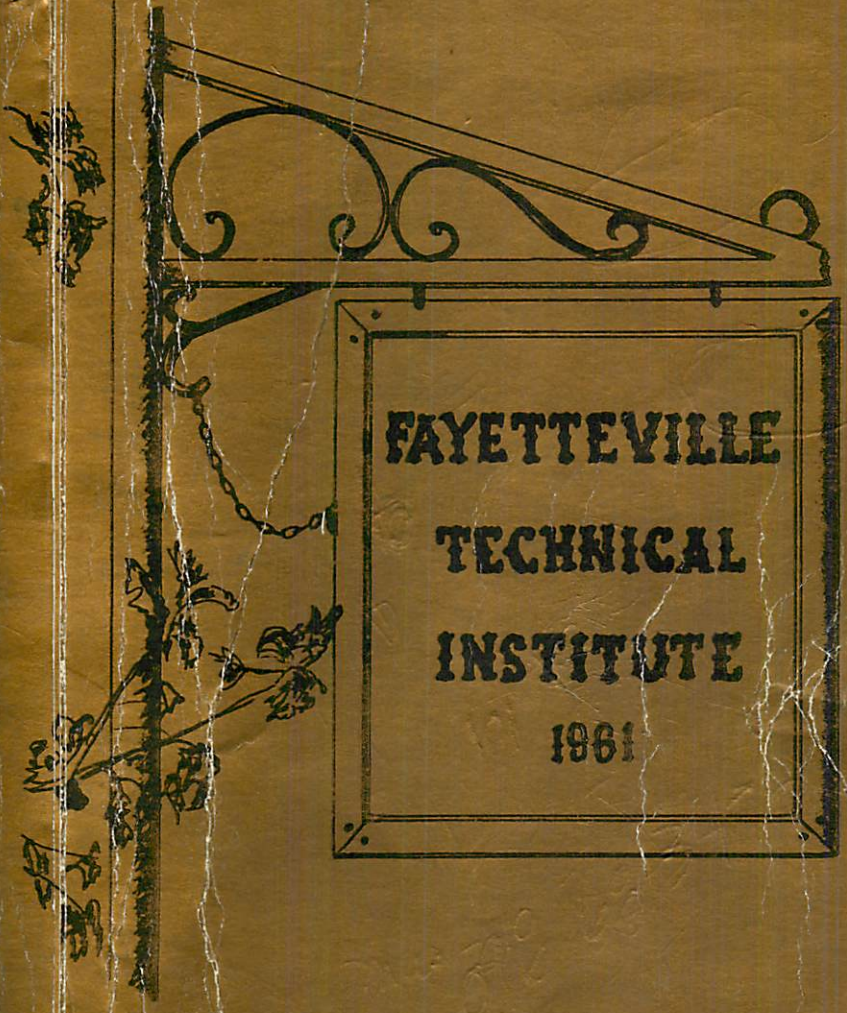
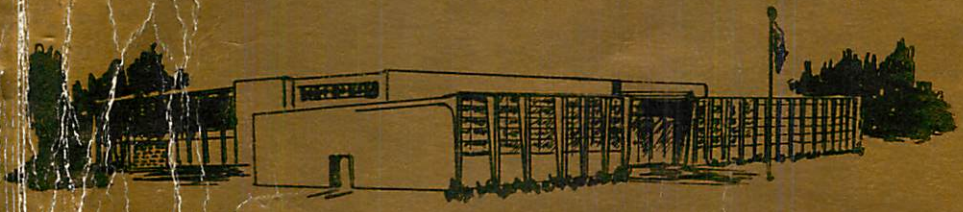




1965 ✦ 1967

FAYETTEVILLE TECHNICAL INSTITUTE

1965 - 1967

CATALOGUE

VOLUME 1

P. O. BOX 5236, FAYETTEVILLE, NORTH CAROLINA
PHONE 484-4121

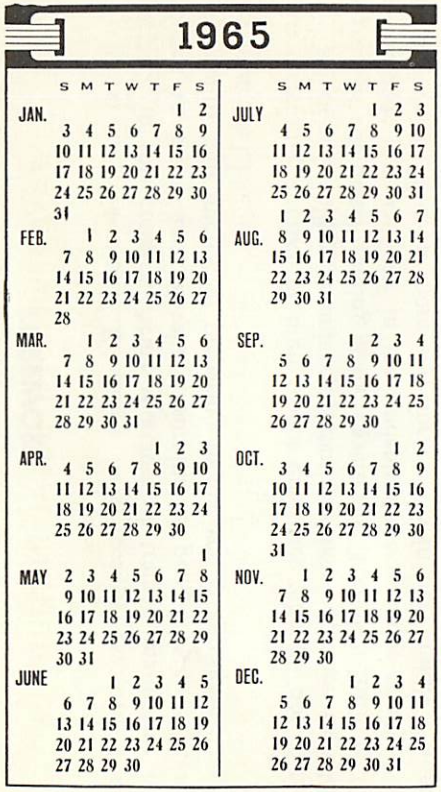
FOREWORD

Technical and Vocational Education have recently assumed a new importance in this country. Acute shortages of trained manpower have developed in many areas despite a surplus of persons who seemingly possess ability and interest in preparing themselves, if appropriate opportunity were available.

An increasing number of high school graduates who do not plan to attend a four-year college or university continue their education by taking two years of additional training at the Fayetteville Technical Institute. Our first endeavor is to cultivate in the students those qualities of mind and character which fit them more ably for careers in our rapidly changing technological world and, secondly to train the students to take their place in our complex American society as an American citizen.

The Fayetteville Technical Institute offers a variety of programs, designed to meet the needs of all the people of our community, and to provide the type of education which industry and business are demanding of their employees today.

HOWARD E. BOUDREAU,
President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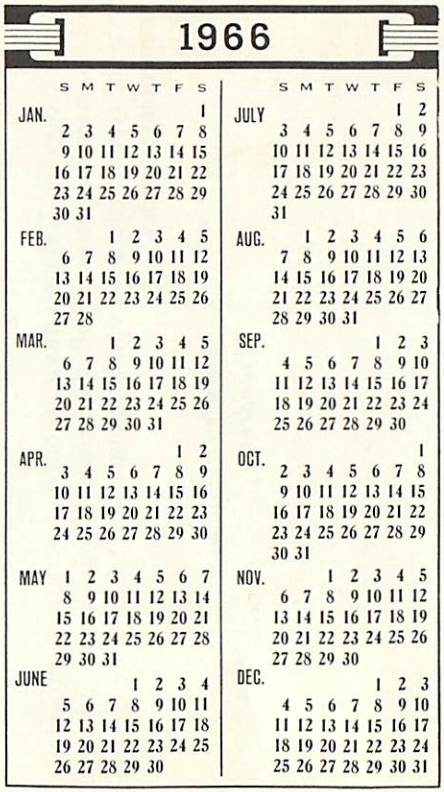
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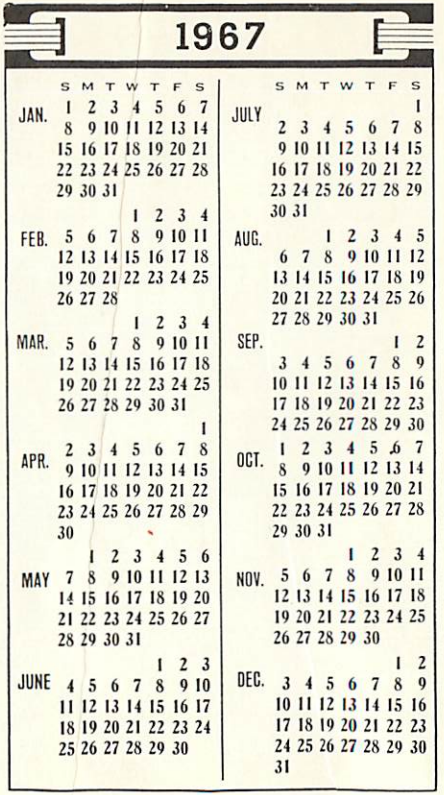
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FAYETTEVILLE TECHNICAL INSTITUTE

ACADEMIC CALENDAR 1965-66

Fall Quarter

September 7-8	Registration for all-day students.
September 8	Orientation for beginning students.
September 9	Classes begin for all students.
November 24	Last day of fall quarter.
November 25-26	Thanksgiving Recess.

Winter Quarter

November 30—December 1	Registration.
December 2	Second quarter begins.
December 24—January 2	Christmas Recess.
February 25	Last day of winter quarter.

Spring Quarter

March 2-3	Registration.
March 7	Third quarter begins.
	Easter Recess
May 25	Last day of spring quarter.
May 28	Graduation exercises.

Summer Quarter

June 2-3	Registration for new students.
June 6	Classes begin.
July 2-4	Fourth of July weekend.
August 12	Last day of summer quarter.

ACADEMIC CALENDAR 1966-67

Fall Quarter

September 6-7	Registration for all-day students.
September 7	Orientation for beginning students.
September 8	Classes begin for all students.
November 23	Last day of fall quarter.
November 24-25	Thanksgiving Recess.

Winter Quarter

November 29—November 30	Registration.
December 1	Second quarter begins.
December 23—January 4	Christmas Recess.
February 24	Last day of winter quarter.

Spring Quarter

March 1	Registration.
March 2	Third quarter begins.
	Easter Recess.
May 24	Graduation exercises.

Summer Quarter

June 1-2	Registration for new students.
June 5	Classes begin.
July 4	Fourth of July weekend.
August 11	Last day of summer quarter.

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OFFICERS OF ADMINISTRATION

Department of Community Colleges

I. E. Ready ..... Director
Ivan E. Valentine .... Assistant Director, Vocational-Technical Programs

BOARD OF TRUSTEES OF FAYETTEVILLE TECHNICAL INSTITUTE

Paul Thompson	1965	Fayetteville, North Carolina
James Gary, Sr.	1971	Hope Mills, North Carolina
Howard Hall	1967	Spring Lake, North Carolina
W. J. West	1971	Fayetteville, North Carolina
Gibson Prather	1969	Fayetteville, North Carolina
F. C. Franklin	1971	Fayetteville, North Carolina
Henry A. Rankin, Jr.	1969	Fayetteville, North Carolina
Thornton Rose	1967	Fayetteville, North Carolina
Roscoe Blue	1965	Fayetteville, North Carolina
Neill Currie, Jr.	1969	Fayetteville, North Carolina
Herbert Vick, M.D.	1965	Fayetteville, North Carolina
Mrs. Thomas H. Finch	1967	Fayetteville, North Carolina

FAYETTEVILLE TECHNICAL INSTITUTE ADMINISTRATIVE STAFF

Howard E. Boudreau, B.S., M.Ed., President, Colorado State University

William E. Sease, B.S., M.Ed., Director of Technical Vocational Education, Virginia Polytechnic Institute

Samuel Lee Johns, Maj. (ASA) Ret., Director of Evening Programs

Niles E. Compton, B.S., M.Ed., Director of Student Personnel, University of Florida

Charles A. Purcell, Jr., PE, B.S., Asst. Director of Tech. Voc. Program, Georgia Institute Technology

William L. Bryant, B.S., M.Ed., Director of Extension, North Carolina State

FACULTY

ROBERT CRAIG ALLEN, B.S., M.Ed., Dept. Head, Business Education, University of North Carolina

GEORGE T. BECK, B.S., M.Ed., Instructor, Related Science, University of North Carolina

JAMES H. CHRISTIE, B.S., Dept. Head, Welding, North Carolina State

MAXINE M. CLIATT, R.N., Instructor, Practical Nurse Education

CAROLYN P. CRABTREE, R.N., Instructor, Practical Nurse Education

BETHEL H. DAVIS, Reg. Surv., B.C.E., Dept. Head, Civil Technology, North Carolina State

J. D. DETTER, Ref. and A. C. License Cont., Instructor, Air Conditioning and Refrigeration, Wilmington Technical Institute

GORDON L. DWIGGINS, PE, B.S., MSSE, Dept. Head, Sanitary Engineering Technology, University of North Carolina

JOSEPH H. FOERCH, JR., Lt. Col. Signal Corp., Ret., Dept. Head, Radio and Television

ROBERT S. GORDON, A.A.S., Dept Head, Electronics, Coyne Radio and Television and Electronics

WILLIAM E. HANCOCK, B.Ed., B.S., MA, Dept. Head, Drafting, East Tennessee State University

WOODROW MASHBURN, Master Machinist, Dept Head, Machine Shop

ARMAND MAYVILLE, JR., B.S., Instructor, Related Science, Alabama Polytechnic Institute

FRANKLIN McDONALD, Master Mechanic, Instructor, Automotive

GRAVES H. McDOWALL, A.B., Dept. Head, Social Science, Millsaps College

FRANK C. MILLER, A.A.S., Instructor, Air Conditioning and Refrigeration, Southern Technical Institute

EDMUND E. NUTE, Master Mechanic, Dept. Head, Automotive

ERVIN D. OAKES, JR., Refr. Licensed Cont., Instructor, Air Conditioning and Refrigeration

DOROTHY O'BRIEN, R.N., Instructor, Practical Nurse Education

JAMES T. PADEN, SR., A.A.S., Instructor, Automotive, Presbyterian Junior College

FRANCES PEDEN, R.N., Instructor, Practical Nurse Education

JAMES B. PITTMAN, Master Machinist, Instructor, Machine Shop

CARL D. PRICE, B.S., M.S., Dept. Head, Agricultural, North Carolina State

ANDREA G. RAY, R.N., Supervisor, Instructor, Practical Nurse Education, Mercy Hospital, Portland, Maine

Paul B. Sharpe, Jr., A.A.S., Dept. Head, Air Conditioning and Refrigeration, Danville Technical Institute

John L. Shoemaker, Col. Arty., Ret., Instructor, Drafting

Jean L. Sims, A.B., Instructor, Business Education, Elon College

Loreen M. Smith, R.N., Instructor, Practical Nurse Education

Abram C. Stephenson, A.B., Dept. Head, Mathematics, Elon College

Betty Jean Williamson, B.S., M.Ed., Librarian, East Carolina

OFFICE AND GENERAL STAFF

William P. Standley, CWO (AGC), Ret., ARA and MDTA Coordinator, San Francisco State

James Pruette, Maintenance Supervisor

Louise Griffin, Bookkeeper

Barbara McCaskill, Secretary

Sandra Norris, Secretary

Patricia Rushing, Secretary

Germain Standley, Secretary

Jean M. Thompson, Secretary

Patricia Trantham, Secretary

HISTORY OF FAYETTEVILLE TECHNICAL INSTITUTE

The Fayetteville Technical Institute had its beginning as the Fayetteville Area Industrial Education Center and was established in 1961 as a result of action taken by the North Carolina State Legislature to increase technical training. Under a new law passed in 1963 by the Legislature the center was placed under the administration of the newly created Department of Community Colleges—to be directed by a Local Board of Trustees.

The Center's progress in quality of educational programs offered resulted in the Board of Trustees requesting that the status of Technical Institute be given. This step was approved by the State Board of Education in September 1963 and the name Fayetteville Technical Institute was adopted.

The present facilities are housed in 38,000 square feet of floor space designed for technical and trade programs. The class rooms and laboratory areas are air conditioned and the shop areas are well ventilated for maximum comfort of the students. The design of the building is considered to be one of the best of its kind in the nation.

The Fayetteville Technical Institute is classed as one of the top schools in North Carolina under the Department of Community Colleges. Plans are already under way to expand the buildings, facilities, and staff to meet the urgent demands of increasing enrollment.

OBJECTIVES

The Fayetteville Technical Institute is committed to the task of providing the best possible training to meet the potentials of its student body. The primary goal is to make available to each student training in knowledge, skills and attitudes for his cultural development, for fitting him to be a responsible citizen and for enriched personal living.

The major aims of Fayetteville Technical Institute are to train students as qualified engineering technicians to enter the complex and changing technician work-force, and to train skilled craftsmen to successfully fill the demand for the skilled specialist created by technological advancements. The Fayetteville Technical Institute does not ignore its responsibility to provide related areas of study which equip the student with the ability to develop an understanding of the American free enterprise system and an appreciation for a broader social and spiritual outlook.

GENERAL INFORMATION

ADMISSION REQUIREMENTS

General Admission Policy

The Fayetteville Technical Institute is a co-educational institution open to any individual who meets the admission requirements for the particular course he chooses to follow.

The applicant should be in reasonably good health with no physical defect that would interfere with his ability in his particular field of work. The applicant may be required, in some cases, to furnish evidence of satisfactory health.

A personal interview with the Director of Student Personnel or Counselor is a requirement to complete the processing of an application.

Application forms for admission may be secured by writing to the Registrar, Fayetteville Technical Institute, P. O. Box 5236, Fayetteville, North Carolina.

Entrance Exams

All students are required to take the GATB which is administered by the North Carolina Equipment Security Commission prior to enrollment. With this exception no examinations to determine whether a student will or will not be admitted are required; however, a battery of tests for guidance and counseling purposes is administered to each student in his first week of school.

Educational Requirements for Technical Curriculums

Applicants must be high school graduates or equivalent. He must present at least two years of math including two of the following: Algebra I, Algebra II, Geometry, Trigonometry or Advanced Math.

Applicants must meet the qualifying score on the GATB given by the North Carolina Employment Security Commission.

It is highly recommended that the applicant have courses in science and physics. Biology and Chemistry are prerequisites for the Sanitary Engineering Technology Curriculum.

Educational Requirements for Trade Curriculums

The Trade Curriculums are designed for applicants who have completed high school; however, the applicant may be accepted if he is able to demonstrate experience and mental growth equivalent to that of a high school graduate.

Applicants must meet the qualifying score in the GATB given by the North Carolina Employment Security Commission.

Admission With Advanced Standing

Students may be admitted with advance standing by transfer from other technical institutes, colleges or universities. To transfer, the subjects must be of "C' grade quality and must parallel closely to those subjects in the students' curriculum at Fayetteville Technical Institute.

An official transcript of the students' previous college work must be submitted at least two weeks before registration day.

EXPENSES AND FEES

Tuition

A registration fee of $2.00 is required of all students at the beginning of each school year.

A tuition charge of $30.00 per quarter must be paid on the date of registration.

Books and Supplies

Students are required to buy the necessary textbooks and materials. The cost of books average approximately $35.00 per quarter exclusive of a Drafting kit and slide-rule.

Other Fees

Students are urged to carry the group insurance available at the Institute for $1.75 per year.

Students may purchase a yearbook if they desire and a nominal rental fee is charged for cap and gown for graduation.

ACADEMIC STANDING

Credits

A. Full-time students will receive quarter hours credit for courses in the curriculum in which they are enrolled.

B. The Fayetteville Technical Institute has been authorized by the North Carolina State Board of Education to award the Associate of Applied Science Degree to those students who successfully complete one of the Technology Curriculums.

C. A Diploma is awarded by the Board of Trustees to those students who successfully complete a trade curriculum.

Requirements for Graduation

To be eligible for graduation the student must:

1. Successfully complete his course of study as listed in this catalogue.
2. Have sufficient quality points to average 2.0 in his total program.
3. Have no failing grade on any major subject area course.

4. Have taken care of all financial obligations owed to Fayetteville Technical Institute.

Only one formal graduation is held each year at the end of the Spring Quarter.

Grading Procedures

A. Each grade is assigned a "grade point equivalent" in quality points for each quarter credit hour scheduled. The scholastic point average is determined by dividing the total quality points earned by the number of quarter hours scheduled.

Numerical Grade	*Grade*	*Grade Point Equivalent*
93-100	A = Excellent	4 quality points for each quarter hour
85-92	B = Good	3 quality points for each quarter hour
77-84	C = Average	2 quality points for each quarter hour
70-76	D = Below Average	1 quality point for each quarter hour

B. Inc.—Incomplete (An incomplete signifies that the student has passed final examination but is incomplete in some report or other work assigned by his instructor. An "Inc" must be completed satisfactorily during the next term, or it automatically becomes an "F".)

WF—Withdrawn Failing. (This signifies that a student has been dropped from school or course because of failing grade or excessive absences. Failure penalty is incurred in same manner as for grade of "F".)

C. All final course grades will be a letter grade in accordance with adopted grading system. Students will receive their grade reports at the end of each quarter. Grade reports will also indicate student attitude toward scholastic work as measured by the instructor.

D. All students must have at least 2 2.0 average to be eligible for graduation. In addition, a student must pass all courses in his major subject area.

Withdrawals

A. Students who transfer or who withdraw from the Institute during the school year must first consult with the Director of Student Personnel. Requests to withdraw must be in writing. This will protect the student's scholastic record, his right to re-enroll, and the right to transfer to another Technical Institute.

Attendance

The nature of the program at the Fayetteville Technical Institute is such that it is necessary that students be in attendance regularly and without interruptions due to absences. A cut system is in effect as follows:

1. A student will be permitted to accumulate 3 class absences in a quarter without affecting his grade average. He will be responsible, however, for making up any class assignments during absences.
2. A student who accumulates more than 3 class absences in any one quarter will be dropped from class and will have to be reinstated through the Director of Student Personnel in order to continue.
3. Students who accumulate more than 3 class absences in any one quarter for the following reasons may have their case appraised by the Director of Student Personnel in order to be reinstated in class.
   (1) Illness or injury to student.
   (2) Illness or death in the immediate family.
   (3) Inclement weather (snowstorms, hurricanes, ice)
   (4) Emergency.
4. A student who has been absent excessively will be subject to failure or dismissal from school without credit. Students will be appraised of their absentee status in each grading period.

Academic Deficiency

Any student whose quality point average for any given quarter's work falls below a minimum of 1.0 will be placed on the "Academic Deficiency" list. If his subsequent quarter's work should also fail to meet this minimum, he may be requested to withdraw from school or drop certain courses and/or take remedial work.

Honors

A graduating student who has earned a quality point average of 3.0 during his work at the Technical Institute will be granted a degree (with honors).

Scholastic Award—One-Year Trade Curriculum

This award is given to the student in a one-year trade curriculum who has obtained the highest grade average in all class work taken at the Technical Institute leading to a diploma.

Scholastic Award—Two-Year Trade Curriculum

This award is given to the student in a two-year trade curriculum who has obtained the highest grade average in all class work taken at the Technical Institute leading to a diploma.

Scholastic Award—Two-Year Technical Curriculum

This award is given to the student in a two-year technology curriculum who has obtained the highest grade average in a two-year technology program leading to the Associate of Applied Science Degree.

Citizenship Award

The following criteria is used by the faculty in making a selection.

1. Respects teachers, administrators and fellow students.
2. Willingness to follow others leadership.
3. Respects public property.
4. Exhibits good sportsmanship.
5. Conforms to general rules and regulations of the school.
6. Genuinely loyal to the school.
7. High degree of integrity.
8. Supports and participates in all school activities.
9. Does a thorough job of assigned tasks and elected responsibility.

Outstanding Student Award

The following is the criteria set forth for this award.

1. Scholarship.
2. Definite leadership ability.
3. Willingness to follow others leadership.
4. Respect for public property.
5. Exhibits good sportsmanship.
6. Conforms to general rules and regulations of the school.
7. Genuinely loyal to the school.
8. A high degree of integrity.
9. Supports and participates in all school activities.
10. Does a thorough job of assigned tasks and elected responsibility.

Re-admittance

A. When a student withdraws from school due to hardship or illness, he may be permitted to re-enter at the beginning of the quarter in which those courses will be taught again.

