculty coordinator. † All Medical Lab Courses. 2 Credits.

8086—*Special Problem in Med. Lab. Tech. II**

During the internship period, the student will keep a monthly log indicating scope and degree of activity in the laboratory. A copy of this work will be filed with the hospital and a copy filed with the Institute. A problem of special interest to the student, requiring library and/or laboratory study will be selected by the student and the faculty coordinator. † All Medical Lab Courses. 2 Credits.

Dental Laboratory Technology

8101—*Dental Materials**

A comprehensive study of dental materials such as gypsum products, impression materials resins, waxes, investments and duplicating materials. The laboratory exercises are designed to illustrate the physical properties of all materials studied, plus the results of proper and improper manipulation of the materials. 4 Credits.

8102—*Dental Laboratory**

Handling and pouring of all types of impressions, model trimming, articulation, using various articulators. Investing, using various flasks and rings. To include vacuum in-

vesting. Fabrication of custom trays and occlusion rims. Setting bites for articulation. All types of denture repair. Selection of teeth for denture repairs. Relines and reproductions. Deflasking, remounting, finishing and polishing of dentures. Wax handling. Equipment operations, etc. † 1111, 1311, 8101. 5 Credits.

8103—*Dental Anatomy**

An introduction to the anatomy of the oral cavity. Structures that effect the function and comfort of dental prosthesis. Emphasis is placed on the anatomy of the individual teeth and surrounding tissues plus practical tooth anatomy for function and its relation to occlusion. † 1312, 1321, 8102. 4 Credits.

8104—*Complete Dentures**

Set-ups of complete upper and lower dentures including balancing of occlusion, various techniques, wax-ups, investing, boilout staining, curing, finishing, polishing, and correction of occlusion. Study and application of techniques concerning immediate dentures, and setting teeth against natural dentition. † 1322, 8103, 8113. 10 Credits.

8105—*Partial Dentures**

Survey and partial design for upper and lower cases of various complexities utilizing several tilts is accomplished on duplicated practical cases. Upper and lower partial frameworks are constructed of gold alloy and chrom-cobalt alloy. Use of cast frameworks to set up an dfinish partial dentures. Rebase of partial dentures, construction of wrought partial frameworks and the fabrication of a unilateral tooth borne appliance. Construction of precision attachment. † 1392, 8104. 10 Credits.

8106—*Crown and Bridge**

Models prepared from hydrocolloid and rubber impressions, and dies are prepared from tube impressions. Wax-ups, investing, carving, and polishing simple and complex inlays, full crowns, $\frac{3}{4}$ crowns, and faced crowns. Soldering of contacts and the soldering of castings together. Construction of bridges of various design utilizing metal and porcelain facings. This is to include all procedures from the fabrication of the model through the polishing of the completed bridges. Construction of bridges utilizing pin facings with baked porcelain tip pontic construction in the anterior and posterior regions. To include waxing retainers, baking tips, waxing pontics, casting, soldering and polishing. Crowns and

bridges using a combination of menthyl methacrylate and gold construction. Crowns and bridges using a porcelain and gold construction. † 8105, 8115. 10 Credits.

*8107—Advanced Dental Laboratory Techniques**

An introduction to recent advances in dental laboratory techniques including an introduction to occlusions. The laboratory portion of the course will allow the student to specialize in advance laboratory study of his choice. The areas of study include complete dentures, partial dentures, crown, and bridge, ceramics, pedodontic and orthodontic appliances. † 8106, 8116. 15 Credits.

*8113—Dental Metallurgy**

A study of ferrous and non-ferrous metals and their application to dental procedures including physical properties of metals and alloys, crystalline structure theory of alloys, soldering, casting heat treatment, fatigue and principles of polishing. The laboratory exercises are designed to illustrate the physical properties of the alloys used in dental procedures and the results of proper and improper manipulation. † 8102. 6 Credits.

*8115—Dental Laboratory Operations**

The history of dentistry and the dental laboratory. The role of the laboratory technician in the dental profession. Field trips to dental laboratories. Legal aspects and Code of Ethics. Also included, material on managing commercial laboratory and part of this course can be use dfor field trips to commercial dental laboratories, dental manufacturers, and dental suppliers. 3 Credits.

*8116—Dental Ceramics**

A study of composition and physical properties as well as the fundamentals of manipulation of the materials precludes the laboratory sessions. Fabrication of dies for complete crowns and adaption of matrix plus complete manipulation of porcelain crown, inlays, and porcelain to gold crowns including firing, grinding, glazing. 6 Credits.

Nursing Technology

*8501—Nursing I (Fundamentals)**

An introduction to the field of nursing and assistance toward feeling comfortable in the clinical setting, especially in the nurse-patient relationship. Basic nursing skills and laboratory sessions within the school and clinical areas. † 1351, 1522. 7 Credits.