B. A student dismissed from school by the Administration may re-enter the following September for a probationary period of six weeks.

Refunds

A. Refunds for full-time students shall not be made available unless the student is compelled to withdraw from school for unavoidable reasons. In such cases, $20.00 may be refunded within 20 days from the beginning of each quarter. No refund will be made after 20 days.

B. Veterans:

The following refund policy will be applicable to veterans under Public Law 550, 82nd Congress:

Student Government President. Through the Student Government each student has a voice in school affairs.

Student Publications

A. *Technikos:* Yearbook published by the student body. Students interested in working on this publication should contact James Driscoll (Air Conditioning Technology). The cost of the yearbook is $3.50 and may be ordered during the first quarter.

B. *Technician:* Newspaper published quarterly by the student body. Students interested in working with any phase of this publication should contact Mr. Craig Allen.

STUDENT REGULATIONS

Discipline

A. Students are expected to conduct themselves as mature adults at all times.

B. Try to obey and live by the few regulations set up to make the Institute function smoothly.

C. Anyone who continues to get into difficulty will be dropped from the Institute with no credit.

D. Students who negligently lose, damage, destroy, sell, or otherwise dispose of school property placed in their possession or entrusted to them will be charged for the full extent of the damage or loss and subject to disciplinary action.

E. Students who engage in such acts as stealing, gambling, profane language, personal combat, make themselves liable to disciplinary action.

F. Under no condition will alcoholic beverages be permitted in or on the school property. No one under the influence of alcohol will be permitted on the grounds. Any violation of this regulation will result in expulsion of the student.

Smoking

A. Smoking is permitted in designated areas only. This includes the student lounge, patio, halls and the outside of the building.

B. Smoking is not allowed in the classrooms or library at any time.

Student Automobile

1. Students should operate their automobiles safely, courteously, and moderately.
2. All students should be parked on the east or west side of the campus in the automobile designated parking lots.

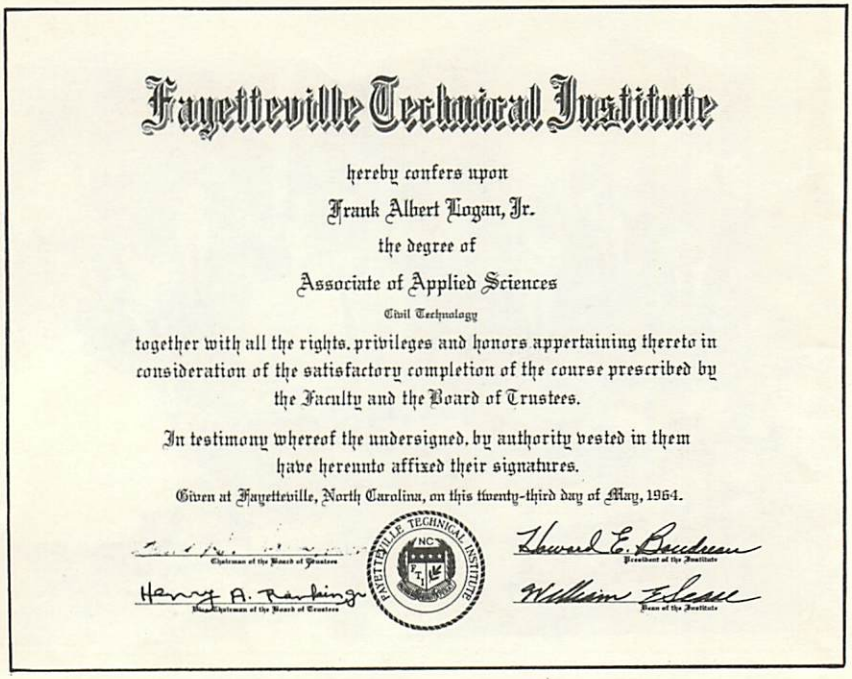
3. A 15 mile per hour speed will be strictly enforced for all vehicles on or near the school campus.
4. Special attention should be given to pedestrians who are in the area.

Student Clothing

Fayetteville Technical Institute students dress informally. A few do wear suits; others find khaki or denim trousers and matching shirt appropriate and acceptable. Every student should bring clothing suitable for wear in shops or labs.

REGISTRATION

NEWSPAPER STAFF



Fayetteville Technical Institute

hereby confers upon

Frank Albert Logan, Jr.

the degree of

Associate of Applied Sciences

Civil Technology

together with all the rights, privileges and honors appertaining thereto in consideration of the satisfactory completion of the course prescribed by the Faculty and the Board of Trustees.

In testimony whereof the undersigned, by authority vested in them have hereunto affixed their signatures.

Given at Fayetteville, North Carolina, on this twenty-third day of May, 1964.

Chairman of the Board of Trustees

Vice-Chairman of the Board of Trustees

President of the Institute

Dean of the Institute

Associate of Applied Science Degree

Accounting

Agricultural Business Technology

Air Conditioning and Refrigeration Technology

Business Administration

Civil Engineering Technology

Electronics Engineering Technology

Engineering and Technical Secretary

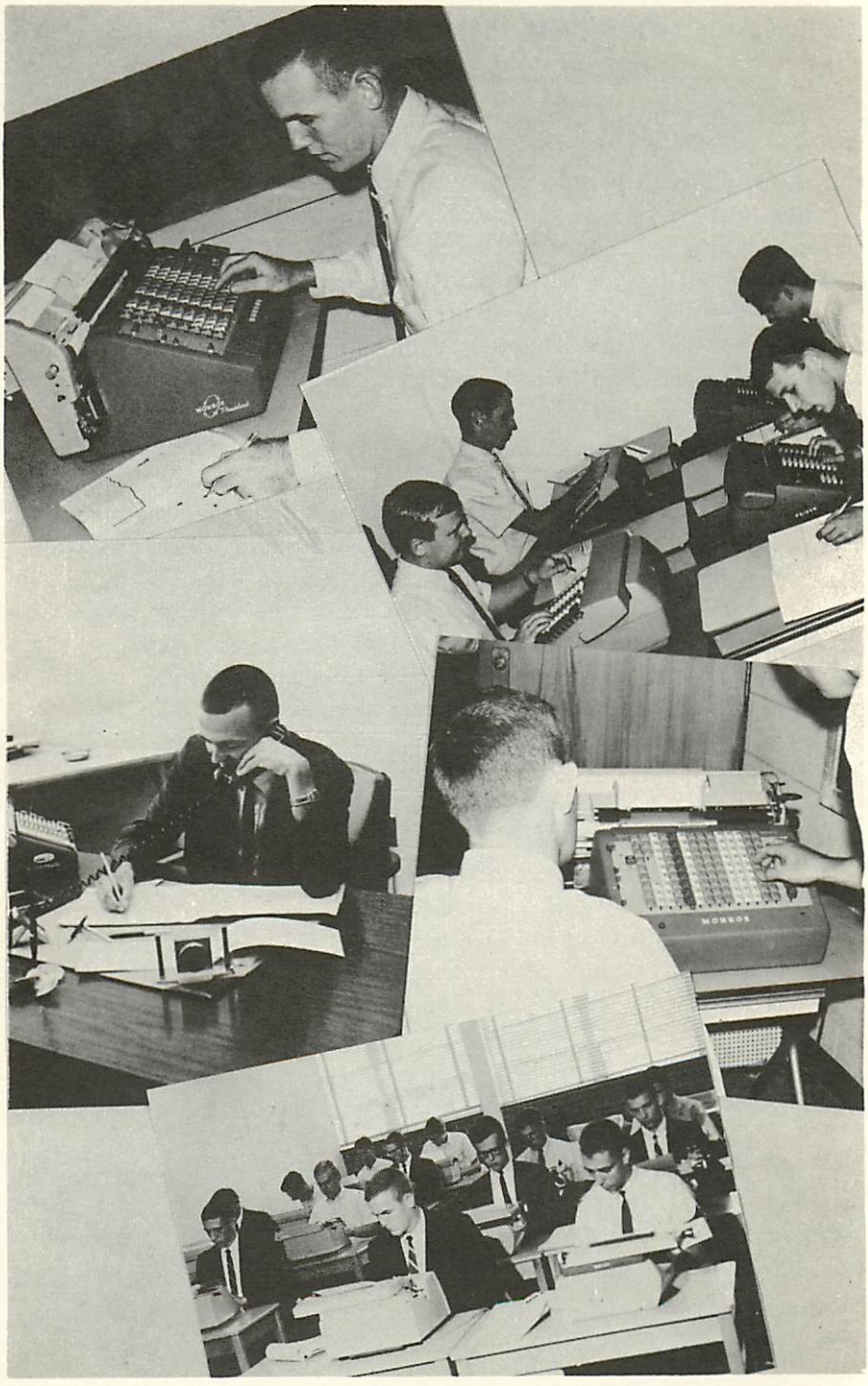
Mechanical Engineering Technology

Sanitary Engineering Technology

Purpose of Technician Training at Fayetteville Technical Institute

Technician training is highly specialized training for effective entrance into specialized areas of occupations. However, there is a core of knowledge and skills which all persons need who work at the level of technician occupations, irrespective of the specific occupational fields in which these persons are employed. Important elements which are common to all technician occupations include basic science, mathematics, industrial terminology, industrial drafting and similar technical skills. Thus, the technician needs a broad post secondary education with emphasis of applied technology which will prepare him to assist engineers, scientists or other professionals in his field.

Our curriculums are designed to build in the first year that degree of competency within the student which will enable him to effectively communicate orally and in writing and which will broaden his outlook and make him a more effective and productive member of society. By adding to this core of fundamentals, in the first year, certain basic skill courses in the major subject area, the student is given a thorough foundation on which to build his second year of intensive training. The second year is spent in a major subject area of highly specialized technician training needed to produce a qualified technician in his chosen specialization.



ACCOUNTING

Purpose of Curriculum

Accounting is one of the fastest growing employment fields in America today, and the job outlook for good accountants seems bright for many years to come. These opportunities result from the tremendous business and industrial expansion in all parts of the country. Because of this emphasis, there is a growing need for trained people in the area of accounting to help managers keep track of a firm's operation. The Accounting Curriculum is designed to fill this need by offering students the necessary accounting theories and skills for the entry into the accounting profession.

The specific objectives of the Accounting Curriculum are to develop the following competencies:

1. Understanding of the principles of organization and management in business operations.
2. Understanding of the fundamentals of accounting and analysis of financial statements.
3. Understanding and skill in effective communications for business.

Job Description

The duties and responsibilities of an accountant vary somewhat in different firms. Some of the things an accountant might do are: record transactions, render periodic reports, maintain cost records, make special reports, complete tax returns, audit the books, and advise management in areas of financial affairs.

The graduate of the Accounting Curriculum may qualify for various jobs in business and industry leading to any of the following accounting positions: accounting clerk, payroll clerk, accounting machine operator, auditor, and cost accountant. This training plus further experience should prepare them to become office managers, accounting supervisors, and to fill other responsible positions in a business firm.

ACCOUNTING CURRICULUM

Course No. and Title	C-L-CH
First Quarter	
ENG 302 Communicative Skills: English	3—0—3
BUS 302-F Typewriting (Or Elective)*	0—5—2
MA 310-F Business Mathematics	3—2—4
BUS 301 Introduction to Business	3—0—3
BUS 351 Business Law	3—0—3
BUS 319 Credit Procedures and Problems	3—0—3
	15—7—18
Second Quarter	
ENG 305 Communicative Skills: Report Writing	3—0—3
BUS 320-F Accounting	5—3—6
BUS 352 Business Law	3—0—3
SOC 302 Economics	3—0—3
BUS 339 Marketing	3—0—3
BUS 360 Office Machines	2—2—3
	19—5—21
Third Quarter	
ENG 306 Communicative Skills: Business Communications	3—0—3
BUS 321-F Accounting	5—3—6
SOC 304 Economics	3—0—3
BUS 328 Business Insurance	3—0—3
BUS 360 Office Machines	2—2—3
	16—5—18
Fourth Quarter	
ENG 307 Communicative Skills: Oral Communications	3—0—3
BUS 364 Business Finance	3—0—3
BUS 353 Business Law	3—0—3
DP 311 Introduction to Data Processing Systems	3—2—4
BUS 322-F Accounting	5—3—6
	17—5—19
Fifth Quarter	
ENG 304 Communicative Skills: Speech	2—0—2
BUS 374-F Advanced Accounting	3—3—4
BUS 323 Cost Accounting	3—2—4
SOC 310 Applied Psychology	3—0—3
Elective**	6—0—6
	17—5—19
Sixth Quarter	
BUS 368 Taxes	3—0—3
BUS 333 Personnel Management	3—0—3
BUS 371 Office Management	3—0—3
BUS 375-F Machine Accounting	3—3—4
BUS 369-F Auditing	3—3—4
	15—6—17

C = Class Hrs. Per Wk. L = Lab Hrs. Per Wk. CH = Credit Hrs. Per Qtr.

*Elective courses must be selected from business education curriculum.

**Elective courses must be selected from the associate degree curriculum.

The institution may elect to require certain courses or may let the student have a free elective. Student schedule, including electives, not to exceed 30 contact hours per week.

ACCOUNTING

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

ENG 302 Communicative Skills: English 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

BUS 302-F Typewriting 0—5—2

Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts. Minimum speed of 30 net words per minute for five minutes.
Prerequisite: None.

MA 310-F Business Mathematics 3—2—4

This course stresses the fundamental operations and their application to business problems. Topics covered include payrolls, price marking, interest and discount, commission, taxes, and pertinent uses of mathematics in the field of business.
Prerequisite: None.

BUS 301 Introduction to Business 3—0—3

A survey of the business world with particular attention devoted to the structure of the various types of business organizations, methods of financing, internal organization, and management.
Prerequisite: None.

BUS 351 Business Law 3—0—3

A general course designed to acquaint the student with certain fundamentals and principles of business law, including contracts, negotiable instruments, partnerships, corporations, and agencies.
Prerequisite: None.

BUS 319 Credit Procedures and Problems 3—0—3

Principles and practices in the extension of credit; collections procedures; laws pertaining to credit extension and collection are included.
Prerequisite: None.

Second Quarter

ENG 305 Communicative Skills: Report Writing 3—0—3

A study and practice in the fundamentals of report writing, including style and mechanics in preparing reports of various types, which are most likely to be used by people engaged in business and the professions.
Prerequisite: ENG 302.

BUS 320-F Accounting 5—3—6

Principles, techniques and tools of accounting for understanding of the mechanics of accounting — collecting, summarizing, analyzing, and reporting information about service and merchantile enterprises, to include practical application of the principles learned.
Prerequisite: None.

BUS 352 Business Law 3—0—3

Includes the study of laws pertaining to bailments, sales, risk-bearing, partnership-corporation, mortgages and property rights.
Prerequisite: BUS 351.

SOC 302 Economics 3—0—3

The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None.

BUS 339 Marketing 3—0—3

A study of the marketing structure within the framework of the U. S. economic system. It includes the study of the movement of goods from producer to consumer through various channels of distribution, the functions of marketing, the social and economic implications.
Prerequisite: None.

BUS 360 Office Machines 2—2—3

A general survey of the business and office machines. Students will receive training in techniques, processes, operation and application of the ten-key adding machines, full keyboard adding machines, calculator, and duplicating equipment.
Prerequisite: None.

Third Quarter

ENG 306 Communicative Skills:
Business Communications **3—0—3**

Develops skills in techniques in writing business communications. Emphasis is placed on writing action—getting sales letters and prospectuses. Business reports, summaries of business conferences, spot announcements for radio and television as well as letters involving credit, collections, adjustments, complaints, orders, acknowledgments, remittances, and inquiry are also included in this course.
Prerequisite: ENG 305.

BUS 321-F Accounting **5—3—6**

Partnership and corporation accounting including a study of payrolls, Federal and State taxes. Emphasis is placed on the recording, summarizing and interpreting data for management control rather than on bookkeeping skills. Accounting services are shown as they contribute to the recognition and solution of management problems.
Prerequisite: BUS 320.

SOC 304 Economics **3—0—3**

Greater depth in principles of economics, including a penetration into the composition and pricing of national output, distribution of income, international trade and finance, and current economic problems.
Prerequisite: SOC 302.

BUS 328 Business Insurance **3—0—3**

A presentation of the basic principles of risk insurance and their application. A survey of the various types of insurance is included.
Prerequisite: None.

BUS 361 Office Machines **2—2—3**

A more intensive study of one of the machines used in Business Machines 360 plus instruction in the operation of the bookkeeping-accounting machines and the dictating and transcribing machines.
Prerequisite: BUS 360.

Fourth Quarter

ENG 307 Communicative Skills:
Oral Communications **3—0—3**

Includes study in areas of face-to-face conversation, delegating and accepting, understanding, listening, questioning, conferences, and the use of words.
Prerequisite: BUS 306.

BUS 364 Business Finance **3—0—3**

Financing of business units, as individuals, partnerships, corporations, and trusts. A detailed study is made of the organization, management, and financing of businesses.
Prerequisite: None.

BUS 353 Business Law **3—0—3**

A study of the powers, policies, methods, and procedures used by various Federal, State and local administrative agencies in promoting and regulating business enterprises. It includes a consideration of the constitutional and statutory limitations on these bodies and judicial review of administrative action.
Prerequisite: BUS 351 and 352.

DP 311 Introduction to Data Processing Systems **3—2—4**

Fundamental concepts and operational principles of data processing systems as an aid in developing a basic knowledge of computers, prerequisite to the detail study of particular computer problems. This course is a prerequisite for all programming courses.
Prerequisite: None.

BUS 322-F Accounting **5—3—6**

Thorough working knowledge of concepts used in preparation and interpretation of financial statements. Each item of the income statement and balance sheet is carefully analyzed.
Prerequisite: BUS 320 and 321.

Fifth Quarter

ENG 304 Communicative Skills:
Speech **2—0—2**

Technical speech to develop the speaking skills with emphasis on the dual role of communications as both a speaking and listening skill. Stress is placed on growth in poise and confidence of the student. Practice through individual speeches and group discussion. Recordings are made of the student's voice and used as an aid in speech development.
Prerequisite: ENG 307.

BUS 374-F Advanced Accounting **3—3—4**

Advanced accounting theory and principles as applied to special accounting problems, bankruptcy proceedings, estates and trusts, consolidation of statements, parent, and subsidiary accounting.
Prerequisite: BUS 320, 321, and 322.

BUS 323 Cost Accounting **3—2—4**

Nature and purposes of cost accounting; accounting for direct labor, materials, and factory burden; job cost, and standard cost principles and procedures; selling and distribution costs; budgets, and executive use of cost figures.
Prerequisite: BUS 320, 321, 322 and 374.

SOC 310 Applied Psychology **3—0—3**

This course stresses the procedures of building an efficient, enthusiastic business team and deals with the nature of the problems which arise in business organizations. The individual and his behavior are discussed, as well as the problems of influence and authority.
Prerequisite: None.

Elective** **6—0—6**

Sixth Quarter

BUS 368 Taxes **3—0—3**

Application of Federal and State taxes to various businesses and business conditions. A study of the following taxes: Income, payroll, intangible, capital gain, sales and use, excise, and inheritance.
Prerequisite: None.

BUS 333 Personnel Management **3—0—3**

Principles of human relationships; selection of personnel by interviewing and testing; and training of personnel.
Prerequisite: None.

BUS 371 Office Management **3—0—3**

Presents the fundamental principles of office management. Emphasis on the role of office management; office automation; planning, controlling, organizing and actuating in office management.
Prerequisite: BUS 340.

BUS 375-F Machine Accounting **3—3—4**

The application of various types of machines to accounting, statistical, and payroll work based on the principles of double entry accounting using the punch-card system. Visits to local installations with these types of machines.
Prerequisite: BUS 374.

BUS 369-F Auditing **3—3—3**

Principles of conducting audits and investigations; setting up accounts based upon audits; collecting data on working papers; arranging and systemizing the audit, and writing the audit report. Emphasis placed on detailed audits, internal auditing, and internal control.
Prerequisite: BUS 320, 321, 322 and 374.

**Elective courses must be selected from the associate degree curriculum.

AIR CONDITIONING AND REFRIGERATION TECHNOLOGY

INTRODUCTION

Purpose of Curriculum

In recent years the use of air-conditioning and refrigeration equipment has increased tremendously. Practically all new building construction for business and commercial use have "year-round" air-conditioning systems. Many homes now have air conditioning and the trend is toward greater use of "year-round" systems for cooling and heating. Food stores are requiring greater use of refrigeration systems for storage and display of products. With this great upswing in the use of air-conditioning and refrigeration equipment, a greater demand is made on trained personnel to plan and supervise installations and to supervise the operation and maintenance of heating, air-conditioning, and refrigeration equipment.

This curriculum is designed to meet the basic requirements of a program to provide capable technicians in the industry. The principle objective has been to outline the required technical information and theoretical knowledge, while maintaining a good balance of certain manipulative skills which enable the technician to function efficiently with the wide range of engineers, designers, skilled craftsmen, salesmen, and others in the field. Considerable emphasis is placed on self-development in an effort to encourage the individual trained hereby to continue to study and grow as the industry advances.

Job Description

The air-conditioning and refrigeration technician is employable in areas of sales, maintenance, installation, production, application engineering, or research design. He is involved with equipment for changing temperature, control systems, and ducts and piping for distribution of air, water, steam, and refrigerants. His duties may be concerned with any or all of these systems and components.

AIR CONDITIONING AND REFRIGERATION TECHNOLOGY CURRICULUM

Course No. and Title — First Quarter	C-L-CH
MA 301 Technical Mathematics I	5—0—5
D 307 General Drafting I	2—3—3
ENG 302 Communicative Skills: Grammar	3—0—3
PHY 301 Physics: Properties of Matter	3—2—4
AHR 311 Fundamentals of Refrigeration I	3—6—5
	16–11–20

Second Quarter	C-L-CH
MA 302 Technical Mathematics II	5—0—5
DD 308 General Drafting II	2—3—3
ENG 303 Communicative Skills: Tech. Writing	3—0—3
PHY 302 Physics: Work, Energy, Power	3—2—4
AHR 312 Fundamentals of Refrigeration II	3—6—5
	16–11–20

Third Quarter	C-L-CH
MA 303 Technical Mathematics III	5—0—5
ENG 307 Communicative Skills: Oral Communications	3—0—3
PHY 303 Physics: Electricity	3—2—4
PHY 311 Physics: Fluid Mechanics	3—0—3
AHR 313 Commercial Refrig. Systems Designs	5—4—7
	19—6—22

Course No. and Title — Fourth Quarter	C-L-CH
MA 304 Technical Mathematics IV	3—0—3
SOC 302 Economics	3—0—3
DD 310 Descriptive Geometry	2—4—4
AHR 314 Heating Principles	3—4—5
AHR 315 Fuels and Burners	3—4—5
	14–12–20

Fifth Quarter	C-L-CH
ISc 301 Industrial Organization & Management	3—0—3
DD 316 Air Conditioning Sys. Drawings	2—4—4
AHR 316 Circuits and Controls	4—2—5
AHR 318 Air Conditioning Principles	5—6—8
	14–12–20

Sixth Quarter	C-L-CH
SOC 310 Applied Psychology	3—0—3
AHR 317 Estimating and Contracts	3—4—5
AHR 319 Air Conditioning Sys. Design	5—6—8
AHR 320 Seminar and Research	1—3—2
	12–13–18

C=Class Hrs. Per Wk. L=Lab Hrs. Per Wk. CH=Credit Hrs. Per Qtr.

*Electives: Student Schedule, including electives,. not to exceed 30 contact hours per week.

AIR CONDITIONING AND REFRIGERATION TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 301 Technical Mathematics I 5—0—5

The real number system is developed as an extension of natural numbers, integers, and rational numbers. Insight into the processes of arithmetic and algebra is provided. Additional topics include sets, equations, number bases, number lines, coordinate systems, trigonometry of the right triangle, vectors, dimensional analysis and the derivative.
Prerequisite: None.

DD 307 General Drafting I 2—3—3

An introductory course in drafting for students needing a knowledge of drawing principles and practices for reading and describing objects in the graphic language. The student is expected to gain basic skills in drawing with instruments, lettering, geometrical constructions, freehand sketching, and describing objects orthographically with principal views. Freehand sketching and orthographic reading are to be emphasized.
Prerequisite: None.

ENG 302 Communicative Skills: Grammar 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

PHY 301 Physics: Properties of Matter 3—2—4

A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None.

AHR 311 Fundamentals of Refrigeration I 3—6—5

Terminology, laws of refrigeration, absolute pressure and absolute temperature, energy conversion units; specific heat, latent heat and sensible heat; measurement of heat in quantity and intensity; tone of refrigeration, pressure temperature relationships, transfer of heat by conduction, convection and radiation; elementary refrigeration, refrigeration cycle and refrigerant controls. Tools, materials and methods applicable to aid conditioning and refrigeration.
Prerequisite: None.

Second Quarter

MA 302 Technical Mathematics II 5—0—5

Algebraic operations are applied to linear, quadratic, and polynomial functions and special equations of second degree. Complex numbers are introduced and the study of the derivative is continued. Selected applications involving rates of change, maxima and minima, approximation, areas, and volumes are considered.
Prerequisite: MA 301.

DD 308 General Drafting II 2—3—3

The student continues the study of orthographic projection with applications to orthographic instrument drawing. Dimensioning procedures and practices are emphasized and the student is introduced to the "working drawing." Methods of describing complex objects with auxiliary views and/or sections and conventions are taught.
Prerequisite: DD 307.

ENG 303 Communicative Skills: Technical Writing 3—0—3

The fundamentals of English are utilized as a background for the organization and techniques of modern technical writing. Exercises in developing typical technical reports, using writing techniques and graphic devices, are completed by the students. Practical application in the preparation of a full-length technical report is required of each student at the end of the term.
Prerequisite: ENG 302.

PHY 302 Physics: Work, Energy, Power 3—2—4

Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity, and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisites: MA 301, PHY 301.

AHR 312 Fundamentals of Refrigeration II 3—6—5

Refrigerants and their application in commercial refrigeration; system components, accessories, installation procedures and techniques; diagnosing service problems of mechanical difficulties; methods of defrosting; and making sketches of designs for high, medium and low temperature installation. Symbols for refrigeration and piping equipment will be used in making sketches.
Prerequisites: AHR 311, PHY 301.

Third Quarter

MA 303 Technical Mathematics III 5—0—5

Ideas of algebra are used in a study of trigonometric, logarithmic and exponential functions. Selected applications of calculus reinforce this approach. Polar coordinates are introduced and their applications expanded. Complex numbers, vectors, coordinate systems and their applications constitute other areas of study.
Prerequisite: MA 302.

ENG 307 Communicative Skills: Oral Communications 3—0—3

Includes study in face-to-face conversation, delegating and accepting, understanding, listening, questioning, conferences, and the use of words.
Prerequisite: BUS 306.

PHY 303—Physics: Electricity 3—2—4

Basic theories of electricity, types of electricity, methods of production, and transmission and transforming electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage, amperage, resistance, horsepower, wattage, and transformers are major parts of the course.
Prerequisites: MA 302, PHY 301.

PHY 311 Physics: Fluid Mechanics 3—0—3

Fundamental laws of fluid flow and application of these laws to the sizing of hot and cold water piping, steam piping, refrigerant piping, air ducts, pumps, and fans. Particular emphasis will be directed to calculations of capacity, horsepower, and head requirements of pumps and fans; to comparison of the several methods of piping and air duct sizing; and to methods of fluid flow measurement.
Prerequisites: MA 303, PHY 302.

AHR 313 Commercial Refrigeration Systems Design 5—4—7

Procedures of load calculating used in commercial refrigeration. Various types of installations are studied with emphasis on the product to be cooled, the desired temperatures to be maintained, and humidity conditions. Problems involving system balance and component capacity. Use of head load charts, pipe sizing tables, manufacturers' data, and specification sheets.
Prerequisite: AHR 312.

Fourth Quarter

MA 304 Technical Mathematics IV 3—0—3

A further study of analytical geometry, algebra, and calculus; the binomial expansion, arithmetic and geometric progressions, polynomial functions and methods of solution, integration techniques and use of integral tables, polar equations, and an introduction to solid analytical geometry.
Prerequisite: MA 303.

SOC 302 Economics 3—0—3

The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None.

DD 310 Descriptive Geometry 2—4—4

Graphic analysis of space problems involving points, lines, planes, connectors, and a combination of these. Practical design problems will be stressed with analytical verification where applicable. Visualization shall be stressed on every problem.
Prerequisites: DD 302, MA 302.

AHR 314 Heating Principles 3—4—5

Warm air systems, heat emitters, electric heating, forced hot water and steam heating systems including selection and sizing of equipment—registers, grills, furnaces, boilers, radiators, baseboards, piping and ducts. Heating layout and specifications for an existing structure or one in blueprint stage will be prepared.
Prerequisites: PHY 301, DD 308.

AHR 315 Fuels and Burners 3—4—5

Fuels and burners used in supplying heat for various types of heating systems—coal, oil, natural gas, manufactured gas, liquefied petroleum gas, and electricity. Experiments in equipment selection, installation, adjusting and servicing will be conducted.
Prerequisite: PHY 301.

Fifth Quarter

ISc 301 Industrial Organization and Management 3—0—3

Organization structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None.

DD 316 Air Conditioning Systems Drawings 2—4—4

Drawing of air-conditioning systems and study of related architectural and structural elements. Sheet metal intersections and developments and types of duct installation. Air-conditioning and refrigeration layouts, diagrams and schematics.
Prerequisites: DD 308, AHR 314.

AHR 316 Circuits and Controls 4—2—5

Electric, electronic and pneumatic controls as related to ventilation, refrigeration and air-conditioning systems. Practice in layouts, including symbols and schematic diagrams. Laboratory work in installation of control systems. Test instruments and their use. System adjustments for proper operation.
Prerequisites: AHR 313, AHR 314, PHY 303.
Corequisite: AHR 318.

AHR 318 Air Conditioning Principles 5—6—8

An introduction to air distribution. Humidity, saturated and unsaturated mixtures; psychrometric charts and graph; specific heat and air flow calculations, heat load calculations, the state of mixture of two air streams, bypass factor and dehumidification.
Prerequisite: AHR 313.

Sixth Quarter

SOC 310 Applied Psychology 3—0—3

A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions, are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None.

AHR 317 Estimating and Contracts 3—4—5

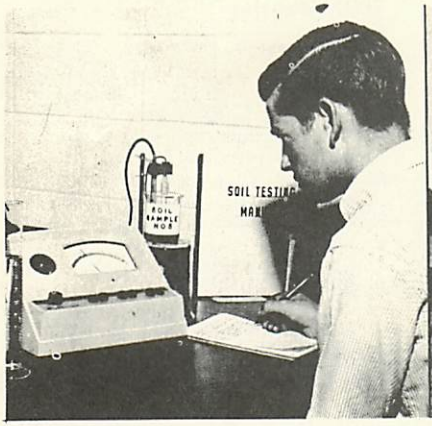
Cost estimation, plans and specifications, equipment take-off, materials take-off, labor take-off, sub-contractors' estimates overhead cost, and bid and contract procedures.
Prerequisites: AHR 318 DD 316.

AHR 319 Air Conditioning Systems Design 5—6—8

Self-contained units, remote units, unitary systems and control systems. Chilled water units, air duct units, high velocity duct units. Air and/or water-cooled systems, centrifugal pressure systems, conventional systems, absorption systems, air-handling and filtering systems.
Prerequisites: AHR 318, AHR 315, AHR 314.

AHR 320 Seminar and Research 1—3—2

Successful completion of the Air-Conditioning and Refrigeration Technology curriculum is climaxed by the student conducting a research project and writing a report on this project. The student, through consultation with the instructors, will choose an individual project that will, when feasible, involve an actual installation. Frequent conferences with instructor will guide the student in the progress of research and in the preparation of the report.
Prerequisites: AHR 314, AHR 316, AHR 318.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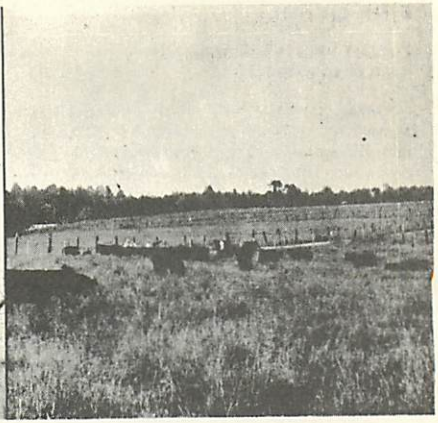


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AGRICULTURAL BUSINESS TECHNOLOGY

Purpose of Curriculum

Agriculture is undergoing tremendous changes. The trends are to larger, highly mechanized and specialized farms with huge capital investments. This means that there will be an increasing demand for capable farm managers to coordinate the purchasing, production and marketing of these larger agricultural production operations.

Farm managers of the future must possess greater technical competence to remain in the highly competitive production phase of agriculture. They must be able to cope with present production problems and adapt to rapid technological changes.

It is anticipated that changes in agriculture and the general economic environment will occur at a faster rate in the future. Profitable management of agricultural operations will demand successful adjustment to these changes. Decisions involved in these adjustments will require an individual with more training, knowledge and ability.

The objectives of the Agricultural Business Technology Curriculum shall be to develop:

1. Understanding of the principles and procedures of business management and their application to agricultural production, and abilities essential to the management of an efficient well-organized farming operation.
2. Understanding of the agricultural sciences most essential to the production and marketing of agricultural products, including knowledge of the animal, plant, and soil sciences and their relationships with ability to apply these educational experiences to practical problems of agricultural business and industry.

Job Description

The trend towards larger farming operations with increased non-farm control of production means there will be greater employment opportunities for well-trained individuals who can efficiently and profitably supervise the production and marketing of agricultural products.

Numerous agricultural business and industry firms are seeking qualified personnel to supervise the agricultural production operations of their concerns.

This curriculum prepares the graduate for employment directly associated with production of agricultural products. Marketing and processing agri-business firms frequently employ individuals to work with farmers in order to assure a dependable supply of quality raw materials for the companies.

AGRICULTURAL BUSINESS TECHNOLOGY CURRICULUM

Course No. and Title — First Quarter	C-L-CH
MA 301 Technical Math I	5—0—5
ENG 302 Communicative Skills: English	3—0—3
CHEM 301 Chemistry	3—2—4
AG 310 Introduction to Agricultural Economics	3—2—4
AG 370 Animal Science	3—2—4
	17—6—20

Second Quarter	C-L-CH
MA 310 Business Math	3—0—3
ENG 305 Communicative Skills: Report Writing	3—0—3
BUS 320 Accounting I	2—4—4
BUS 301 Introduction to Business	3—0—3
BIO 310 Applied Biology	3—2—4
AG 342 Farm Mechanization	2—4—4
	16—10—21

Third Quarter	C-L-CH
ENG 306 Communicative Skills: Business Comm.	3—0—3
BUS 360 Office Machines	2—2—3
BUS 321 Accounting II	2—4—4
AG 490 Soil Science & Fertility	5—2—6
AG 312 Agricultural Marketing	3—2—4
	15—10—20

Course No. and Title — Fourth Quarter	C-L-CH
BUS 364 Business Finance	3—0—3
BUS 366 Budget & Record Keeping	3—0—3
BUS 317 Sales Development	3—0—3
AG 314 Farm Business Management	3—6—6
AG 420 Plant Science	4—2—5
	16—8—20

Fifth Quarter	C-L-CH
ENG 304 Communicative Skills: Speech	2—0—2
ISc 301 Industrial Organization & Management	3—0—3
BUS 351 Business Law	3—0—3
AG 322 Agricultural Prices	3—0—3
AG 306 Farm Chemicals	4—2—5
AG 301-F Crop Production	4—2—5
	19—4—21

Sixth Quarter	C-L-CH
BUS 368 Taxes	3—0—3
BUS 372 Principles of Supervision	3—0—3
SOC 310 Applied Psychology	3—0—3
AG 380 Livestock Diseases & Parasites	2—4—4
AG 302-F Animal Production	2—6—5
	13—10—18

C=Class Hrs. Per Wk. L=Lab Hrs. Per Wk. CH=Credit Hrs. Per Qtr.

*Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

AGRICULTURAL BUSINESS TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 301 Technical Math I 5—0—5

The real number system is developed as an extension of natural numbers, integers, and rational numbers. Insight into the processes of arithmetic and algebra is provided. Additional topics include sets, equations, number bases, number lines, coordinate systems, trigonometry of the right triangle, vectors, dimensional analysis, and the derivative.
Prerequisite: None.

ENG 302 Communicative Skills: English 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

CHEM 301 Chemistry 3—2—4

Study of the physical and chemical properties of substances, chemical changes; elements, compounds, gases, chemical combinations; weights and measurements; theory of metals; acids, bases, salts, solvents, solutions, and emulsions. In addition, study of carbohydrates; electrochemistry, electrolytes, and electrolysis in their application of chemistry to industry.
Prerequisite: None.

AG 310 Introduction to Agricultural Economics 3—2—4

An introduction to economics, the functions of the economic system and agriculture's role in the economy. A review of the functions of the manager and an introduction to the principles he uses in making decisions to adjust to changing conditions. Analysis of the main sources of change which affect agricultural firms.
Prerequisite: None.

AG 370 Animal Science 3—2—4

Basic principles of zoology and genetics as related to farm animals. The scientific study of all commercially important classes of farm animals.
Prerequisite: None.

Second Quarter

MA 310 Business Math 3—0—3

This course stresses the fundamental operations and their application to business problems. Topics covered include payrolls, price marking, interest and discount, commission, taxes and pertinent uses of mathematics in the field of business.
Prerequisite: None.

ENG 305 Communicative Skills: Report Writing 3—0—3

A study and practice in the fundamentals of report writing, including style and mechanics in preparing reports of various types, which are most likely to be used by people engaged in business and the professions.
Prerequisite: ENG 302.

BUS 320 Accounting I 2—4—4

Principles, techniques and tools of accounting, for understanding of the mechanics of accounting—collecting, summarizing, analyzing, and reporting information about service and mercantile enterprises, to include practical application of the principles learned.
Prerequisite: None.

BUS 301 Introduction to Business 3—0—3

A survey of the business world with particular attention devoted to the structure of the various types of business organizations, methods of financing, internal organization and management.
Prerequisite: None.

BUS 310 Applied Biology 3—2—4

A basic course in biology with emphasis on microorganisms and laboratory procedures for the identification and differentiation of organisms peculiar to the water and liquid waste treatment processes and stream sanitation.
Prerequisite: None.

AG 342 Farm Mechanization 2—4—4

A study of farm machinery management and labor-saving devices. The economics of selection and operation of farm machinery. Study and evaluation of feed grinders and mixers, storage facilities, materials handling systems and other labor-saving devices.
Prerequisite: None.

Third Quarter

ENG 306 Communicative Skills: Business Communications 3—0—3

A course in writing purposeful, correct letters, telegrams, and minutes of meetings through experience in analyzing problem situations. Particular attention to letters involving credit, collections, complaints, orders, acknowledgements, remittances, and inquiry are also included in this course.
Prerequisite: ENG 305.

RUS 360 Office Machines 2—2—3

To develop a working knowledge of the ten-key and full keyboard adding machines, printing calculators and duplicating equipment.
Prerequisite: None.

BUS 321 Accounting II 2—4—4

Partnership and corporation accounting including a study of payrolls, Federal and State taxes. Emphasis is placed on the recording, summarizing and interpreting data for management control rather than on bookkeeping skills. Accounting services are shown as they contribute to the recognition and solution of management problems.
Prerequisite: BUS 320.

AG 490 Soil Science and Fertility 5—2—6

Soil types; basic principles of efficient management of soils and the growing of crops; care and cultivation of the soil, fertilization and conservation of soil fertility.
Prerequisite: None.

AG 312 Agricultural Marketing 3—2—4

An analysis of the functions of marketing in the economy and a survey of the problems marketing faces. A review of the market structure and the relationship of local, terminal, wholesale, retail and foreign markets. Problems in the operations of marketing firms including buying and selling, processing, standardization and grading, risk taking and storage, financing, efficiency, and cooperation. Discussion of procedures of marketing such commodities as grain, cotton, livestock and tobacco.
Prerequisite: AG 310.

Fourth Quarter

BUS 364 Business Finance 3—0—3

Financing of business units, as individuals, partnerships, corporations and trusts. A detailed study is made of the organization, management and financing of businesses.
Prerequisite: None.

BUS 366 Budget and Recording Keeping 3—0—3

The projection and preparation of operating budgets. Special attention is given to the involvement of individual departments and the role they play. Emphasis is placed on the necessity for accurate record keeping in order to evaluate the effectiveness of budget planning.
Prerequisite: BUS 320.

BUS 317 Sales Development 3—0—3

A study of retail wholesale and specialty selling. Emphasis is placed upon mastering and applying the fundamentals of selling.
Prerequisite: None.

AG 314 Farm Business Management 3—6—6

A review of the functions of the manager of a business firm and the problems he faces. Development of the concept of planning by both partial and complete budgeting. Review of the concepts of costs and the length of run in production. Practice in preparing enterprise budgets as an aid in choosing what to produce. Use of partial budgeting to find the least cost production procedure. Analysis of production data to select the level of production that yields the most net revenue. Relationship between size, efficiency and income of a farm. Review of procedures for evaluating the efficiency of the manager.
Prerequisite: AG 310.

AG 420 Plant Science 4—2—5

An introductory general botany and crop science course covering the fundamental principles of the reproduction, growth, functions, and development of seed bearing plants with application to certain commercially important plants in North Carolina.
Prerequisite: None.

Fifth Quarter

ENG 304 Communicative Skills 2—0—2

Technical speech to develop the speaking skills with emphasis on the dual role of communications as both a speaking and listening skill. Stress is placed on growth in poise and confidence of the student. Practice through individual speeches and group discussion. Recordings are made of the student's voice and used as an aid in speech development.
Prerequisite: ENG 302.

ISc 301 Industrial Organization and Management 3—0—3

Organization structure for industrial management; operational and financial activities,

BUSINESS ADMINISTRATION

Purpose of Curriculum

In North Carolina the opportunities in business are increasing. With the increasing population and industrial development in this State, business has become more competitive and automated. Better opportunities in business will be filled by students with specialized education beyond the high school level. The Business Administration Curriculum is designed to prepare the student for employment in one of many occupations common to business. Training is aimed at preparing the student in every phase of administrative work that might be encountered in the average business.

The specific objectives of the Business Administration Curriculum are to develop the following competencies:

1. Understanding of the principles of organization and management in business operations.
2. Understanding and skill in effective communication for business.
3. Knowledge of human relations as they apply to the successful operations in the rapidly expanding business economy.

Job Description

The graduate of the Business Administration Curriculum may enter a variety of career opportunities from beginning sales person or office clerk to manager trainee. The duties and responsibilities of this graduate vary in different firms. These encompassments might include: making up and filing reports, tabulating and posting data in various books, sending out bills, checking calculations, adjusting complaints, operating various office machines, and assisting managers in supervising. Positions are available in businesses such as advertising; banking; credit; finance; retailing; wholesaling; hotel, tourist, and travel industry; insurance; transportation; and communications.

BUSINESS ADMINISTRATION CURRICULUM

Course No. and Title — First Quarter	C-L-CH
ENG 302 Communicative Skills: English	3—0—3
BUS 302-F Typewriting (Or Elective)*	0—5—2
MA 310-F Business Mathematics	3—2—4
BUS 301 Introduction to Business	3—0—3
BUS 351 Business Law	3—0—3
BUS 317 Sales Development	3—0—3
BUS 319 Credit Procedures and Problems	3—0—3
	18—7—21

Second Quarter	C-L-CH
ENG 305 Communicative Skills: Report Writing	3—0—3
BUS 320-F Accounting	5—3—6
BUS 352 Business Law	3—0—3
SOC 302 Economics	3—0—3
BUS 339 Marketing	3—0—3
	17—3—18

Third Quarter	C-L-CH
ENG 306 Communicative Skills: Business Communications	3—0—3
BUS 355-F Interpreting Accounting Records	3—2—4
SOC 304 Economics	3—0—3
BUS 316 Retailing	3—0—3
BUS 328 Business Insurance	3—0—3
BUS 360 Office Machines	2—2—3
	17—4—19

Course No. and Title — Fourth Quarter	C-L-CH
ENG 307 Communicative Skills: Oral Communications	3—0—3
BUS 364 Business Finance	3—0—3
BUS 366 Budget and Record Keeping	3—0—3
DP 311 Introduction to Data Processing Systems	3—2—4
BUS 337 Wholesaling	3—0—3
Elective**	3—0—3
	18—2—19

Fifth Quarter	C-L-CH
ENG 304 Communicative Skills: Speech	2—0—2
BUS 365 Business Finance	3—0—3
BUS 327 Advertising	3—2—4
BUS 335 Business Management	3—0—3
SOC 310 Applied Psychology	3—0—3
BUS 371 Office Management	3—0—3
Elective**	3—0—3
	20—2—21

Sixth Quarter	C-L-CH
BUS 368 Taxes	3—0—3
BUS 333 Personnel Management	3—0—3
BUS 332 Sales Promotion Management	3—0—3
BUS 372 Principles of Supervision	3—0—3
BUS 353 Business Law	3—0—3
Elective**	3—3—4
	18—3—19

C=Class Hrs. Per Wk. L=Lab Hrs. Per Wk. CH=Credit Hrs. Per Qtr.

*Elective courses must be selected from the business education curriculum.

**Elective courses must be selected from the associate degree curriculum.

Student schedule, including electives, not to exceed 30 contact hours per week.

BUSINESS ADMINISTRATION

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

ENG 302 Communicative Skills: English 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

BUS 302-F Typewriting 0—5—2

Introduction to the touch typewriting system with emphasis on correct techniques, mastery of the keyboard, simple business correspondence, tabulation, and manuscripts. Minimum speed of 30 Net words per minute for five minutes.
Prerequisite: None.

MA 310-F Business Mathematics 3—2—4

This course stresses the fundamental operations and their application to business problems. Topics covered include payrolls, price marking, interest and discount, commission, taxes, and pertinent uses of mathematics in the field of business.
Prerequisite: None.

BUS 301 Introduction to Business 3—0—3

A survey of the business world with particular attention devoted to the structure of the various types of business organizations, methods of financing, internal organization, and management.
Prerequisite: None.