* Technical Courses

† Prerequisites

8502—*Nursing II (Child and Adolescent)**

Correlated with the child and adolescent psychology course. The nursing needs of children and adolescents as related to their physical and psychological development. Emphasis on nursing problems commonly encountered in pediatric and adolescent nursing. Student participation in the care of children of various ages and in the care of adolescents. † 1351, 1352, and 1523, 1522, 8501. 6 Credits.

8503—*Nursing III (Mothers and Newborns)**

Correlated with the section of the adult psychology course dealing with the young adult and the developing family, with an exploration of family-centered nursing care during pregnancy, labor, delivery, and puerperium, with focus on common nursing problems. Student participation in the care of mothers and infants. † 1352, 1353, 1524, 1523, 8502. 6 Credits.

8504—*Nursing IV (Adults with Physical Illnesses)**

Nursing problems encountered in the care of adults of all ages. Students given opportunity to carry out some specific nursing measures in moderately complex situations with emphasis upon synthesizing basic knowledge and understanding from the biological and behavioral sciences in the solution of nursing problems in relatively simple situations. Each student given a limited opportunity, under guidance, to assess nursing needs and to plan for and give nursing care to a small group of patients in relatively simple situations. † 1353, 1523, 8503. 12 Credits.

8505—*Nursing V (Advanced)**

Advancement made to the more in-depth knowledge and understandings from the natural and behavioral sciences in the solution of nursing problems in more complex situations. Presentation of more nursing situations which call for a greater input of previous learning and continuously developing ability to synthesize. Clinical laboratory involving the care of adult patients with physical illnesses. † 8504. 9 Credits.

8506—*Nursing VI (Psychiatric)**

A course dealing with the role of the technical nurse in the care of the patient who is mentally ill. Student participation in learning activities in a psychiatric unit of a general hospital. † 8505. 6 Credits.

* Technical Course

8507—*Nursing VII (Technical Nurse Role)**

A problem-solving course built upon all preceding nursing and related courses, to continue experiences in more complex nursing situations. Consideration given to allowing the student to become involved in this problem solving experience in the context of the area of nursing (i.e. maternity, pediatric, medical-surgical) in which work is planned. Each student is given a limited opportunity, under guidance, to carry out a patient assignment of a nature approaching that of beginning technical nurse. † 8506. 12 Credits.

8514—*Trends and Issues in the Health Field**

Attention to prevalent trends and issues in the health field. Encourages a responsible attitude on the part of the technician. Current journals utilized † 8501. 3 Credits.

Laboratory Animal Technology

8901—*Introduction To Laboratory Animal Science**

The introduction to animal species, their use in research, research models and handling procedures. Laws and ethics related to laboratory animal care. Professional literature available for continuing education. 3 Credits.
lar and special diets. 2 Credits.

8903—*Nutrition and Feeding**

A study of feed composition, such as carbonhydrates, proteins, fats, vitamins, and minerals. The requirements of nutrition and signs of deficiencies. Mixing of feeds for regular and special diets. 2 Credits.

8904—*Animal Health and Diseases**

This course deals with the colony health, disease prevention and signs of diseases in each of the species. † 8901, 8911, 8912. 4 Credits.

8905—*Pharmacology and Anesthesiology**

Introduction to the major drugs in veterinary medicine and also drugs and equipment used for anesthesia. † 8015, 8901. 4 Credits.

8906—*Animal Experimentation**

This is a basic course in animal experimentation dealing with the principles of scientific research and the technician's association with the primary research investigator. Basic statistics and an introduction to the use of data processing in laboratory experimentation. † 8912. 3 Credits.

8911—*Laboratory Animal Technology I**

This course familiarizes the student with feeds, feeding procedures, feeding systems, environmental temperature control, and basic animal science. 3 Credits.

8912—*Laboratory Animal Technology II**

The study of the animal caging systems, physical handling of the animal and restraint for biological testing. † 8801, 8911. 4 Credits.

8914—*Gnotobiotics**

The study and training of the germ free animal, its requirements and technical manipulation. † 8015, 8912. 5 Credits.

8915—*Sanitation, Housing & Instrumentation**

This course deals with the basic principles of animal first problems. Also housing and use of laboratory equipment will be covered. † 8912. 5 Credits.

8916—*Surgical Technology**

This course deals with the basic principles of animal first aid, radiology, minor surgical techniques, techniques in sterility, instrument sterilization and technical assistance to the surgical investigator. † 1322, 8015, 8912. 4 Credits.

8925—*Animal Facility Administration**

This course covers the management of personnel in the animal research facility, the administration of supply requisitions, animal requisitions, medical records concerning the colony of research animals. Basic accounting principles for the laboratory animal facility. † 8912. 5 Credits.

8926—*Clinical Laboratory Technology**

This course deals with the clinical technology and physiological measurements, particularly urine and blood. It also introduces the laboratory technologist to clinical pathology and histopathology procedures. † 8015, 8912. 4 Credits.

8936—*Genetics and Mating Systems**

Introduction of genetics and mating systems for the production of laboratory animals. † 8912. 4 Credits.

Notes