BUS 351 Business Law 3—0—3

A general course designed to acquaint the student with certain fundamentals and principles of business law, including contracts, negotiable instruments, partnerships, corporations, and agencies.
Prerequisite: None.

BUS 317 Sales Development 3—0—3

A study of retail, wholesale and specialty selling. Emphasis is placed upon mastering and applying the fundamentals of selling. Preparation for and execution of sales demonstrations required.
Prerequisite: None.

BUS 319 Credit Procedures and Problems 3—0—3

Principles and practices in the extension of credit; collections procedures; laws pertaining to credit extension and collection are included.
Prerequisite: None.

Second Quarter

ENG 305 Communicative Skills: Report Writing 3—0—3

A study and practice in the fundamentals of report writing, including style and mechanics in preparing reports of various types, which are most likely to be used by people engaged in business and the professions.
Prerequisite: ENG 302.

BUS 320-F Accounting 5—3—6

Principles, techniques and tools of accounting, for understanding of the mechanics of accounting—collecting, summarizing, analyzing, and reporting information about service and mercantile enterprises, to include practical application of the principles learned.
Prerequisite: None.

BUS 352 Business Law 3—0—3

Includes the study of laws pertaining to bailments, sales, risk-bearing, partnership-corporation, mortgages, and property rights.
Prerequisite: BUS 351.

SOC 302 Economics 3—0—3

The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None.

BUS 339 Marketing 3—0—3

A study of the marketing structure within the framework of the U. S. economic system. It includes the study of the movement of goods from producer to consumer through various channels of distribution, the functions of marketing, the social and economic implications.
Prerequisite: None.

Third Quarter

ENG 306 Communicative Skills: Business Communications 3—0—3

Develops skills in techniques in writing business communications. Emphasis is placed on writing action—getting sales letters and prospectuses. Business reports, summaries of business conferences, spot announcements for radio and television as well as letters involving credit, collections, adjustments, complaints, orders, acknowledgments, remittances, and inquiry are also included in this course.
Prerequisite: ENG 305.

BUS 355-F Interpreting Accounting Records 3—2—4

Designed to aid the student in developing a "use understanding" of accounting records, reports and financial statements. Interpretation, analysis, and utilization of accounting statements.
Prerequisite: BUS 320.

SOC 304 Economics 3—0—3

Greater depth in principles of economics, including a penetration into the composition and pricing of national output, distribution of income, international trade and finance, and current economic problems.
Prerequisite: SOC 302.

BUS 316 Retailing 3—0—3

A study of the role of retailing in the economy including development of present retail structure, functions performed, principles governing effective operation and managerial problems resulting from current economic and social trends.
Prerequisite: None.

BUS 328 Business Insurance 3—0—3

A presentation of the basic principles of risk insurance and their application. A survey of the various types of insurance is included.
Prerequisite: None.

BUS 360 Office Machines 2—2—3

A general survey of the business and office machines. Students will receive training in techniques, processes, operation and application of the ten-key adding machines, full keyboard adding machines, calculator, and duplicating equipment.
Prerequisite: None.

Fourth Quarter

ENG 307 Communicative Skills: Oral Communications 3—0—3

Includes study in areas of face-to-face conversation, delegating and accepting, understanding, listening, questioning, conferences, and the use of words.
Prerequisite: BUS 306.

BUS 364 Business Finance 3—0—3

Financing of business units, as individuals, partnerships, corporations, and trusts. A detailed study is made of the organization, management, and financing of businesses.
Prerequisite: None.

BUS 366 Budget and Record Keeping 3—0—3

The basic principles, methods, and procedures for preparation and operation of budgets. Special attention is given to the involvement of individual departments and the role they play. Emphasis on the necessity for accurate record keeping in order to evaluate the effectiveness of budget planning.
Prerequisite: BUS 320.

DP 311 Introduction to Data Processing Systems 3—2—4

Fundamental concepts and operational principles of data processing systems, as an aid in developing a basic knowledge of computers, prerequisite to the detail study of particular computer problems. This course is a prerequisite for all programming courses.
Prerequisite: None.

BUS 337 Wholesaling 3—0—3

The development of wholesaling; present-day trends in the United States. A study of the functions of wholesaling.
Prerequisite: None.

Elective** 3—0—3

**Elective courses must be selected from the associate degree curriculum.

Fifth Quarter

ENG 304 Communicative Skills: Speech **2—0—2**

Technical speech to develop the speaking skills with emphasis on the dual role of communications as both a speaking and listening skill. Stress is placed on growth in poise and confidence of the student. Practice through individual speeches and group discussion. Recordings are made of the student's voice and used as an aid in speech development.
Prerequisite: ENG 307.

BUS 365 Business Finance **3—0—3**

An advanced course designed to give the student practical knowledge of the different kinds of stocks and bonds, mortgages, working capital, sinking funds, capitalization, sales of securities, surplus and dividends.
Prerequisite: BUS 364.

BUS 327 Advertising **3—2—4**

The role of advertising in a free economy and its place in the media of mass communications. A study of advertising appeals; product and market research; selection of media; means of testing effectiveness of advertising. Theory and practice of writing advertising copy for various media.
Prerequisite: None.

BUS 335 Business Management **3—0—3**

Principles of business management including overview of major functions of management such as planning, staffing, controlling, directing, and financing. Clarification of the decision-making function versus the operating function. Role of management in business—qualifications and requirements.
Prerequisite: None.

SOC 310 Applied Psychology **3—0—3**

This course stresses the procedures of building an efficient, enthusiastic business team and deals with the nature of the problems which arise in business organizations. The individual and his behavior are discussed, as well as the problems of influence and authority.
Prerequisite: None.

BUS 371 Office Management **3—0—3**

Presents the fundamental principles of office management. Emphasis on the role of office management; office automation; planning, controlling, organizing and actuating in office management.
Prerequisite: BUS 340.

Ellective** **3—0—3**

Sixth Quarter

BUS 368 Taxes **3—0—3**

Application of Federal and State taxes to various businesses and business conditions. A study of the following taxes: income, payroll, intangible, capital gain, sales and use, excise, and inheritance.
Prerequisite: None.

BUS 333 Personnel Management **3—0—3**

Principles of human relationships; selection of personnel by interviewing and testing; and training of personnel.
Prerequisite: None.

BUS 332 Sales Promotion Management **3—2—4**

The scope and activities of sales promotion with emphasis on the coordination of advertising display, special events, and publicity. External and internal methods of promoting business; budgeting, planning, and implementing the plan.
Prerequisite: BUS 327.

BUS 372 Principles of Supervision **3—0—3**

Introduces the basic responsibilities and duties of the supervisor and his relationship to superiors, subordinates, and associates. Emphasis on securing an effective work force and the role of the supervisor. Methods of supervision are stressed.
Prerequisite: None.

BUS 353 Business Law **3—0—3**

A study of the powers, policies, methods, and procedures used by the various Federal, State and local administrative agencies in promoting and regulating business enterprises. It includes a consideration of the constitutional and statutory limitations on these bodies and judicial review of administrative action.
Prerequisite: BUS 351 and 352.

Elective** **3—3—4**

CIVIL ENGINEERING TECHNOLOGY

Purpose of Curriculum

Civil Engineering technicians perform many of the planning and supervisory tasks necessary in the construction of highways, bridges, power plants, dams, missile sites, airfields, water and sewage treatment plants, industrial buildings and utilities. In the planning stages of construction they may be engaged in estimating costs, ordering materials, interpreting specifications, computing earthwork cuts and fills and storm drainage requirements, surveying or drafting. Once the actual construction work has begun, many technicians perform supervisory functions. Some may be responsible for seeing that construction activities are performed in proper sequence, and for inspecting the work as it progresses for conformance with blueprints and specifications.

The expanding construction industry needs up-to-date technically trained personnel. The objective of the Civil Engineering Technology program is to train technicians who will work with skilled craftsmen and engineers in performing the various functions included in the broad field of construction. This curriculum provides the necessary basic background and related theory with specific skills needed in the general construction field. Basic construction knowledges and skills are supplemented by courses in Communicative Skills, Economics, Industrial Organization and Management, and Human Relations.

Job Description

The large and varied construction industry provides excellent opportunities for the individual with ability and training. Depending on the organization and the size of the construction project, the technician may work directly with an engineer or with skilled craftsmen or he may function as a liaison between them.

An individual upon graduating from this program should qualify for various jobs such as, Instrument Man, Party Chief, Quantity Survey Man, Material Tester (Laboratory Testing), Expediter, Field Clerk, Materials Man, Construction Equipment and Materials Salesman, and Field Draftsman. Upon gaining sufficient experience, the technician has the opportunity of advancing into positions such as, Contractor, Construction Superintendent, Engineering Aide, Surveyor, Estimator, Inspector on Construction Jobs, and City Building Inspector.

CIVIL ENGINEERING TECHNOLOGY CURRICULUM

Course No. and Title — First Quarter	C-L-CH
MA 301 Technical Mathematics I	5—0—5
DD 307 General Drafting I	2—3—3
ENG 302 Communicative Skills: Grammar	3—0—3
PHY 301 Physics: Properties of Matter	3—2—4
CIV 310 Surveying I	2—6—4
	15–11–19

Second Quarter	C-L-CH
MA 302 Technical Mathematics II	5—0—5
DD 308 General Drafting II	2—3—3
ENG 303 Communicative Skills: Technical Writing	3—0—3
PHY 302 Physics: Work, Energy, Power	3—2—4
CIV 314 Statics	3—2—4
ISc 301 Industrial Organization & Management	3—0—3
	19—7–22

Third Quarter	C-L-CH
MA 303 Technical Mathematics III	5—0—5
ENG 307 Communicative Skills: Oral Communications	3—0—3
PHY 303 Physics: Electricity	3—2—4
CIV 311 Surveying II	2—6—4
CIV 316 Strength of Materials	3—2—4
	16–10–20

Course No. and Title — Fourth Quarter	C-L-CH
MA 304 Technical Mathematics IV	3—0—3
SOC 302 Economics	3—0—3
CIV 312 Surveying III	2—6—4
CIV 315 Properties of Engineering Materials	2—4—4
CIV 317 Construction Methods & Equipment	2—3—3
	12–13–17

Fifth Quarter	C-L-CH
CIV 313 Surveying IV	2—6—4
CIV 318 Plain Concrete	2—4—4
CIV 323 Codes, Contracts & Specifications	2—0—2
CIV 320 Construction Planning	3—2—4
CIV 322 Properties of Soils	2—4—4
	11–16–18

Sixth Quarter	C-L-CH
SOC 310 Applied Psychology	3—0—3
CIV 321 Reinforced Concrete Construction	2—4—4
CIV 325 Construction, Estimates & Costs	3—6—5
CIV 326 Foundation Construction	3—0—3
CIV 327 Construction of Roads & Pavements	3—0—3
CIV 330-F Surveying V	2—4—4
	16–14–22

C = Class Hrs. Per Wk. L = Lab Hrs. Per Wk. CH = Credit Hrs. Per Qtr.

*Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

CIVIL ENGINEERING TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 301 Technical Mathematics I 5—0—5

The real number system is developed as an extension of natural numbers, integers, and rational numbers. Insight into the processes of arithmetic and algebra is provided. Additional topics include sets, equations, number basis, number lines, coordinate systems, trigonometry of the right triangle, vectors, dimensional analysis, and the derivative.
Prerequisite: None.

DD 307 General Drafting I 2—3—3

An introductory course in drafting for students needing a knowledge of drawing principles and practices for reading and describing objects in the graphic language. The student is expected to gain basic skills in drawing with instruments, lettering, geometrical constructions, freehand sketching, and describing objects orthographically with principal views. Freehand sketching and orthographic reading are to be emphasized.
Prerequisite: None.

ENG 302 Communicative Skills: Grammar 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

PHY 301 Physics: Properties of Matter 3—2—4

A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None.

CIV 310 Surveying I 2—6—4

Theory and practice of plane surveying including taping, differential and profile leveling, cross sections, earthwork computations, transit, stadia, and transit-tape surveys.
Corequisites: MA 301, DD 307.

Second Quarter

MA 302 Technical Mathematics II 5—0—5

Algebraic operations are applied to linear, quadratic, and polynomial functions and special equations of second degree. Complex numbers are introduced and the study of the derivative is continued. Selected applications involving rates of change, maxima and minima, approximation, areas, and volumes are considered.
Prerequisite: MA 301.

DD 308 General Drafting II 2—3—3

The student continues the study of orthographic projection with applications to orthographic instrument drawing. Dimensioning procedures and practices are emphasized and the student is introduced to the "working drawing." Methods of describing complex objects with auxiliary views and/or sections and conventions are taught.
Prerequisite: DD 307.

ENG 303 Communicative Skills: Technical Writing 3—0—3

The fundamentals of English are utilized as a background for the organization and techniques of modern technical writing. Exercises in developing typical technical reports, using writing techniques and graphic devices, are completed by the students. Practical application in the preparation of a full-length technical report is required of each student at the end of the term.
Prerequisite: ENG 302.

PHY 302 Physics: Work, Energy, Power 3—2—4

Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity, and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisite: MA 301.

CIV 314 Statics

Forces, resultants, and types of force systems; moments, equilibrium of coplanar forces by analytical and graphic methods; stresses and reactions in simple structures; equilibrium of forces in space; static and kinetic friction; center of gravity, centroids, and moment of inertia.
Corequisite: MA 302.

ISc 301 Industrial Organization and Management 3—0—3

Organization structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None.

Third Quarter

MA 303 Technical Mathematics III 5—0—5

Ideas of algebra are used in a study of trigonometric, logarithmic and exponential functions. Selected applications of calculus reinforce this approach. Polar coordinates are introduced and their applications expanded. Complex numbers, vectors, coordinate systems and their applications constitute other areas of study.
Prerequisite: MA 302.

ENG 307 Communicative Skills: Oral Communications 3—0—3

Includes study in face-to-face conversation, delegating and accepting, understanding, listening, questioning, conferences and the use of words.

PHY 303 Physics: Electricity 3—2—4

Basic theories of electricity, types of electricity, methods of production, and transmission and transforming of electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage, amperage, resistance, horsepower, wattage, and transformers are major parts of the course.
Prerequisite: MA 301.

CIV 311 Surveying II 2—6—4

Triangulation of ordinary precision; use of plane table; calculation of areas of land; land surveying; topographic surveys and mapping.
Prerequisite: CIV 310.
Corequisites: MA 302, DD 308.

CIV 316 Strength of Materials 3—2—4

Fundamental stress and strain relationship; torsion, shear and bending moments; stresses and deflections in beams; introduction to statically indeterminate beams; columns; combined stresses.
Prerequisite: CIV 314.
Corequisite: MA 303.

Fourth Quarter

MA 304 Technical Mathematics IV 3—0—3

A further study of analytical geometry, algebra, and calculus: the binomial expansion, arithmetic and geometric progressions, polynomial functions and methods of solution, integration techniques and use of integral tables, polar equations, and an introduction to solid analytical geometry.
Prerequisite: MA 303.

SOC 302 Economics 3—0—3

The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None.

CIV 312 Surveying III 2—6—4

Route surveys by ground and aerial methods; simple, compound, reverse, parabolic and spiral curves; geometric design of highways; highway surveys and plans, including mass diagrams.
Prerequisite: CIV 311.
Corequisite: MA 303.

CIV 315 Properties of Engineering Materials 2—4—4

Study and testing of the properties of ferrous and nonferrous metals, timber, stone, clay products, bituminous cementing materials; load and strain measurements; behavior of materials under load; qualities other than strength; control of the properties of the materials; non-destructive tests.
Prerequisite: PHY 301.
Corequisite: CIV 316.

CIV 317 Construction Methods and Equipment 2—3—3

Excavating methods and equipment used in building and highway construction; pile driving; construction techniques and equipment used in reinforced concrete buildings, bridges, lift-slabs, thin-shells and folded plates, erection methods and equipment of structural steel buildings and bridges; carpentry in house and heavy timber construction; construction safety. Field inspection trips.
Prerequisites: DD 308, CIV 311.

Fifth Quarter

CIV 313 Surveying IV 2—6—4

Aerial photogrammetry; applications of aerial surveys; building and road construction surveying; lines and grades for foundation layout, building construction, bridge layout, sewer and pipe line surveys.
Prerequisite: CIV 312.

CIV 318 Plain Concrete 2—4—4

Study and testing of the composition and properties of concrete including cementing agents, aggregates, admixtures, and air-entrainment; design and proportioning of concrete mixes to obtain pre-determined strengths and properties; methods of placing and curing concrete; standard control tests of concrete.
Prerequisite: CIV 315.

CIV 323 Codes, Contracts and Specifications 2—0—2

Basic principles and methods most significant in contract relationships; appreciation of the legal considerations in construction work; study of the National Building Code and local building codes, interpreting and outlining specification.
Prerequisite: None.

CIV 320 Construction Planning 3—2—4

Analysis of construction plant layout requirements and contractor's organization for building and highway projects. Construction scheduling; project control and supervision; coordinating trades on building construction. Operations, charts, and practical application of Critical Path Method (CPM) for construction planning, scheduling, and "time-cost" determination.
Prerequisites: CIV 317, CIV 318, CIV 319.
Corequisites: CIV 321, CIV 323.

CIV 322 Properties of Soils 2—4—4

Study of soil types and their physical properties; mechanical analysis and tests of soils; techniques of subsurface investigation; earth pressure theories; bearing capability; stability of slopes; hydrostatics of ground water; methods of compaction and consolidation.
Prerequisite: CIV 316.

Sixth Quarter

SOC 310 Applied Psychology 3—0—3

A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions, are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None.

CIV 321 Reinforced Concrete Construction 2—4—4

Analysis and design of reinforced concrete beams, floor systems, and columns. Use of CRSI Design Handbook. Introduction to ultimate strength design. Principles of prestressed and precast concrete. Field inspection trips.
Prerequisite: CIV 316.

CIV 325 Construction Estimates and Costs 3—6—5

Interpretation of working drawings of timber, structural steel, and reinforced concrete structures, and highways; preparation of material and labor quantity surveys from plans and specifications; approximate and detailed estimates of costs; bidding procedures and preparation of bids.
Prerequisite: CIV 320.
Corequisites: CIV 324, CIV 327.

CIV 326 Foundation Construction 3—0—3

Exploration of sites; study of principles of foundation action; theory and construction practices pertaining to excavation bracing, cofferdams, drainage, stabilization, various types of footings, foundation walls, pile foundations, retaining walls, shoring and underpinning.
Prerequisites: CIV 319, CIV 321, CIV 322.

CIV 327 Construction of Roads and Pavements 3—0—3

Construction practices for various types of road building, including soil properties, grading, subgrading, base courses, drainage, embankments, compaction, and formwork. Design, construction, and testing of rigid portland cement concrete and flexible bituminous pavements. Field inspection trips.
Prerequisites: CIV 313, CIV 317, CIV 318, CIV 322.

CIV 330-F Surveying V 2—4—4

Land deed descriptions, land deed records, land title searching, boundary laws, property mapping for recording, property mapping for planning, land subdivision, subdivision utilities, subdivision layout by coordinates, transit check and adjustment, level check and adjustment, compass check and adjustment, chain repair and calibration, determination of a meridian by Polaris observation and determination of a meridian by the sun observation.

ENGINEERING AND TECHNICAL SECRETARY

Purpose of Curriculum

The Engineering and Technical Secretary Curriculum is designed to prepare a student for a position in the office of a firm dealing in research, development and production in the scientific fields. The curriculum offers students the necessary secretarial skills and the required background of understanding and appreciation of the scientific method, the beginnings of a technical vocabulary and a feeling of respect for accuracy that will be essential in later work in the field.

Job Description

Graduates of this program may qualify for employment as stenographer-secretaries, technical secretaries, and private secretaries. They are in demand where engineers and other technical personnel find a need for secretarial help who can understand the specialized language of Electrical, Mechanical, Civil, or Chemical Engineers. The duties of an engineering and technical secretary may consist of taking dictation and transcribing letters, memoranda and reports, meeting office callers and screening telephone calls, filing, and scheduling appointments. Graduates of this program, since they have received a background of science and engineering terminology in addition to their business background, are admirably prepared to work with engineering reports, records, correspondence, specifications, and contracts.

ENGINEERING AND TECHNICAL SECRETARY CURRICULUM

Course No. and Title — First Quarter	C-L-CH
ENG 302 Communicative Skills: English	3—0—3
BUS 302 Typewriting	2—3—3
MA 310 Business Mathematics	3—0—3
BUS 301 Introduction to Business	3—0—3
BUS 306 Shorthand	2—3—3
BUS 320-F Accounting	3—2—4
	16—8—19

Second Quarter	C-L-CH
ENG 305 Communicative Skills: Report Writing	3—0—3
BUS 303 Typewriting	2—3—3
BUS 307 Shorthand	2—3—3
SOC 302 Economics	3—0—3
BUS 351 Business Law	3—0—3
BUS 321-F Accounting II	3—2—4
	16—8—19

Third Quarter	C-L-CH
ENG 306 Communicative Skills: Business Comm.	3—0—3
BUS 304 Typewriting	2—3—3
BUS 308 Shorthand	2—3—3
SOC 312 Personality Development	3—0—3
BUS 360 Office Machines I	2—2—3
BUS 383 Terminology and Vocabulary	3—0—3
BUS 322-F Accounting III	3—2—4
	18—10—22

Course No. and Title — Fourth Quarter	C-L-CH
BUS 356 Dictation and Transcription	3—2—4
DP 311 Introduction to Data Processing Sys.	3—2—4
BUS 350 Advanced Typewriting	2—3—3
BUS 361 Office Machines II	2—2—3
DD 307-F Drafting I	2—4—4
PHY 307-F Physics I	3—0—3
	15—13—21

Fifth Quarter	C-L-CH
ENG 307 Communicative S Oral Comm.	3—0—3
BUS 357 Dictation and Transcription	3—2—4
BUS 340 Secretarial Procedures	3—0—3
BUS 366 Budget and Record Keeping	3—0—3
PHY 308-F Ph sic. II	3—0—3
ISc 312-F Tec nical Illustrations	1—2—2
	16—4—18

Sixth Quarter	C-L-CH
BUS 370 Office Application	6—0—6
BUS 358 Dictation and Transcription	3—2—4
BUS 371 Office Management	3—0—3
SOC 310 Applied Psychology	3—0—3
BUS 334-F Specification Writing	3—2—4
	18—4—20

C = Class Hrs. Per Wk. L = Lab Hrs. Per Wk. CH = Credit Hrs. Per Qtr.

*Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

ENGINEERING AND TECHNICAL SECRETARY

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

ENG 302 Communicative Skills: Grammar 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate the students in their day-to-day situations in industry and social life.
Prerequisite: None:

BUS 302 Typewriting 2—3—3

Required of all students who have had no previous typing. The touch system is taught. The proper manipulation of the keyboard and the operation of the machine are given special attention.
Prerequisite: None.

MA 310 Business Mathematics 3—0—3

This course stresses the fundamental operations and their application to business problems. Topics covered include payrolls, price marking, interest and discount, commission, taxes and pertinent uses of mathematics in the field of business.
Prerequisite: None.

BUS 301 Introduction to Business 3—0—3

A survey of the business world with particular attention devoted to the structure of the various types of business organizations, methods of financing, internal organization and management.
Prerequisite: None.

BUS 306 Shorthand 2—3—3

A beginning course in the theory and practice of reading and writing shorthand.
Prerequisite: None.

BUS 320-F Accounting I 3—2—4

Places emphasis on the complete accounting cycle including such items as, accounting for cash, merchandise, payroll accounting and accounting for a retail store.
Prerequisite: None.

Second Quarter

ENG 305 Communicative Skills: Report Writing 3—0—3

A study and practice in the fundamentals of report writing, including style and mechanics in preparing reports of various types, which are most likely to be used by people engaged in business and the professions.
Prerequisite: ENG 302.

BUS 303 Typewriting 2—3—3

Continuation of theory and speed practice. Minimum speed of 40 words per minute for five minutes.
Prerequisite: BUS 302 or equivalent.

BUS 307 Shorthand 2—3—3

Continued study of theory with greater emphasis on dictation for speed building. Minimum dictation speed of 80 words per minute required for five minutes on new material.
Prerequisite: BUS 306 or a dictation speed of 50 words per minute on new material for five minutes.

SOC 302 Economics 3—0—3

The fundamental principles of economics including the institutions by which people gain a livelihood. Included is a study of the law of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None.

BUS 351 Business Law 3—0—3

A general course designed to acquaint the student with certain fundamentals and principles of business law, including contracts, negotiable instruments, partnerships, corporations, etc.
Prerequisite: None.

BUS 321-F Accounting II 3—2—4

Dwells on accounting for investments, the personal service enterprise, owner's equity, notes and drafts, purchases, sales, installment sales, and consignment sales.
Prerequisite: BUS 320-F.

Third Quarter

ENG 306 Communicative Skills: Business Communications 3—0—3

A course in writing purposeful, correct letters, telegrams, and minutes of meetings through experience in analyzing problem situations. Particular attention to letters involving credit, collections, complaints, orders, acknowledgements, remittances, and inquiry are also included in this course.
Prerequisite: ENG 305.

BUS 304 Typewriting 2—3—3

Emphasis on production typing problems and continues speed building. Minimum speed of 50 words per minute for five minutes.
Prerequisite: BUS 303.

BUS 308 Shorthand 2—3—3

Theory and speed building. Introduction of office style dictation. Minimum dictation of 80 words per minute required for five minutes on new material.
Prerequisite: BUS 307.

SOC 312 Personality Development 3—0—3

Designed to help the student recognize the importance of the physical, intellectual, social, and emotional dimensions of personality. Emphasis is placed on grooming, personality improvement and methods.
Prerequisite: None.

BUS 360 Office Machines I 2—2—3

To develop a working knowledge of the ten-key and full keyboard adding machines, printing calculators and duplicating equipment.
Prerequisite: None.

BUS 383 Terminology and Vocabulary 3—0—3

To develop an understanding of the terminology and vocabulary appropriate to the course of study, as it is used in businesses and professional offices.
Prerequisite: None.

BUS 322-F Accounting III 3—2—4

Delves into accounting for inventory and prepaid expenses, tangible fixed assets, a wholesale business, monthly financial statements, and end of the month and end of the year accounting procedures.
Prerequisite: BUS 321-F.

Fourth Quarter

BUS 356 Dictation and Transcription 3—2—4

Develops the skill of taking dictation and of transcribing at the typewriter materials appropriate to the course of study, which includes a review of the theory and the dictation of familiar and unfamiliar material at varying rates of speed.
Prerequisite: BUS 308.

DP 311 Introduction to Data Processing Systems 3—2—4

Fundamental concepts and operating principles of data processing systems, as an aid in developing a basic knowledge of computers, prerequisite to the detailed study of particular computer problems. This course is a prerequisite for all programming courses.
Prerequisite: None.

BUS 350 Advanced Typewriting 2—3—3

Emphasis in this course is placed on the development of individual production rates. The student learns the techniques needed in planning and in typing projects that closely approximate the work in a business office. These projects include review of letter forms, methods of duplication, statistical tabulation, and the typing of reports, manuscripts and legal documents.
Prerequisite: BUS 304.

BUS 361 Office Machines 2—2—3

A more intensive study of one of the machines used in Business Machines 360 plus instruction in the operation of the bookkeeping-accounting machines and the dictating and transcribing machines.
Prerequisite: BUS 360.

DD 307-F Drafting I 2—4—4

An introductory course in drafting for students needing a knowledge of drawing principles and practices for reading and describing objects in the graphic language. Fundamental drafting principles with instruction and practice in lettering orthographic projection and working drawings. Students are given a survey of other phases of drafting such as: sectional views, auxiliary views, dimensioning and geometrical problems. Also included is a study of title block, format, working sketches, reproduction and filing or storing of drawings.
Prerequisite: None.

PHY 307-F Physics I 3—0—3

An introductory course in general physics covering selected areas of heat, sound, light, electricity, energy and power, and the structure of the atom. Demonstration and audio-visual media are used extensively in support of the course which is designed primarily to furnish the student with a comprehension of the basic principles of physics and correct scientific terminology. Course consists of three one-hour lecture-demonstration periods per week.
Prerequisite: None.

Fifth Quarter

ENG 307 Communicative Skills: Oral Communications 3—0—3

Includes study in face-to-face conversation, delegating and accepting, understanding, listening, questioning, conferences, and the use of words.

BUS 357 Dictation and Transcription 3—2—4

Covering materials appropriate to the course of study, the student develops the accuracy, speed, and vocabulary that will enable her to meet the stenographic requirements of business and professional offices.
Prerequisite: BUS 356.

BUS 340 Secretarial Procedures 3—0—3

All the general office skills outside of machine operation will be discussed. These include the following: receptionist duties, handling the mail, telephone techniques, travel information, telegrams, office records, purchasing of supplies, desk and office organization, insurance claims, and personal problems in getting along with others on the job.
Prerequisite: None.

BUS 366 Budget and Record Keeping 3—0—3

The projection and preparation of operating budgets. Special attention is given to the involvement of individual departments and the role they play. Emphasis is placed on the necessity for accurate record keeping in order to evaluate the effectiveness of budget planning.
Prerequisite: BUS 320.

PHY 308-F Physics II 3—0—3

This is a survey course in physics consisting of three one-hour combined lecture and demonstration periods per week. It is designed to give the non-technical student a background of scientific knowledge and terminology. Areas covered include matter, forces, energy and power, heat, light, electricity and an introduction to the atom.
Prerequisite: None.

ISc 312-F Technical Illustrations 1—2—2

The student will prepare charts and graphs for visual presentations and reproduction in technical publications. Sample layouts, using prepared art work; lettering and outline templates; and adhesive backed tapes will be made. The student will work with various media and will utilize office copying machines, blueprint machines, overhead projectors, and transparency materials. A practical course on the proper use of visual aids and visual presentations.
Prerequisite: DD 307-F.

Sixth Quarter

BUS 370 Office Application 6—0—6

During the sixth quarter only, students are assigned to work in a business or professional office for six hours per week. The objective is to provide actual work experience for secretarial students and an opportunity for the practical application of the skills and knowledge previously learned, according to the course of study.
Prerequisite: BUS 361.

BUS 358 Dictation and Transcription 3—2—4

Principally a speed building course, covering materials appropriate to the course of study, with emphasis on speed as well as accuracy.
Prerequisite: BUS 357.

BUS 371 Office Management 3—0—3

Presents the fundamental principles and successful practices used in getting office work accomplished. Case problems are used in making effective solutions to office management problems.
Prerequisite: BUS 340.

SOC 310 Applied Psychology 3—0—3

This course studies the procedures of building an efficient, enthusiastic business team and deals with the nature of the problems which arise in business organizations. The individual and his behavior are discussed, as well as the problems of influence and authority.
Prerequisite: None.

BUS 334-F Specification Writing 3—2—4

The principles and techniques of specification writing and contract preparation. The parts of the contract documents, how to receive bids, procedures for contract execution. Considerable time is spent in transcribing technical specifications from dictation and each student must submit this transcription properly outlined in report form, as a final project.
Prerequisites: BUS 356, BUS 350.

ELECTRONICS ENGINEERING TECHNOLOGY

Purpose of Curriculum

The field of electronics has developed at a rapid pace since the turn of the century. For many years the major concern of electronics was in the area of communications. Developments during World War II and in the period since have revolutionized production techniques. New industries have been established to supplement the need and demand for electronics equipment.

Many opportunities exist for men and women with a technical education in electronics. This curriculum provides a basic background in electronic related theory with practical applications of electronics for business and industry. Courses are designed to develop competent electronics technicians who may take their place as an assistant to an engineer, or as a liaison between the engineer and the skilled craftsman.

Job Description

The Electronics Engineering Technician will start in one or more of the following areas: research, design, development, production, maintenance or sales. He may be an assistant to an engineer, an engineering aide, laboratory technician, supervisor or equipment specialist. His training is similar to that of an engineer, but in less depth and more practical in application. He can function as a liaison between an engineer and the skilled craftsman.

ELECTRONICS ENGINEERING TECHNOLOGY CURRICULUM

Course No. and Title	C-L-CH
First Quarter	
MA 301 Technical Mathematics I	5—0—5
DD 307 General Drafting I	2—3—3
ENG 302 Communicative Skills: Grammar	3—0—3
PHY 301 Physics: Properties of Matter	3—2—4
ELEC 310 Electricity: Direct Current	3—6—6
	16–11–21
Second Quarter	
MA 302 Technical Mathematics II	5—0—5
DD 308 General Drafting II	2—3—3
ENG 303 Communicative Skills: Tech. Writing	3—0—3
PHY 302 Physics: Work, Energy, Power	3—2—4
ELEC 311 Electricity: Alternating Current	3—6—6
	16–11–21
Third Quarter	
MA 303 Technical Mathematics III	5—0—5
ENG 307 Communicative Skills: Oral Communications	3—0—3
PHY 304 Physics: Light and Sound	3—2—4
ELN 312 Electronics I	5—8—9
	16–10–21

Course No. and Title	C-L-CH
Fourth Quarter	
MA 304 Technical Mathematics IV	3—0—3
SOC 302 Economics	3—0—3
CHEM 301 Applied Chemistry	3—2—4
ELN 313 Electronics II	5–10–10
	14–12–20
Fifth Quarter	
ELN 316 Transistor Applications	4—6—7
ELN 317 Communication & UHF	2—4—4
ELN 318 Special Circuitry	4—4—6
ISc 301 Industrial Organization & Management	3—0—3
	13–14–20
Sixth Quarter	
SOC 310 Applied Psychology	3—0—3
ELN 319 Instrumentation	4—6—7
ELN 320 Circuit Analysis & Maintenance	4—6—7
	11–12–17

C = Class Hrs. Per Wk. L = Lab Hrs. Per Wk. CH = Credit Hrs. Per Qtr.

*Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

ELECTRONICS ENGINEERING TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 301 Technical Mathematics I 5—0—5

The real number system is developed as an extension of natural numbers, integers, and rational numbers. Insight into the processes of arithmetic and algebra is provided. Additional topics include sets, equations, number bases, number lines, coordinate systems, trigonometry of the right triangle, vectors, dimensional analysis, and the derivative.
Prerequisite: None.

DD 307 General Drafting I 2—3—3

An introductory course in drafting for students needing a knowledge of drawing principles and practices for reading and describing objects in the graphic language. The student is expected to gain basic skills in drawing with instruments, lettering, geometrical constructions, freehand sketching, and describing objects orthographically with principal views. Freehand sketching and orthographic reading are to be emphasized.
Prerequisite: None.

ENG 302 Communicative Skills: Grammar 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis of grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

PHY 301 Physics: Properties of Matter 3—2—4

A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None.

ELEC 310 Electricity: Direct Current 3—6—6

Basic electricity subjects include: structure of matter, electrical terminology and symbols, electron theory of current flow, magnets and magnetic fields. Rigorous mathematical analysis of direct current resistive circuits. Ohm's Law, Kirchhoff's Laws, Thevenin's Theorem, Norton's Theorem, the Superposition Principle and loop current methods. Solution of complex resistive networks. Fundamental principles of inductors, capacitors, and time constants circuits are introduced.
Prerequisite: None.

Second Quarter

MA 302 Technical Mathematics II 5—0—5

Algebraic operations are applied to linear, quadratic, and polynomial functions and special equations of second degree. Complex numbers are introduced and the study of the derivative is continued. Selected applications involving rates of change, maxima and minima, approximation, areas, and volumes are considered.
Prerequisite: MA 301.

DD 308 General Drafting II 2—3—3

The student continues the study of rothographic projection with applications to orthographic instrument drawing. Dimensioning procedures and practices are emphasized and the student is introduced to the "working drawing." Methods of describing complex objects with auxiliary views and/or sections and conventions are taught.
Prerequisite: DD 307.

ENG 303 Communicative Skills: Technical Writing 3—0—3

The fundamentals of English are utilized as a background for the organization and techniques of modern technical writing. Exercises in developing typical technical reports using writing techniques and graphic devices, are completed by the students. Practical application in the preparation of a full-length technical report is required of each student at the end of the term.
Prerequisite: ENG 302.

PHY 302 Physics: Work, Energy, Power 3—2—4

Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity, and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisite: MA 301.

ELEC 311 Electricity: Alternating Current 3—6—6

Alternating current and voltage: alternating current theory. Mathematical analysis is made of both sine and non-sine wave forms. Inductive reactance, capacitive reactance, and impedance characteristics of alternating current circuits are investigated. The use of vector and complex numbers in circuit impedance. Series and parallel resonant circuit conditions are compared and practical application of these conditions explained.
Prerequisite: ELEC 310, MA 301, PHY 301.

Third Quarter

MA 303 Technical Mathematics III 5—0—5

Ideas of algebra are used in a study of trigonometric, logarithmic and exponential functions. Selected application of calculus reinforce this approach. Polar coordinates are introduced and their applications expanded. Complex numbers, vectors, coordinate systems and their applications constitute other areas of study.
Prerequisite: MA 302.

ENG 307 Communicative Skills: Oral Communications 3—0—3

Includes study in face-to-face conversation, delegating and accepting, understanding, listening, questioning, conferences, and the use of words.

PHY 304 Physics: Light and Sound 3—2—4

A study of sound and wave motion and its technical applications to industry and related fields. Light and illumination. Principles of optical instruments. Practical aspects are emphasized.
Prerequisite: MA 301.

ELN 312 Electronics I 5—8—9

A treatment of electron tubes semi-conductors and their associated circuitry; thermionic emission; diode, triode, tetrode and pentode characteristics. Theory of semiconductor diode and transistor operation is studied in detail. Application of vacuum tubes and semi-conductors in power supplies, voltage amplifiers, power amplifiers, and the advantages and disadvantages of each considered.
Prerequisites: ELEC 310, MA 301. PHY 301.

Fourth Quarter

MA 304 Technical Mathematics IV 3—0—3

A further study of analytical geometery, algebra, and calculus: the binomial expansion, arithmetic and geometric progressions, polynomial functions and methods of solution, integration techniques and use of integral tables, polar equations and an introduction to solid analytical geometry.
Prerequisite: MA 303.

SOC 302 Economics 3—0—3

The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None.

CHEM 301 Applied Chemistry 3—2—4

Study of the physical and chemical properties of substances, chemical changes; elements, compounds, gases, chemical combinations; weights and measurements; theory of metals; acids, bases, salts, solvents, solutions, and emulsions. In addition, study of carbohydrates; electrochemistry, electrolytes, and electrolysis in their application of chemistry to industry.
Prerequisite: None.

ELN 313 Electronics II 5—10—10

Design and analysis of vacuum tube and transistor oscillators, radio frequency analysis and intermediate frequency amplifiers. Frequency response, stage gain, distortion, noise characteristics and frequency stability will be explored.
Prerequisites: ELN 312, MA 303.

Fifth Quarter

ELN 316 Transistor Applications 4—6—7

Transistor circuitry and design problems. Junction diodes, transistor triodes, tunnel and zener diodes with associated circuitry. Temperature variation, transit time, and frequency response are studied in detail.
Prerequisites: ELN 313, MA 304.

ELN 317 Communications & UHF 2—4—4

Application of previously studied circuits to the broad field of communications and ultra high frequency. Amplitude and frequency modulated transmitters, receivers, wave guides, cavity resonators; klystron, magnetron and traveling wave tubes are discussed.
Prerequisite: ELN 313.

ELN 318 Special Circuitry 4—4—6

The design and analysis of special circuitry: wave shaping, pulse techniques, broad-band amplifiers, diode switches, multivibrators, gates, magnetic amplifiers, chopper amplifiers, clipper and clamping

circuits, synchro and servo systems, photo control devices, step counters and other specific application circuitry.
Prerequisites: ELN 314, ELN 316.

ISc 301 Industrial Organization and Management **3—0—3**

Organization structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None.

Sixth Quarter

SOC 310 Applied Psychology **3—0—3**

A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions, are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None.

ELN 319 Instrumentation **4—6—7**

A basic study of sensory devices for detecting changes in pressure, temperatures, sound, light and electricity; the associated circuitry and indicating devices.
Prerequisites: ELN 316, ELN 318.

ELN 320 Circuit Analysis & Maintenance **4—6—7**

Systematic analysis of complex circuitry. Methods of locating and correcting malfunctions. Troubleshooting by voltage measurements; resistance measurements, and waveform observations. Schematic reading and interpretation.
Prerequisites: ELN 319, MA 304, PHY 304.

MECHANICAL ENGINEERING TECHNOLOGY

Purpose of Curriculum

This curriculum guide was prepared for the purpose of outlining a training program for students of Mechanical Engineering Technology, Drafting and Design option. There are certain identifiable duties which are common to all technicians of this general classification and which comprise the basic areas of technical knowledge they need. This curriculum has been designed for training persons in the accepted performance of these basic duties that will be assigned, and to enable the individual student to become proficient in a short time after he becomes employed in the industry.

Courses in general education have been included to give a student the assurance that comes with education upon a broad base. The technician associates with many levels of thought and expression—administrative personnel, scientists, engineers, skilled workmen—and must be able to communicate effectively with all levels. Courses in the skills of communication, human relations, economics and the field of industrial organization and management have been provided to assist the student to develop understanding and confidence. Courses containing essential information from related subject areas, such as mathematics, physics, and mechanics have been included in order to provide the student a ~~better~~ strong academic base ~~for his training~~.

Job Description

Mechanical Engineering Technicians, Drafting ~~and Design option~~, are concerned with the preparation of drawings for design proposals, for experimental models and items for production use.

These technicians perform many aspects of design in a specialized field, such as the developing of the design of a section, sub-assembly or major component. Investigating design factors and availability of material and equipment, production methods and facilities are frequent assignments. They also design units and controls from specifications by utilizing drawings of existing units and reports on functional performance or design components in industrial fields based on engineers' original design concepts or specific ideas. They are assigned as coordinators for the execution of related work of other design, production, tooling, material and planning groups. Technicians in this classification will often supervise the preparation of working drawings.

MECHANICAL ENGINEERING TECHNOLOGY CURRICULUM

Course No. and Title	C-L-CH
First Quarter	
MA 301 Technical Mathematics I	5—0—5
DD 301 Technical Drafting I	2—9—5
ENG 302 Communicative Skills: Grammar	3—0—3
PHY 301 Physics: Properties of Matter	3—2—4
MECH 301 Materials, Tools and Processes I	2—2—3
	15–13–20
Second Quarter	
MA 302 Technical Mathematics II	5—0—5
DD 302 Technical Drafting II	2—9—5
ENG 303 Communicative Skills: Tech. Writing	3—0—3
PHY 302 Physics: Work, Energy, Power	3—2—4
MECH 302 Materials, Tools and Processes II	2—2—3
	15–13–20
Third Quarter	
MA 303 Technical Mathematics III	5—0—5
ENG 307 Communicative Skills: Oral Communications	3—0—3
PHY 303 Physics: Electricity	3—2—4
DD 303 Technical Drafting III	2—6—4
DD 322-F Drafting: Surveying & Topographic	2—3—3
MECH 303 Materials, Tools and Processes III	2—2—3
	17–13–22

Course No. and Title	C-L-CH
Fourth Quarter	
MA 304 Technical Mathematics IV	3—0—3
SOC 302 Economics	3—0—3
DD 304 Technical Drafting IV	4—6—6
DD 310 Descriptive Geometry	2—4—4
CIV 314 Statics	3—2—4
	15–12–20
Fifth Quarter	
CIV 316 Strength of Materials	3—2—4
DD 311 Mechanisms	3—3—4
DD 305 Design Drafting I	2—6—4
ELN 301 Industrial Controls	3—2—4
ISc 301 Industrial Organization & Management	3—0—3
	14–13–19
Sixth Quarter	
SOC 310 Applied Psychology	3—0—3
PHY 305 Physics: Hydraulics & Pneumatics	2—4—4
DD 312 Jigs & Fixtures Design	2—6—4
DD 306 Design Drafting II	2—6—4
MECH 304 Metallurgy	2—3—3
	11–19–18

C = Class Hrs. Per Wk. L = Lab Hrs. Per Wk. CH = Credit Hrs. Per Qtr.

Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

MECHANICAL ENGINEERING TECHNOLOGY

DRAFTING AND DESIGN

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 301 Technical Mathematics 5—0—5

The real number system is developed as an extension of natural numbers, integers, and rational numbers. Insight into the processes of arithmetic and algebra is provided. Additional topics include sets, equations, number bases, number lines, coordinate systems, trigonometry of the right triangle, vectors, dimensional analysis, and the derivative.
Prerequisite: None.

DD 301 Technical Drafting I 2—9—5

Introduction to drafting and design practices and principles. Attainment of basic skills and techniques of drafting: use of drafting equipment; lettering; freehand orthographic and pictorial sketching; geometric construction; orthographic instrument drawing of principal views; and standards and practices of dimensioning and noting. Methods of reproducing, filing, and storing drawings are studied and the student is introduced to "working drawings."
Prerequisite: None.

ENG 302 Communicative Skills: Grammar 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

PHY 301 Physics: Properties of Matter 3—2—4

A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None.

MECH 301 Materials, Tools and Processes 2—2—3

An overall view of the methods and procedures used to transform raw materials into finished products. Characteristics of metals, woods, and plastics and how these characteristics affect the selection and use of materials and methods of production in the manufacture of an object. Unit production system, sand casting, forging and allied processes, welding, sheet metal working processes and woodworking processes constitute areas of study.
Prerequisite: None.

Second Quarter

MA 302 Technical Mathematics II 5—0—5

Algebraic operations are applied to linear, quadratic, and polynomial functions and special equations of second degree. Complex numbers are introduced and the study of the derivative is continued. Selected applications involving rates of change, maxima and minima, approximation, areas, and volumes are considered.
Prerequisite: MA 301.

DD—302 Technical Drafting II 2—9—5

The application of orthographic projection principles to the more complex drafting problems, primary and secondary auxiliary views, simple and successive revoluations, and sections and conventions will be studied. The introduction of the graphical analysis of space problems involving points, lines, planes and a combination of these elements. Precision and limit dimensioning practices.
Prerequisite: DD 301.

ENG 303 Communicative Skills: Technical Writing 3—0—3

The fundamentals of English are utilized as a background for the organization and techniques of modern technical writing. Exercises in developing typical technical reports, using writing techniques and graphic devices, are completed by the students. Practical application in the preparation of a full-length technical report is required of each student at the end of the term.
Prerequisite: ENG 302.

PHY 302 Physics: Work, Energy, Power 3—2—4

Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity, and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisite: PHY 301, MA 301.

MECH 302 Materials, Tools and Processes II 2—2—3

Study of manufacturing processes involving machining of materials. The operation of lathes, grinders, drills, milling machines, shapers, planers, metal sawing machines, broaching machines, gear cutting machines, and finishing machines. Dimensional control and precision measuring as applied to machining of materials.
Prerequisite: MECH 301.

Third Quarter

MA 303 Technical Mathematics III 5—0—5

Ideas of algebra are used in a study of trigonometric, logarithmic and exponential functions. Selected applications of calculus reinforce this approach. Polar coordinates are introduced and their applications expanded. Complex numbers, vectors, coordinate systems and their applications constitute other areas of study.

ENG 307 Communicative Skills: Oral Communications 3—0—3

Includes study in face-to-face conversation, delegating and accepting, understanding, listening, questioning, conferences, and the use of words.

PHY 303 Physics: Electricity 3—2—4

Basic theories of electricity, types of electricity, methods of production, and transmission and transforming of electricity. Electron theory, electricity by chemical action, electricity by friction, electricity by magnetism, induction voltage amperage, resistance, horepower, wattage and transformers are major parts of the course.
Prerequisites: PHY 301, MA 302.

DD 303 Technical Drafting III 2—6—4

Intersection and development and their practical solutions. Where applicable, model solutions accompany the problems. The various techniques employed to produce and render isometric and oblique drawings, isometric, dimetric and trimetric projections, will be included.
Prerequisite: DD 302.

DD 322-F Drafting: Surveying and Topographic 2—3—3

This course is designed to give the student theory and practice in the use of the level and transit with primary emphasis on topographic leveling. The student learns to interpret field notes, make a topographic map from the field notes, and finally make a relief map. Learning proper drafting technique is an important part of this course.
Prerequisites: DD 301, DD 302.

MECH 303 Materials, Tools and Processes III 2—2—3

Mass-production methods and design factors in areas of casting, forging, molding, pressing, drilling, boring, reaming, turning, grinding, milling, and surface finishing.
Prerequisite: MECH 302.

Fourth Quarter

MA 304 Technical Mathematics IV 3—0—3

A further study of analytical geometry, algebra, and calculus: the binomial expansion, arithmetic and geometric progressions, polynomial functions and methods of solution, integration techniques and use of integral tables, polar equations, and an introduction to solid analytical geometry.
Prerequisite: MA 303.

SOC 302 Economics 3—0—3

The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None.

DD 304 Technical Drafting IV 4—6—6

Applications and constructions of charts, graphs, and nomographs in engineering and technical data. Screw threads, springs, keys, rivets, piping, and welding symbols, methods of representing and specifying will be covered. Basic mechanisms of motion transfer, gears and cams, will be studied and drawn with emphasis on methods of specifying, calculating, dimensions, and delineating.
Prerequisite: DD 303.

DD 310 Descriptive Geometry 2—4—4

Graphic analysis of space problems involving points, lines, planes, connectors, and a combination of these. Practical design problems will be stressed with analytical verification where applicable. Visualization shall be stressed on every problem.
Prerequisites: DD 302, MA 302.

CIV 314 Statics 3—2—4

Forces, resultants, and types of force systems; moments, equilibrium of coplanar forces by analytical and graphic methods; stresses and reactions in simple structures; equilibrium of forces in space; static and kinetic friction; center of gravity, centroids, and moment of inertia.
Corequisite: MA 302.

Fifth Quarter

CIV 316 Strength of Materials 3—2—4

Fundamental stress and strain relationship; torsion, shear and bending moments; stresses and deflections in beams; introduction to statically indeterminate beams; columns; combined stresses.
Prerequisite: CIV 314.
Corequisite: MA 303.

DD 311 Mechanisms 3—3—4

Mathematical and drafting room solutions of problems involving the principles of machine elements. Study of motions of linkages, velocities and acceleration of points within a link mechanism; layout methods for designing cams, belts, pulleys, gears and gear trains.
Prerequisites: DD 304, MA 303, PHY 302.

DD 305 Design Drafting I 2—6—4

Basic design is introduced in the study of motion transfer mechanisms as they relate to power trains. Principles of design sketching, design drawing, layout drafting, detailing from layouts, production drawings and simplified drafting practices constitute areas of study. Types and methods of specifying materials and workmanship are an integral part of the course.
Prerequisites: DD 304, MA 302, PHY 303.

ELN 301 Industrial Controls 3—2—4

Industrial controls is the study of modern methods of controlling machinery by electronic circuitry. Machinery controls and electronic mechanisms that automatically operate machines will be studied. Types of motors, generators, control signals and devices, thyratrons, gates, switches, and servomechanism circuits are major areas of study.
Prerequisite: PHY 303.

ISc 301 Industrial Organization and Management 3—0—3

Organization structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None.

Sixth Quarter

SOC 310 Applied Psychology 3—0—3

A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions, are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None.

PHY 305 Hydraulics and Pneumatics 2—4—4

The basic theories of hydraulic and pneumatic systems. Combinations of systems in various circuits. Basic designs and functions of circuits and motors, controls, electro-hydraulic servomechanisms, plumbing, filtration, accumulators and reservoirs.
Prerequisite: PHY 302.

DD 312 Jig and Fixture Design 2—6—4

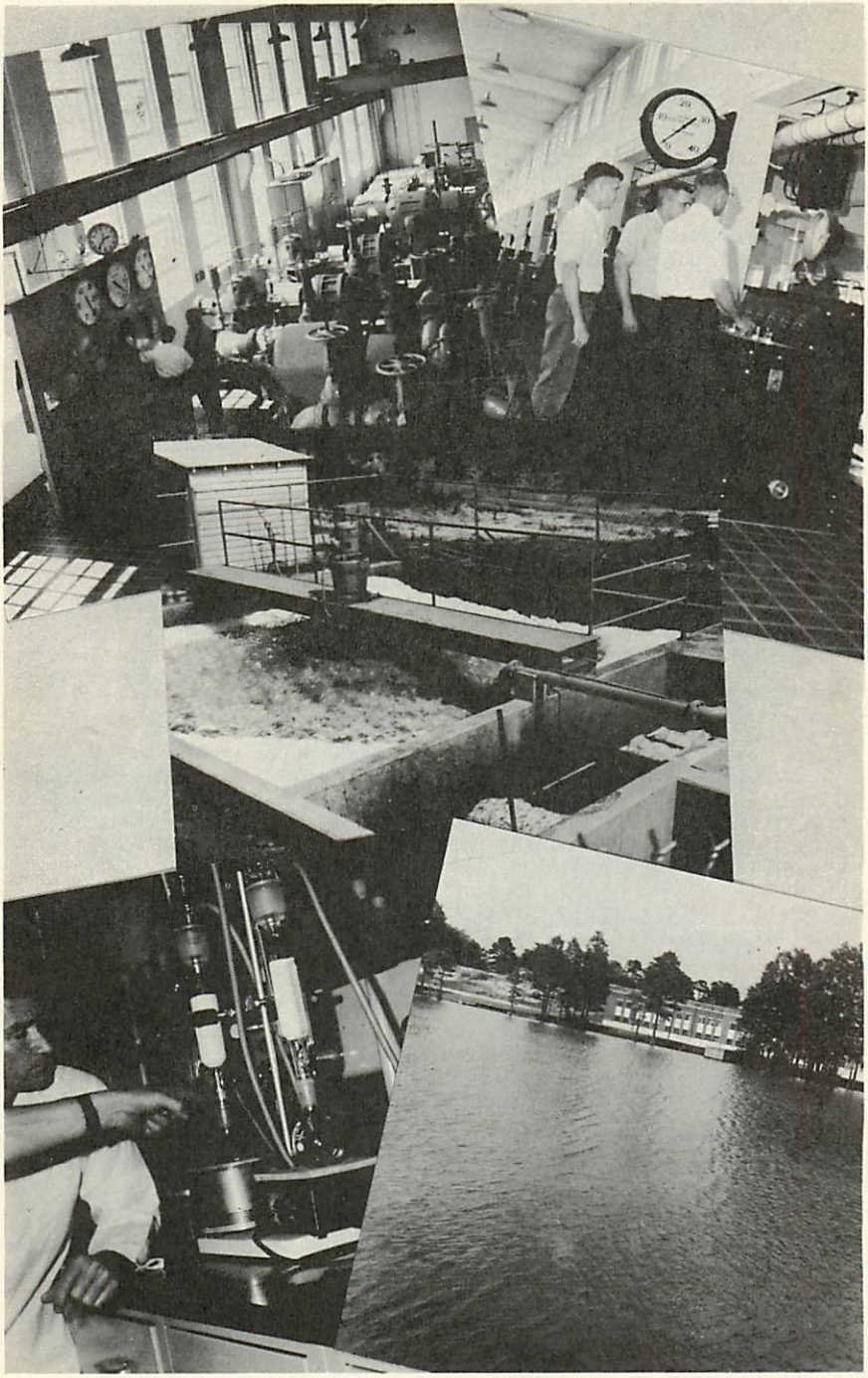
Commercial standards, principles, practices and tools of jig and fixture design. Individual project and design work to acquaint students with the types of jigs and fixtures and their design.
Prerequisites: DD 305, DD 311.

DD 306 Design Drafting II 2—6—4

Research to solve a problem in design by consulting various manuals, periodicals, and through laboratory experiments. A written technical report, preliminary design sketches, layout drawings, detail drawings, assembly and sub-assembly drawings, pictorial drawings, exploded pictorial assembly, patent drawings and specifications are required as a part of the problem.
Prerequisites: DD 305, DD 310.

MECH 304 Metallurgy 2—3—3

Properties of metals and various methods of changing these properties, classifications of metals, powder metallurgy and factors contributing to production and selection of metals for use.
Prerequisite: None.



SANITARY ENGINEERING TECHNOLOGY

Purpose of Curriculum

Our ever-increasing population and industrial expansion carries with it the demand for many services, one of the most vital of these services is the production and safeguarding of our water supply. The production and protection of our water supply represents an economic investment in which North Carolina alone is spending over 20 million dollars per year for the construction and re-construction of water and waste treatment facilities. Our industries use tremendous amounts of water daily in industrial processes and are spending thousands of dollars each year in research on treatment of liquid waste before it is returned to the streams and rivers.

These activities require increasing numbers of highly skilled technical personnel to perform the many specialized tasks involved.

These technicians are also being utilized for inspection and safe operation of milk production and processing, meat packing, food processing and service, together with housing and allied health problems, and the control of diseases.

This curriculum was designed to train technicians to work in the areas related to Sanitary Engineering and Public Health. The student will receive related courses in mathematics, science, drawing and surveying in addition to specialized technical courses such as water and waste treatment, sanitation, control systems and plant equipment and maintenance.

Job Description

The graduate of this curriculum will have a knowledge of laboratory procedures and skill in performing many types of tests on liquid and solid wastes, foods, and water to determine bacteriological characteristics, acidity, etc. He will be qualified for entry into a variety of positions such as public health engineering aide, sanitarian aide, treatment plant operators, stream sanitation technicians, industrial waste technicians, technical sales and services of equipment and chemicals, water plant operators and engineering technician positions with federal, state and local governments and municipalities.

Additional Admission Requirements

In addition to the minimum admission requirements for technician programs, one unit of chemistry is required for entrance into the Sanitary Engineering Technology curriculum.

SANITARY ENGINEERING TECHNOLOGY CURRICULUM

Course No. and Title	C-L-CH
First Quarter	
MA 301 Technical Mathematics I	5—0—5
DD 307 General Drafting I	2—3—3
ENG 302 Communicative Skills: Grammar	3—0—3
PHY 301 Physics: Properties of Matter	3—2—4
CIV 310 Surveying I	2—6—4
	15–11–19
Second Quarter	
MA 302 Technical Mathematics II	5—0—5
DD 308 General Drafting II	2—3—3
ENG 303 Communicative Skills: Tech. Writing	3—0—3
PHY 302 Physics: Work, Energy, Power	3—2—4
BIO 310 Applied Biology	3—2—4
ISc 301 Industrial Organization & Management	3—0—3
	19—7–22
Third Quarter	
MA 303 Technical Mathematics III	5—0—5
ELEC 305 Applied Electricity	2—4—4
BIO 311 Basic Microbiology	3—2—4
CIV 308 Basic Hydraulics: Prin. of Flow	2—4—4
SAN 311 Introduction to Sanitation	2—4—4
	14–14–21

Course No. and Title	C-L-CH
Fourth Quarter	
MA 304 Technical Mathematics IV	3—0—3
SOC 302 Economics	3—0—3
SAN 312 Sanitary Chemistry & Biology I	2—4—4
SAN 315 Water Supply & Liquid Waste	3—0—3
SAN 316 Water Purification	5—4—7
	16—8–20
Fifth Quarter	
PHY 307 Physics: Control Systems	2—4—4
CIV 323 Codes, Contracts & Specifications	2—0—2
SAN 313 Sanitary Chemistry & Biology II	2—4—4
SAN 317 Liquid Waste Treatment I	3—4—5
SAN 319 Plant Equipment & Maintenance	2—2—3
	11–14–18
Sixth Quarter	
SOC 310 Applied Psychology	3—0—3
ENG 307 Communicative Skills: Oral Communications	3—0—3
SAN 314 Sanitary Chemistry & Biology III	2—4—4
SAN 318 Liquid Waste Treatment II	3—4—5
CIV 325 Construction, Estimates & Cost	3—6—5
	14–14–20

C=Class Hrs. Per Wk. L=Lab Hrs. Per Wk. CH=Credit Hrs. Per Qtr.

*Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

SANITARY ENGINEERING TECHNOLOGY

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 301 Technical Mathematics I 5—0—5

The real number system is developed as an extension of natural numbers, integers, and rational numbers. Insight into the processes of arithmetic and algebra is provided. Additional topics include sets, equations, number bases, number lines, coordinate systems, trigonometry of the right triangle, vectors, dimensional analysis, and the derivative.

DD 307 General Drafting I 2—3—3

An introductory course in drafting for students needing a knowledge of drawing principles and practices for reading and describing objects in the graphic language. The student is expected to gain basic skills in drawing with instruments, lettering, geometrical constructions, freehand sketching, and describing objects orthographically with principal views. Freehand sketching and orthographic reading are to be emphasized.
Prerequisite: None.

ENG 302 Communicative Skills 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

PHY 301 Physics: Properties of Matter 3—2—4

A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None.

CIV 310 Surveying 2—6—4

Theory and practice of plane surveying including taping, differential and profile leveling, cross sections, earthwork computations, transit, stadia, and transit-tape surveys.
Corequisites: MA 301 DD 307.

Second Quarter

MA 302 Technical Mathematics II 5—0—5

Algebraic operations are applied to linear, quadratic, and polynomial functions and special equations of second degree. Complex numbers are introduced and the study of the derivative is continued. Selected applications involving rates of change, maxima and minima, approximation, areas, and volumes are considered.
Prerequisite: MA 301.

DD 308 General Drafting II 2—3—3

The student continues the study of orthographic projection with applications to orthographic instrument drawing. Dimensioning procedures and practices are emphasized and the student is introduced to the "working drawing." Methods of describing complex objects with auxiliary views and/or sections and conventions are taught.
Prerequisite: DD 307.

ENG 303 Communicative Skills: Technical Writing 3—0—3

The fundamentals of English are utilized as a background for the organization and techniques of modern technical writing. Exercise in developing typical technical reports, using writing techniques and graphic devices, are completed by the students. Practical application in the preparation of a full-length technical report is required of each student at the end of the term.
Prerequisite: ENG 302.

PHY 302 Physics: Work, Energy, Power 3—2—4

The major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity, and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisite: MA 301.

BIO 310 Applied Biology 3—2—4

A basic course in biology with emphasis on microorganisms and laboratory procedures for the identification and differentiation of organisms peculiar to the water and liquid waste treatment processes and stream sanitation.
Prerequisite: None.

ISc 301 Industrial Organization and Management 3—0—3

Organization structure for industrial management; operational and financial activities, including accounting, budgeting, banking, credit and industrial risk, forecasting of markets, selection and layout of physical facilities; selection, training and supervision of personnel as found in typical industrial organizations.
Prerequisite: None.

Third Quarter

MA 303 Technical Mathematics III 5—0—5

Ideas of algebra are used in a study of trigonometric, logarithmic and exponential functions. Selected applications of calculus reinforce this approach. Polar coordinates are introduced and their applications expanded. Complex numbers, vectors, coordinate systems and their applications constitute other areas of study.
Prerequisite: MA 302.

ELEC 305 Applied Electricity 2—4—4

Electrical code, interpretation of nameplate data, motor characteristics and selection, motor controls and protection devices, single phase and three-phase current applications, wire size calculations and Y and Delta connections.
Prerequisite: PHY 302.

BIO 311 Basic Microbiology 3—2—4

Scope and history of microbiology, classification of microorganisms, protazoa, fungi, viruses, microscopy, bacterial physiology, saprophytic bacteria, culture media and methods, sterilization and disinfection, germicides, sources of infection, microbes and disease, skin infections. The study of several pathogenic bacteria associated with water and food, natural and acquired resistance to bacteria, and respiratory disease producing microbes.
Prerequisite: BIO 310.

CIV 308 Basic Hydraulics: Principles of Flow 2—4—4

A basic study of closed conduit and open channel flow, including stream flow, subterranean flow, runoff, pump head and wave action.
Prerequisites: MA 302 PHY 302.

SAN 311 Introduction to Sanitation 2—4—4

Methods of disease transmission, hygienic excreta disposal, municipal and industrial liquid waste disposal methods, characteristics of water, water treatment, protection of ground water, insect and rodent control, solid waste collection and disposal, milk and food sanitation, swimming pool sanitation and industrial hygiene.
Prerequisite: None.

Fourth Quarter

MA 304 Technical Mathematics IV 3—0—3

A further study of analytical geometry, algebra, and calculus: the binomial expansion, arithmetic and geometric progressions, polynomial functions and methods of solution, integration techniques and use of integral tables, polar equations, and an introduction to solid analytical geometry.
Prerequisite: MA 303.

SOC 302 Economics 3—0—3

The fundamental principles of economics including the institutions and practices by which people gain a livelihood. Included is a study of the laws of supply and demand and the principles bearing upon production, exchange, distribution, and consumption both in relation to the individual enterprise and to society at large.
Prerequisite: None.

SAN 312 Sanitary Chemistry and Biology I 2—4—4

Theory and laboratory technique for all control tests of water purification including: bacteriology, color, turbidity, pH, alkalinity, hardness, coagulation, chlorides, fluorides, iron, manganese, detergents, bactericides, and nitrates. Basic "in-plant studies: at nearby plants."
Prerequisites: BIO 310, BIO 311, SAN 311.

SAN 315 Water Supply and Liquid Wastes 3—0—3

Water sources, quantity required, effect of storage on quality, quantity of storage, transportation, protection from pollution, methods of evaluating water quality, the ability of a water course to assimilate waste, stream sampling procedure and distribution design.

Liquid waste collection, physical conditions, transportation, system design, system maintenance, degree of treatment necessary, effect on streams, biological forms of life associated with sewage pollution, bottom deposits, industrial wastes and their effect on streams.
Prerequisites: CIV 308, BIO 310, BIO 311.

SAN 316 Water Purification 5—4—7

Basic principles of water purification including: aeration, sedimentation, rapid sand filtration, chlorination, treatment chemicals, taste and odor control, bacteriological control, mineral control, design criteria and operational problems. New processes and recent developments. Rules, regulations, forms and records.
Prerequisites: CIV 308, BIO 310, BIO 311.

Fifth Quarter

PHY 307 Physics: Control Systems 2—4—4

Hydraulic, pneumatic, mechanical, electrical and electronic control systems and components. Basic description, analysis and explanation of operation. Typical performance characteristics, limitations on performances, accuracy, applications and their utilization in industrial processes.
Prerequisites: PHY 302, ELEC 301 or ELEC 305.

CIV 323 Codes, Contracts and Specifications 2—0—2

Basic principles and methods most significant in contract relationships; appreciation of the legal considerations in construction work; study of the National Building Code and local building codes, interpreting and outlining specifications.
Prerequisite: None.

SAN 313 Sanitary Chemistry and Biology II 2—4—4

Theory and laboratory technique for the determination of solids, dissolved oxygen, oxygen consumed, relative stability, water and sewage bacteria.
Prerequisite: SAN 312.

SAN 317 Liquid Waste Treatment I 3—4—5

Composition of sewage, nitrogen cycle, carbon cycle, sulphur cycle, aerobic and anacrobic decomposition, dilution, screening, degritting, measuring, sedimentation, aeration, digestion, filtration, air drying, biological purification, grease and oil removal, disinfection, chemical precipitation, sand filters, filter flies, field studies, in-plant studies, industrial waste. Rules, regulations, forms and records.
Prerequisites: SAN 312, CIV 308.

SAN 319 Plant Equipment and Maintenance 2—2—3

Basic principles of corrosion and its prevention, painting, lubrication, controls, (operation and maintenance), safety, sewer cleaning, pumps.
Prerequisite: ELEC 305.

Sixth Quarter

SOC 310 Applied Psychology 3—0—3

A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions, are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None.

ENG 307 Communicative Skills: Oral Communications 3—0—3

Includes study in face-to-face conversation, delegating and accepting, understanding, listening, questioning, conferences, and the use of words.

SAN 314 Sanitary Chemistry and Biology III 2—4—4

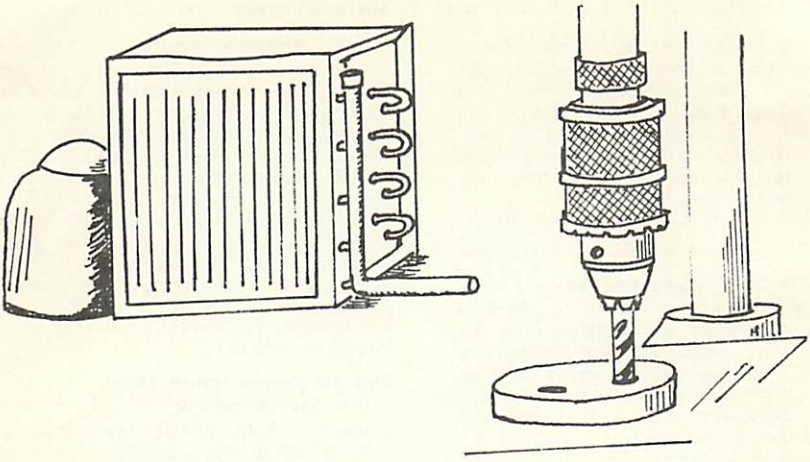
Theory and laboratory technique on biochemical oxygen demand, organic nitrogen, volatile acids, toxic metals, stream studies, in-plant studies at nearby plants.
Prerequisite: SAN 313.

SAN 318 Liquid Waste Treatment II 3—4—5

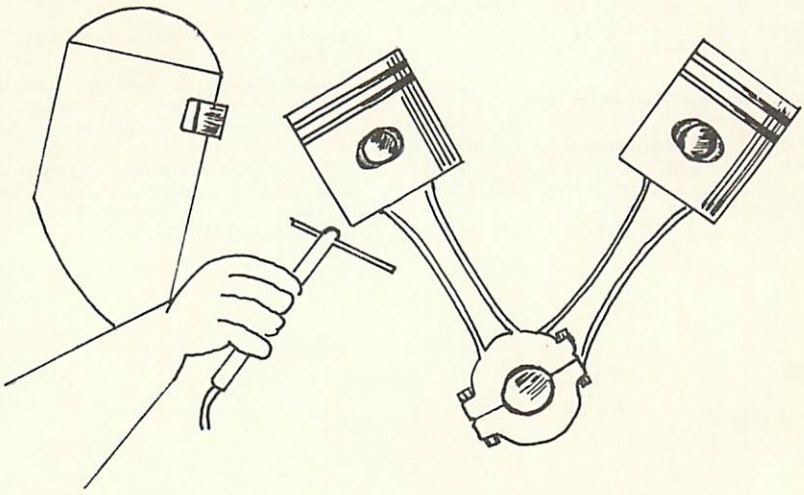
Methods of treatment, detailed study of at least two types of plants, basic design parameters of all units, quantity expected from population, application of package plants and application of septic tanks. Rules, regulations, forms and records.
Prerequisite: SAN 317.

CIV 325 Construction Estimates and Costs 3—6—5

Interpretation of working drawings of timber, structural steel, and reinforced concrete structures, and highways; preparation of material and labor quantity surveys from plans and specifications; approximate and detailed estimates of costs; bidding procedures and preparation of bids.
Prerequisite: CIV 310, DD 308.



TRADE DIVISION

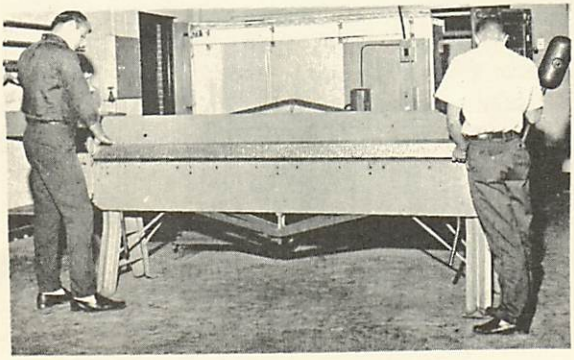


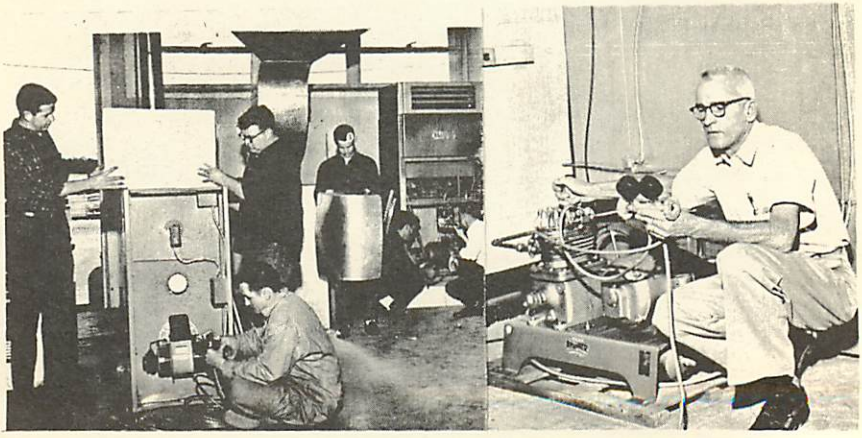
Purpose of the Trade Training Programs at Fayetteville Technical Institute

The rapid expansion of industry with its technological advancements has created a demand for skilled workers who can enter an occupation with a competent knowledge of the manipulative skills required and the capacity to perform these skills. These occupations require some knowledge of mathematics, the sciences and communicative skills, but to a greater degree a depth in manipulative skills in a more restricted range of activities.

The craftsman works closely with the technician, thus he needs a workable background of the related subjects materials in order to communicate intelligently with every member of the work team.

Our trade curriculums are designed to give the tradesman, in the first year, a strong basic background of related subjects especially geared to his capabilities. Added to this are certain courses which place emphasis on an understanding of the American economic system and develop interest in the betterment of our society. The degree of competency which a skilled worker must have to effectively enter a trade occupation is gained through depth courses in specific skills in the second year. These courses are taught in laboratory and shop situations with maximum industrial equipment.





AIR CONDITIONING AND REFRIGERATION TRADE CURRICULUM

Purpose of Curriculum

There is today a greater demand from industry for qualified mechanical experts in all areas of the field of Air Conditioning and Refrigeration. This curriculum is designed to help equip young men who plan for a vocation in this broad sphere of activity.

A comprehensive study of theory and fundamentals of refrigeration, heating and air conditioning is completed and the student is enabled to understand rather than merely accept the functions of the mechanical equipment involved. Great emphasis is placed on manipulative skills, installation and service procedures, exercise and training in practical thinking. The related subject phase of the program provides for a better rounded individual through work in the areas of Math, English and Social Studies.

Job Description

An abundance of job opportunities exist in the many mechanical contracting organizations in business today. Graduates may pursue one of the many lines of work that make up this great industry. They may remain entirely in the refrigeration branch following the trade of installation or service mechanic or both. Some of the larger contractors indulge in all phases and provide a vast assortment of jobs including pipe work, metal work, insulation work, control and service work. Background afforded the student often enables him to elevate himself to foreman and supervisory positions. Plant maintenance in industry and government provide attractive possibilities.

AIR CONDITIONING AND REFRIGERATION TRADE CURRICULUM

Course No. and Title	C-L-CH
First Quarter	
MA 120 Mathematics: Fundamentals	5—0—5
ENG 102-F Communicative Skills: Grammar	3—0—3
PHY 104-F Applied Physics I: Properties of Matter	3—2—4
ISc 102 Industrial Organization & Management	3—0—3
AHR 121-F Fundamentals of Refrigeration I	5—6—7
	19—8—22
Second Quarter	
MA 124 Mathematics: Algebra	5—0—5
PHY 105-F Applied Physics II: Electricity	3—2—4
DD 107-F Trade Drafting	2—3—3
AHR 122-F Fundamentals of Refrigeration II	3—9—6
	13—14—18
Third Quarter	
SOC 105 Economics	3—0—3
PHY 106-F Applied Physics III: Work, Energy, Power	3—2—4
ENG 103-F Communicative Skills: Report Writing	3—0—3
AHR 120-F Sheet Metal Layout	2—4—4
AHR 123-F Commercial Refrigeration	3—9—6
	14—15—20

Course No. and Title	C-L-CH
Fourth Quarter	
ENG 104 Communicative Skills: Industrial Comm.	3—0—3
AHR 124-F Winter Air Conditioning I	4—6—6
AHR 125-F Principles of Air Conditioning	5—0—5
AHR 126-F Duct Systems Layout	3—6—5
	15—12—19
Fifth Quarter	
WELD 101-F Welding: Basic	2—4—3
AHR 127-F Winter Air Conditioning II	4—6—6
AHR 128-F Auto Air Conditioning	2—3—3
AHR 129-F Air Conditioning Shop Practice I	3—6—5
	11—19—17
Sixth Quarter	
SOC 110-F Applied Psychology	3—0—3
AHR 130-F Heat Pumps	3—3—4
AHR 131-F Absorption Systems	3—3—4
AHR 132-F Chilled Water Systems	3—3—4
AHR 133-F Air Conditioning Shop Practice II	3—6—5
	15—15—20

C = Class Hrs. Per Wk. L = Lab Hrs. Per Wk. CH = Credit Hrs. Per Qtr.

*Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

AIR CONDITIONING TRADE

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 120 Mathematics: Fundamentals 5—0—5

Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None.

ENG 102-F Communicative Skills: Grammar 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis of grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

PHY 104-F Applied Physics I: Properties of Matter 3—2—4

Introductory physics and its applications. Systems of measurement, theory of matter, properties of solids, liquids, and gases.
Prerequisite: None.

ISc 102 Industrial Organization and Management 3—0—3

Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost.
Prerequisite: None.

AHR 121-F Fundamentals of Refrigeration I 5—6—7

Terminology used in the trade, principles of refrigeration; identification of basic system components; introduction to and practice with tools and shop equipment found in the field today. Standard procedures and safety measures are included.
Prerequisite: None.

Second Quarter

MA 124 Mathematics: Algebra 5—0—5

Basic concepts and operations of algebra: historical background of our base-10 number system; algebraic operations: addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms, tables and interpolation.
Prerequisite: None.

PHY 105-F Applied Physics II: Electricity 3—2—4

Basic principles of electricity, types of electricity, and its production, transmission, and transformation. Such factors as the electron theory, electrical measurement, magnetism, electromagnetism, and the magnetic effects of electricity constitute major areas of study.
Prerequisite: PHY 104-F.

DD 107-F Trade Drafting 2—3—3

Fundamental drafting principles with instruction and practice in lettering, orthographic projection, working drawings. Introduction to the principles of sectioning, dimensioning, use of drawing instruments and the solution of geometrical problems are covered. This is an introductory course in drafting for students needing a knowledge of drawing principles for reading and describing objects in the graphic language.
Prerequisite: None.

AHR 122-F Fundamentals of Refrigeration II 3—9—6

A follow-up course in basic refrigeration utilizing theory, procedures, tools and equipment studied in first quarter's work. Strong emphasis is placed upon domestic refrigerators, freezers and window air conditioning units. Machines with electrical and mechanical difficulties are brought in and repaired by the student. Refrigerant characteristics are studied. Manufacturers' service manuals are used in conjunction with text.
Prerequisite: AHR 121-F.

Third Quarter

SOC 105 Economics 3—0—3

Designed to help the student understand present day economic problems. Topics include: production, consumption, exchange and distribution, money and credit, business fluctuations, labor and management relations, and challenges to our system of free enterprise.
Prerequisite: None.

PHY 106-F Applied Physics III: Work, Energy, Power 3—2—4

Physical principles of force, energy, work and power; equilibrium and the laws of motion; principles of machines, mechanical advantage, and transmission of power in practical applications and the use of vectors and graphical presentations.
Prerequisites: PHY 104-F, MA 120.

ENG 103-F Communicative Skills: Report Writing 3—0—3

Brief review of English grammar, spelling, and punctuation. Concentrated effort will be applied to the fundamentals of good writing; sentence structure, proper development of descriptive reporting, and the mechanics of report construction. Practice in writing letters and various report forms will be given and some time will be devoted to oral speech and note taking.
Prerequisite: ENG 102-F.

AHR 120-F Sheet Metal Layout 2—4—4

Work in drafting room with instruments developing patterns on paper for popular duct fittings. Proper layout procedures are followed in work on plates including square and radius elbows, offsets, transitions, "Y" branches and square to rounds.
Prerequisite: None.

AHR 123-F Commercial Refrigeration 3—9—6

Installation of common types of commercial refrigeration; problems and solutions prevalent in the commercial field, medium and low temperature units with electric, hot gas, reverse cycle and water defrost; use of manufacturers' catalogs in sizing and matching system components; system sketching and pipe symbols.
Prerequisite: AHR 122-F, PHY 105-F.

Fourth Quarter

ENG 104 Communicative Skills: Industrial Communications 3—0—3

Development of trainee's ability to communicate effectively with other individuals through the medium of good language usage in speaking and writing, to think more clearly, and to reason more forcefully in work problems pertaining to his job.
Prerequisite: None.

AHR 124-F Winter Air Conditioning I 4—6—6

Introduction to heating systems; furnaces, boilers, steam and hot water piping; humidifiers, air movement and noise; heat loss and new terminology. Hot air and hot water systems will be installed, operated, checked and adjusted.
Prerequisite: AHR 123-F.

AHR 125-F Principles of Air Conditioning 5—0—5

Review of refrigerant cycle and characteristics of mechanical cooling equipment. Sensible and latent heat loads; air mixtures and dehumification; system capacity and air distribution; pipe schematics and component symbols.
Prerequisites: AHR 123-F, AHR 124-F.

AHR 126-F Duct System Layout 3—6—5

Practical duct layout and fabrication in the shop; good duct fitting and system design is followed. Complete air handling systems are built, installed, checked and balanced. Metal and labor costs are reviewed and expounded.
Prerequisite: AHR 120-F.

Fifth Quarter

WELD 101-F Welding: Basic 2—4—3

The various processes used for joining materials by welding are discussed. Lecture, demonstrations and practice cover the oxyacetylene and arc welding processes, filler metals used, gases, currents, weldability of metals. Instruction is given in the set-up and safe operation of oxyacetylene and arc welding apparatus. Students prepare joints by both hand and machine cutting with the oxyacetylene torch.
Prerequisite: None.

AHR 127-F Winter Air Conditioning II 4—6—6

Stress is placed upon the burner mechanism of the boiler or furnace. Piping and wiring; burner components and system controls both electrical and mechanical; operational problems involving diagnosis, procedure and service technique; oil and gas burner capacity and efficiency test; code and safety.
Prerequisite: AHR 124-F.

AHR 128-F Auto Air Conditioning 2—3—3

Components of an auto air conditioning system; installation of unit with necessary controls; charging systems, checking brakes, replacing compressor, installing gauges, interpreting pressures and general service; magnetic clutch and solenoid by-pass, under-dash unit and trunk unit.
Prerequisite: AHR 125-F.

AHR 129-F Air Conditioning Shop Practice I 3—6—5

A continuation of practice on all shop procedures encountered by the student to this point; work on air conditioning compressors, central installations and trouble

shooting; sheet metal duct fabrication and installation; also duct insulation materials and procedures.
Prerequisites: AHR 123-F, AHR 126-F, AHR 127-F.

Sixth Quarter

SOC 110-F Applied Psychology 3—0—3

This course studies the procedures of building an efficient, enthusiastic business team and deals with the nature of the problems which arise in business organizations. The individual and his behavior are discussed, as well as the problems of influence and authority.
Prerequisite: None.

AHR 130-F Heat Pumps 3—3—4

Basic principles, air to air, water to air, earth to air heat pumps; coefficient of performance; reversing valves, unit controls, outdoor coil defrosting, heat capacity limits, supplementary strips, balance points and comparative cost of operation.
Prerequisites: AHR 125-F.

AHR 131-F Absorption Systems 3—3—4

Basic absorption cycle, strong solution circuit, refrigerant circuit, system components, system controls, direct and indirect fired; advantages, disadvantages and applications.
Prerequisite: AHR 125-F.

AHR 132-F Chilled Water Systems 3—3—4

Characteristics of water, principles of water chilling, the refrigerant circuit, the water circuit and pumps; basic motor controls, domestic and commercial applications; prevention of freezing; connections to hot water heating system; flexibility of equipment.
Prerequisites: AHR 124-F, AHR 125-F.

AHR 133-F Air Conditioning Shop Practice II 3—6—5

Emphasis on pipe work and water circuits with boilers and chillers; emphasis on control work with heat pumps, chillers and direct expansion air conditioning systems; fabrication and installation of motorized dampers automatically operated; strengthen all manipulative skills through practice.
Prerequisite: AHR 129-F.

AUTOMOTIVE MECHANICS

Purpose of Curriculum

This curriculum provides a training program for developing the basic knowledge and skills needed to inspect, diagnose, repair or adjust automotive vehicles. Manual skills are developed in practical shop work. Thorough understanding of the operating principles involved in the modern automobile comes in class assignments, discussion, and shop practice.

Complexity in automotive vehicles increases each year because of scientific discovery and new engineering. These changes are reflected not only in passenger vehicles, but also in trucks, buses and a variety of gasoline-powered equipment. This curriculum provides a basis for the student to compare and adapt to new techniques for servicing and repair as vehicles are changed year by year.

Job Description

Automobile mechanics maintain and repair mechanical, electrical, and body parts of passenger cars, trucks, and buses. In some communities and rural areas they also may service tractors or marine engines and other gasoline-powered equipment. Mechanics inspect and test to determine the causes of faulty operation. They repair or replace defective parts to restore the vehicle or machine to proper operating condition. They use shop manuals and other technical publications.

Automotive mechanics in smaller shops usually are general mechanics qualified to perform a variety of repair jobs. A large number of automobile mechanics specialize in particular types of repair work. For example, some may specialize in repairing only power steering and power brakes, or automatic transmissions. Usually such specialists have an all-round knowledge of automotive repair and may occasionally be called upon to do other types of work.

AUTOMOTIVE MECHANICS TRADE CURRICULUM

Course No. and Title	C-L-CH
First Quarter	
MA 120 Mathematics: Fundamentals	5—0—5
ENG 102-F Communicative Skills: Grammar	3—0—3
PHY 104-F Applied Physics I: Properties of Matter	3—2—4
ISc 102 Industrial Organization & Management	3—0—3
AUTO 121 Automotive: Engines	3—9—6
	17–11–21
Second Quarter	
MA 124 Mathematics: Algebra	5—0—5
PHY 105-F Applied Physics II: Electricity	3—2—4
ENG 103-F Communicative Skills: Report Writing	3—0—3
AUTO 122 Automotive: Electrical & Fuel Systems	3—12—7
	14–14–19
Third Quarter	
DD 107-F Drafting: Trade I	2—3—3
SOC 105 Economics	3—0—3
PHY 106-F Applied Physics II: Work, Energy, Power	3—2—4
AUTO 123 Automotive: Chassis & Suspension	3—12—7
	11–17–17

Course No. and Title	C-L-CH
Fourth Quarter	
ENG 104 Communicative Skills: Industrial Comm.	3—0—3
WELD 101-F Welding: Basic	2—4—3
AUTO 124 Automotive: Power Train Systems	3—9—6
AUTO 102-F Auxiliary Systems	3—6—5
	11–19–17
Fifth Quarter	
MECH 101-F Machine Shop: Basic	2—6—4
AUTO 107-F Automotive: Automatic Transmission	6—6—8
AUTO 108-F Automotive: Power Accessories	5—4—6
	13–16–18
Sixth Quarter	
SOC 110-F Applied Psychology	3—0—3
AHR 101 Air Conditioning: Automotive	1—3—2
AUTO 125 Automotive: Servicing	3—9—6
AUTO 111-F Automotive: Tune up	1—3—2
AUTO 106-F Automotive: Front End & Brakes	3—3—4
	11–18–17

C=Class Hrs. Per Wk. L=Lab Hrs. Per Wk. CH=Credit Hrs. Per Qtr.

*Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

AUTOMOTIVE MECHANICS

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 120 Mathematics: Fundamentals **5—0—5**

Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades.
Prerequisite: None.

ENG 102-F Communicative Skills: Grammar **3—0—3**

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis of grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

PHY 104-F Applied Physics I: Properties of Matter **3—2—4**

Introductory physics and its applications. Systems of measurement, theory of matter, properties of solids, liquids, and gases.
Prerequisite: None.

ISc 102 Industrial Organization and Management **3—0—3**

Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting produce cost.
Prerequisite: None.

AUTO 121 Automotive: Engines **3—9—6**

Development of a thorough knowledge and ability in using, maintaining, and storing the various hand tools and measuring devices needed in automotive repair work. Study of the construction and operation of components of automotive engines. Testing of engine performance; servicing and maintenance of pistons, valves, cams and camshafts, fuel and exhaust systems, cooling systems, proper lubrication; and methods of testing, diagnosing and repairing.
Prerequisite: None.

Second Quarter

MA 124 Mathematics: Algebra **5—0—5**

Basic concepts and operations of algebra: historical background of our base-10 number system; algebraic operations: addition, subtraction, multiplication and division; letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction substitution, graphing; exponents, logarithms, tables and interpolation.
Prerequisite: None.

PHY 105-F Applied Physics II: Electricity **3—2—4**

Basic principles of electricity, types of electricity, and its production transmission, and transformation. Such factors as the electron theory, electrical measurement, magnetism, electromagnetism, and the magnetic effects of electricity constitute major areas of study.
Prerequisite: PHY 104-F.

ENG 103-F Communicative Skills: Report Writing **3—0—3**

Brief review of English grammar, spelling, and punctuation. Concentrated effort will be applied to the fundamentals of good writing; sentence structure, proper development of descriptive reporting, and the mechanics of report construction. Practice in writing letters and various report forms will be given and some time will be devoted to oral speech and note taking.
Prerequisite: ENG 102-F.

AUTO 122 Automotive: Electrical and Fuel Systems **3—12—7**

A thorough study of the electrical and fuel systems of the automobile. Battery cranking mechanism, generator, ignition, accessories and wiring; fuel pumps, carburetors, and fuel injectors. Characteristics of fuels, types of fuel systems, special tools, and testing equipment for the fuel and electricial system.
Prerequisite: AUTO 121.

Third Quarter

DD 107-F Drafting: Trade I **2—3—3**

Fundamental drafting principles with instruction and practice in lettering orthographic projection, working drawings. Introduction to the principles of sectioning, dimensioning, use of drawing instruments and

the solution of geometrical problems are covered. This is an introductory course in drafting for students needing a knowledge of drawing principles for reading and describing objects in the graphic language.
Prerequisite: None.

SOC 105 Economics **3—0—3**

Designed to help the student understand present day economic problems. Topics include: production, consumption, exchange and distribution, money and credit, business fluctuations, labor and management relations and challenges to our system of free enterprise.
Prerequisite: None.

PHY 106-F Applied Physics III: Work, Energy, Power **3—2—4**

Physical principles of force, energy, work and power; equilibrium and the laws of motion; principles of machines, mechanical advantage, and transmission of power in practical applications and the use of vectors and graphical presentations.
Prerequisites: PHY 104-F, MA 120.

AUTO 123 Automotive: Chassis and Suspension **3—12—7**

Principles and functions of the components of automotive chassis. Practical job instruction in adjusting and repairing of suspension, steering and braking systems. Units to be studied will be shock absorbers, springs, steering systems, steering linkage, front end, types and servicing of brakes.
Prerequisite: AUTO 122.

Fourth Quarter

ENG 104 Communicative Skills: Industrial Communications **3—0—3**

Development of trainee's ability to communicate effectively with other individuals through the medium of good language usage in speaking and writing, to think more clearly, and to reason more forcefully in work problems pertaining to his job.
Prerequisite: None.

WELD 101-F Welding: Basic **2—4—3**

The various processes used for joining materials by welding are discussed. Lecture, demonstrations and practice cover the oxyacetylene and arc welding processes, filler metals used, gases, currents, weldability of metals. Instruction is given in the set-up and safe operation of oxyacetylene and arc welding apparatus. Students prepare joints by both hand and machine cutting with the oxyacetylene torch.
Prerequisite: None.

AUTO 124 Automotive: Power Train Systems **3—9—6**

Principles and functions of automotive power train systems: clutches, transmission gears, torque converters, drive shaft assemblies, rear axles and differentials. Identification of troubles, servicing, and repair.
Prerequisites: PHY 105-F, PHY 106-F, AUTO 123.

AUTO 102-F Auxiliary Systems **3—6—5**

This course has been designed to give the student a thorough practical knowledge of the cooling, lubricating and fuel systems of a gasoline engine. In this course, the emphasis is placed on actual work experience and the procedures of troubleshooting that makes the student more efficient as a mechanic.
Prerequisite: AUTO 122.

Fifth Quarter

MECH 101-F Machine Shop: Basic **2—6—4**

Further develop skills in the use of basic measuring tools, acquaint the student with the procedures of layout work, correct method of using hand tools, basic fundamentals of drill press and lathe operation and hand grinding drill bits and lathe tools to meet needs common to the automotive shop.
Prerequisite: None.

AUTO 107-F Automotive: Automatic Transmissions **6—6—8**

In order to round out the Automotive Curriculum, a special course is incorporated here to give greater depth in the understanding of Automatic Transmissions. With the event of this type of transmission in the automotive field, a whole new area of service and repair has been opened up to the Auto Mechanic. This course acquaints the student with the basic principles of all automatic transmissions and attempts to develop the student's skill in servicing and repairing most of the popular types of automatic transmissions.
Prerequisite: AUTO 124.

AUTO 108-F Automotive: Power Accessories **5—4—6**

This course is designed to acquaint the student with the operation, service and repair of power operated seats, windows, tops, windshield wipers, radio antennas; etc. It should insure the development of the student's ability to understand and trace out the circuits of the electrical accessories, to enhance his skill in diagnosing troubles and repairing damaged circuits. He will apply his knowledge in drawing and reading schematic diagrams of electrical circuits.
Prerequisite: AUTO 102-F.

Sixth Quarter

SOC 110-F Applied Psychology 3—0—3

A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions, are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None.

AHR 101 Air Conditioning: Automotive 1—3—2

General introduction to the principles of refrigeration; study of the assembly of the components and connections necessary in the mechanisms, the methods of operation, and control; proper handling of refrigerants in charging the system.
Prerequisite: PHY 105-F.

AUTO 125 Automotive: Servicing 3—9—6

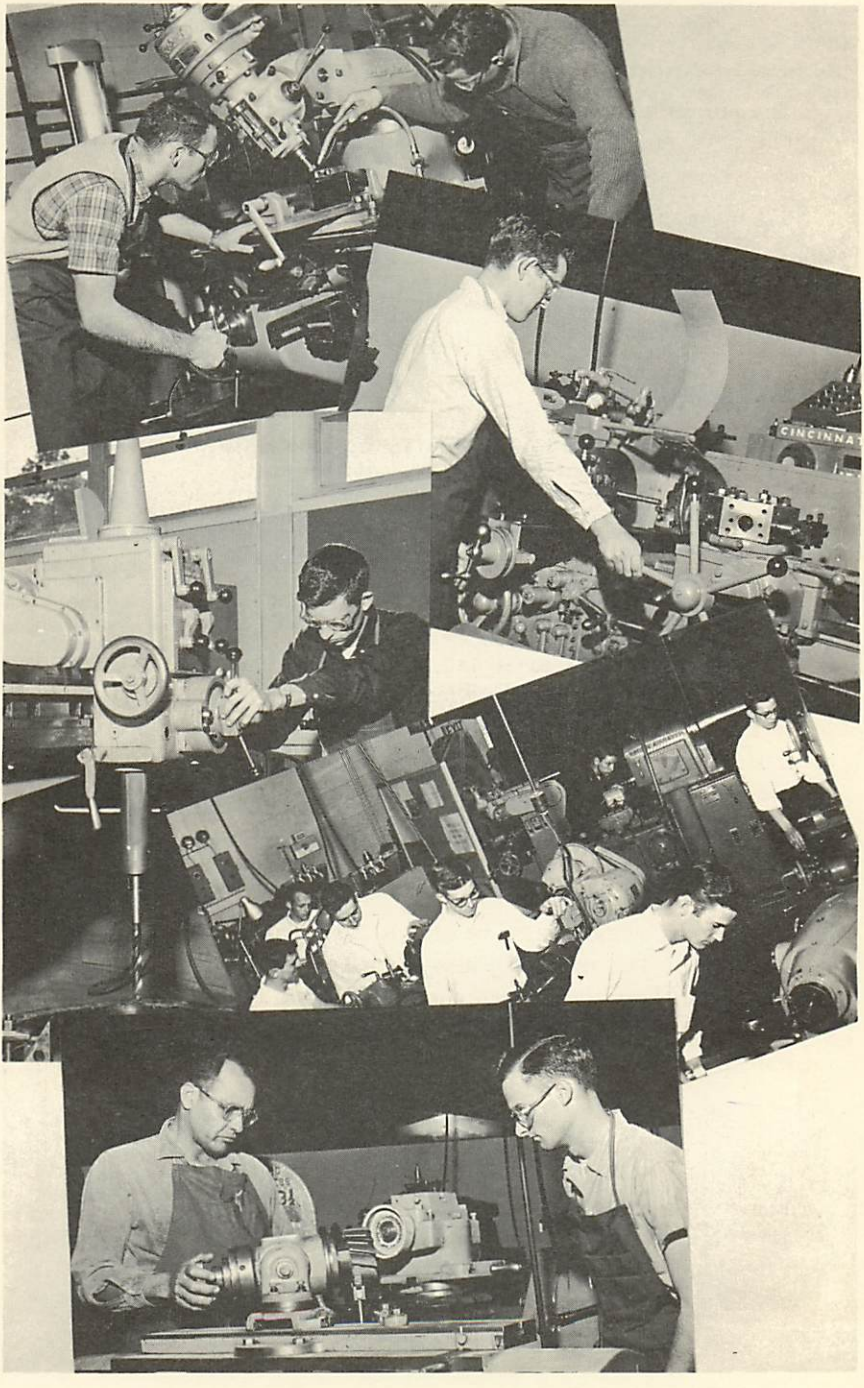
Emphasis is on the shop procedures necessary in determining, the nature of troubles developed in the various component systems of the automobile. Trouble-shooting of automotive systems providing a full range of testing, adjusting, repairing and replacing experiences.
Prerequisite: AUTO 123.

AUTO 111-F Automotive: Tune up 1—3—2

This practical course, coming at the end of the second year, should help the student to increase his work experience with the more technical aspects of engine tune-up and should develop his knowledge of the waveforms of the oscilloscope and other test units on the Tune-up Tester. The student should be able to put to practical use, the basic theory of electricity, storage batteries, ignition systems, cranking motors, charging circuits and engine principles which he has already learned.
Prerequisite: AUTO 123.

AUTO 106-F Automotive: Front End and Brakes 3—3—4

This course covers in depth, Steering Geometry, Steering Linkage and Front Suspension Systems. The Braking System is studied and all phases of hydraulic and power brakes are covered. The use of special equipment such as front-end machines, brake-drum lathes and honing equipment, is thoroughly studied. Much emphasis is placed on the practical aspects of service and repair procedures.
Prerequisite: AUTO 123.



MACHINE SHOP TRADE

Purpose of Curriculum

This curriculum was prepared to meet a definite need for training of machinists. Surveys recently completed in North Carolina show that many of the existing industries lack time and facilities for training enough machinists to meet present and planned needs. Expanding industries already located in our State and new industries under development invariably express the need for skilled carftsmen who have the background knowledge and potential to advance.

This guide is designed to give learners the opportunity to acquire basic skills and the related technical information necessary to gain employment and build a profitable career in the machine shop industry in the State. It is comprised of the joint views of committees responsible for its development.

Job Description

The machinist is a skilled metal worker who shapes metal parts by using machine tools and hand tools. His training and experience enable him to plan and carry through all the operations needed in turning out a machined product and to switch readily from one kind of product to another. A machinist is able to select the proper tools and material required for each job and to plan the cutting and finishing operations in their proper order so that he can complete the finished work according to blueprint or written specifications. He makes standard shop computations relating to dimensions of work, tooling, feeds, and speeds of machining. He often uses precision measuring instruments such as micrometers and gages to measure the accuracy of his work to thousandths of an inch.

This skilled worker must be able to set up and operate most types of machine tools. The machinist also must know the composition of metals so that he can heat and quench cutting tools and parts to improve machinability. His wide knowledge enables him to turn a block of metal into an intricate, precise part.

MACHINE SHOP TRADE CURRICULUM

Course No. and Title First Quarter	C-L-CH
MA 120 Mathematics: Fundamentals	5—0—5
ENG 102-F Communicative Skills: Grammar	3—0—3
PHY 104-F Applied Physics I: Properties of Matter	3—2—4
MECH 121 Theory and Practice I	3—12—7
	14–14–19

Second Quarter	C-L-CH
MA 124 Mathematics: Algebra	5—0—5
PHY 105-F Applied Physics II: Electricity	3—2—4
ENG 103-F Communicative Skills: Report Writing	3—0—3
DD 107-F Drafting: Trade I	2—3—3
MECH 122 Theory and Practice II	3—8—6
	16–13–21

Third Quarter	C-L-CH
MA 123 Mathematics: Machinist I	5—0—5
DD 108-F Drafting: Trade II	2—3—3
SOC 105 Economics	3—0—3
PHY 106-F Applied Physics III: Work, Energy, Power	3—2—4
MECH 123 Theory and Practice III	3—8—6
	16–13–21

Course No. and Title Fourth Quarter	C-L-CH
MA 124-F Mathematics: Machinist II	5—0—5
ENG 104 Communicative Skills: Industrial Comm.	3—0—3
ISc 101 Industrial Specifications	3—0—3
MECH 124 Structure of Metals	3—2—4
MECH 125 Theory and Practice IV	3—9—6
	17–11–21

Fifth Quarter	C-L-CH
WELD 101-F Welding: Basic	2—4—3
DD 123-F Drafting: Blueprint & Shop Sketching	3—0—3
MECH 126 Heat Treating Practices	2—4—3
MECH 130-F Precision Machines	3—9—6
ISc 102 Industrial Organization & Management	3—0—3
	13–17–18

Sixth Quarter	C-L-CH
SOC 110-F Applied Psychology	3—0—3
MECH 131-F Jig & Fixture Making	3—9—6
MECH 132-F Machine Repair	2—4—3
MECH 133-F Advanced Machine Processes	3—6—5
	11–19–17

C=Class Hrs. Per Wk. L=Lab Hrs. Per Wk. CH=Credit Hrs. Per Qtr.

*Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

MACHINE SHOP TRADE

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 120 Mathematics: Fundamentals 5—0—5

Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction to algebra used in trades. Practice in depth.
Prerequisite: None.

ENG 102-F Communicative Skills: Grammar 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis of grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

PHY 104-F Applied Physics I: Properties of Matter 3—2—4

Introductory physics and its applications. Systems of measurement, theory of matter, properties of solids, liquids, and gases.
Prerequisite: None.

MECH 121 Theory and Practice I 3—12—7

An introduction to the machinist trade and the potential it holds for the craftsman. Deals primarily with the identification, care and use of basic hand tools and precision measuring instruments. Elementary layout procedures and processes of lathe, drill press, grinding (off-hand) and milling machines will be introduced both in theory and practice.
Prerequisite: None.

Second Quarter

MA 124 Mathematics: Algebra 5—0—5

Basic concepts and operations of algebra: historical background of our base-10 number system; algebraic operations: addition, subtraction, multiplication and division; fractions, letter representation, grouping, factoring, ratio and proportions, variation; graphical and algebraic solution of first degree equations; solution of simultaneous equations by: addition and subtraction, substitution, graphing; exponents, logarithms tables and interpolation.
Prerequisite: MA 120.

PHY 105-F Applied Physics II: Electricity 3—2—4

Basic principles of electricity, types of electricity, and its production, transmission, and transformation. Such factors as the electron theory, electrical measurement, magnetism, electromagnetism, and the magnetic effects of electricity constitute major areas of study.
Prerequisite: PHY 104-F.

ENG 103-F Communicative Skills: Report Writing 3—0—3

Brief review of English grammar, spelling, and punctuation. Concentrated effort will be applied to the fundamentals of good writing; sentence structure, proper development of descriptive reporting, and the mechanics of report construction. Practice in writing letters and various report forms will be given and some time will be devoted to oral speech and note taking.
Prerequisite: ENG 102-F.

DD 107-F Drafting: Trade I 2—3—3

Fundamental drafting principles with instruction and practice in lettering, orthographic projection, working drawings. Introduction to the principles of sectioning, dimensioning, use of drawing instruments and the solution of geometrical problems are covered. This is an introductory course in drafting for students needing a knowledge of drawing principles for reading and describing objects in the graphic language.
Prerequisite: None.

MECH 122 Theory and Practice II 3—8—6

Advanced operations in layout tools and procedures, power sawing, drill press, surface grinder, milling machine and shaper. The student will be introduced to the basic operations on the cylindrical grinder and will select projects encompassing all the operations, tools and procedures thus far used and those to be stressed throughout the course.
Prerequisite: MECH 121.

Third Quarter

MA 123 Mathematics: Machinist I 5—0—5

Fundamental geometric concepts and construction of plane and solid figures, surface and volume measurements, and related problems; introduction to trigonometry of the right triangle. Introduces gear ratio, lead screw and indexing problems with emphasis on application to the machine shop. Practical applications and problems

furnish the trainee with experience in geometric propositions and trigonometric relations to shop problems; concludes with an introduction to compound angle problems.
Prerequisite: MA 120.

DD 108-F Drafting: Trade II 2—3—3

The student continues the study of orthographic projection with emphasis on working drawings, detailing, isometric drawings, oblique drawings and principles of design. Study and practice is provided in elements of increased complexity. Also included is an introduction to fasteners, structures, welds, freehand sketching and schematic diagrams where applicable.
Prerequisite: DD 107-F.

SOC 105 Economics 3—0—3

Designed to help the student understand present day economic problems. Topics include: production, consumption, exchange and distribution, money and credit, business fluctuations, labor and management relations, and challenges to our system of free enterprise.
Prerequisite: None.

PHY 106-F Applied Physics III: Work, Energy, Power 3—2—4

Physical principles of force, energy, work and power; equilibrium and the laws of motion; principles of machines, mechanical advantage, and transmission of power in practical applications and the use of vectors and graphical presentations.
Prerequisites: PHY 104-F, MA 120.

MECH 123 Theory and Practice III 3—8—6

Advanced work on the engine lathe, turning, boring and threading machines, grinders, milling machine and shaper. Introduction to basic indexing and terminology with additional processes on calculating, cutting and measuring of spur, helical, and worm gears and wheels. The trainee will use precision tools and measuring instruments such as vernier height gages, protractors, comparators, etc. Basic exercises will be given on the turret lathe and on the tool and cutter grinder.
Prerequisites: MECH 121, MECH 122.

Fourth Quarter

MA 124-F Mathematics: Machinist II 5—0—5

Fundamental concepts of plane trigonometry. Functions of the acute angle. Functions of any angle. Relationships between the functions. Trigonometric tables. Interpolation. Solution of right triangles. Law of sines. Law of cosines. Solution of oblique triangles. Logarithms. Practice in depth on machine shop problems.
Prerequisite: MA 123.

ENG 104 Communicative Skills: Industrial Communications 3—0—3

Development of trainee's ability to communicate effectively with other individuals through the medium of good language usage in speaking and writing, to think more clearly, and to reason more forcefully in work problems pertaining to his job.
Prerequisite: None.

ISc 101 Industrial Specifications 3—0—3

Organizing and studying machine tool and hand tool specifications, job sheets and procedure sheets. Catalogs, specification sheets, and manufacturer's handbooks serve as reference sources.
Prerequisite: None.

MECH 124 Structure of Metals 3—2—4

Elementary and practical approach to metals, their structure, markings, classifications and uses. Interpretation of properties and specifications of steels by use of manuals, catalogs, charts, etc.
Prerequisite: PHY 104-F.

MECH 125 Theory and Practice IV 3—9—6

Development of class projects using previously learned procedures in planning, blueprint reading, machine operations, final assembly and inspection. Additional processes on the turret lathe, tool and cutter grinder, cylindrical and surface grinder, advanced milling machine operations, etc. Special procedures faithfully and establishing of good work habits and attitudes acceptable to the industry.
Prerequisites: MECH 121, MECH 122, MECH 123.

Fifth Quarter

WELD 101-F Welding: Basic 2—4—3

The various processes used for joining materials by welding are discussed. Lecture, demonstrations and practice cover the oxyacetylene and arc welding processes, filler metals used, gases, currents, weldability of metals. Instruction is given in the set-up and safe operation of oxyacetylene and arc welding apparatus. Students prepare joints by both hand and machine cutting with the oxyacetylene torch.
Prerequisite: None.

DD 123-F Drafting: Blueprint & Shop Sketching 3—0—3

This course is designed to acquaint the student with shop working drawing interpretation as well as shop sketching. The

complexity of the blueprint reading will increase at a rather rapid rate as the Machine Shop student has completed previous courses in drafting. Some of the topics covered will be title block, bill of material, auxiliary section view, sections for complicated interiors, gear drawings, related or supplementary information and an introduction to the reading of jig, fixture and die drawings.
Prerequisite: DD 108-F, DD 107-F.

MECH 126 Heat Treating Practices 2—4—3

Working knowledge of the methods of treating ferrous and nonferrous metals. The effects of hardening, tempering, and annealing upon the structure and physical properties of metals. Trainees will be given the opportunity to acquaint themselves with the equipment and processes of heat treating.
Prerequisite: MECH 124.

MECH 130-F Precision Machines 3—9—6

To develop skills and understanding of machining precision parts by use of cylindrical grinder, use of magnetic sine table in conjunction with surface grainer, use of optical measuring equipment and precision end rods on machines so equipped, and methods and procedures of checking and inspecting precision parts, maintaining good housekeeping, and safe working habits in all phases.

ISc 102 Industrial Organization and Management 3—0—3

Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost.
Prerequisite: None.

Sixth Quarter

SOC 110-F Applied Psychology 3—0—3

A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions, are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None.

MECH 131-F Jig & Fixture Making 3—9—6

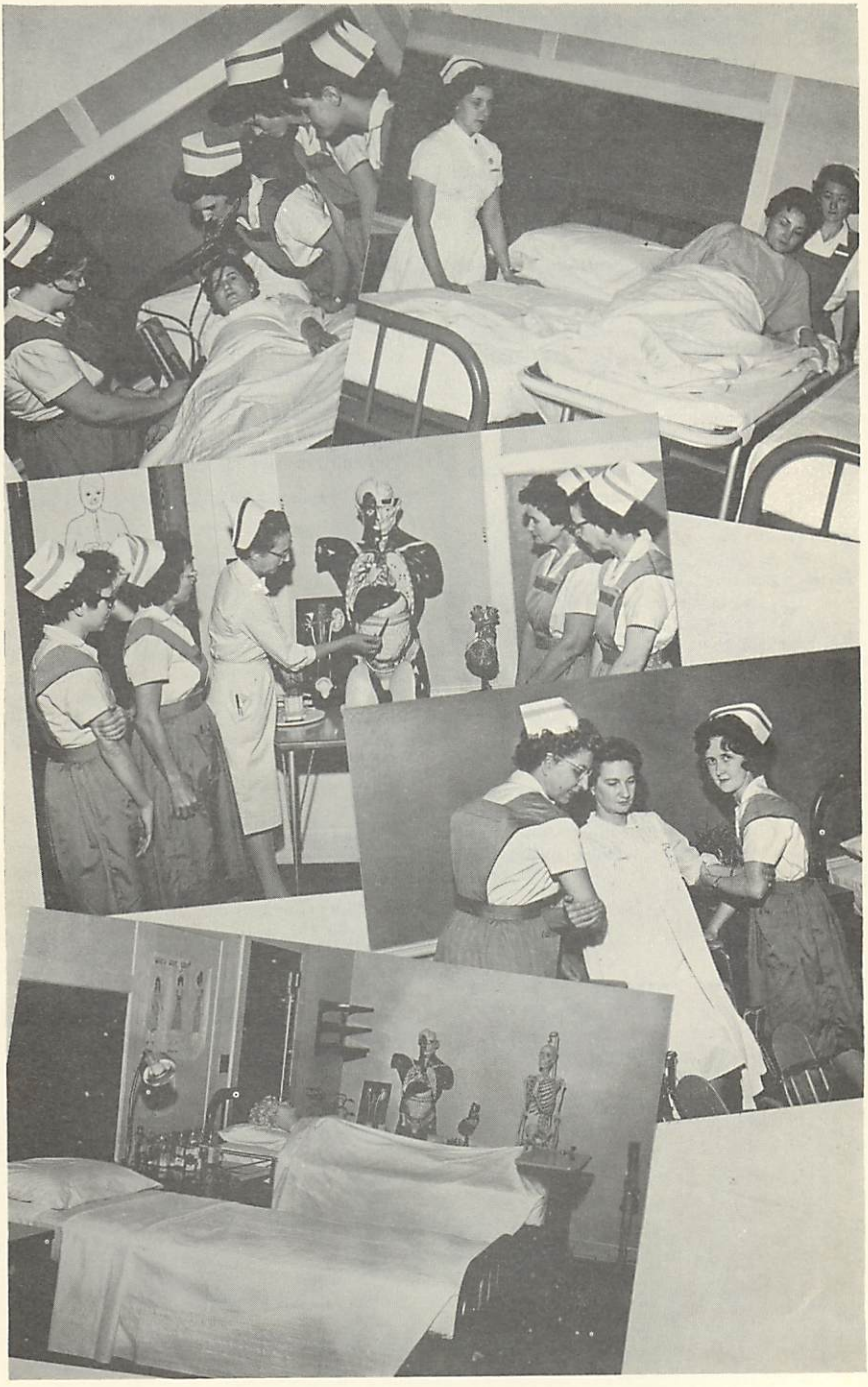
Develop understanding of principle and work of jigs and fixtures. Fabricate simple jigs and fixtures to be used on course projects. Stimulate thinking concerning simplicity and safety features of the job and/or fixture while emphasizing accuracy of parts produced. Develop self confidence and pride in doing highly skilled work.
Prerequisite: MECH 130-F.

MECH 132-F Machine Repair 2—4—3

To acquaint the student with the basic fundamentals of repairing machine tools, emphasis being placed on the machine maintaining its original accuracy. Primary phases of this course will consist of hand scraping, of ways and use of precision straight edge, adjustment and tolerances of headstack bearing fitting and adjustment of gibs, methods of checking for squareness and correct center line distances. Good work habits and workmanship maintained throughout.
Prerequisite: MECH 130-F.

MECH 133-F Advanced Machine Processes 3—6—5

To further acquaint the student with advanced set-ups and operation of machines for mass production. Instruction will be given on the turret lathe, milling machine, cylindrical grinder and other production machines. To motivate the student to apply himself to find ways and means of improving methods of production and manufacturing processes.
Prerequisite: MECH 130-F.



PRACTICAL NURSE EDUCATION

Purpose of Curriculum

The accelerated growth of population in North Carolina and rapid advancement in medical technology demand an increased number of well-trained personnel for health services.

The aim of the Practical Nurse Education Program is to make available to qualified persons the opportunity to prepare for participation in care of patients of all ages, in various states of dependency, and with a variety of illness conditions.

Graduates of accredited programs of practical nurse education are eligible to take the licensing examination given by the North Carolina Board of Nursing. This examination is given twice each year, usually in April and September. A passing score entitles the individual to receive a license and to use a legal title "Licensed Practical Nurse." The license must be renewed annually. The Licensed Practical Nurse can apply for licensure in other states on the basis of a satisfactory examination score, without repeating the examination.

Job Description

Job requirements for the Licensed Practical Nurse include suitable personal characteristics, ability to adapt knowledge and understandings of nursing principles to a variety of situations, technical skills for performance of bedside nursing, appreciation for differences of people and for the worth of every individual, a desire to serve and help others, and readiness to conform to the requirements of nursing ethics and hospital policies.

Throughout the one-year program the student is expected to grow continuously in acquisition of knowledge and understandings related to nursing, the biological sciences, the social sciences and in skills related to nursing practice, communications, interpersonal relations, and use of good judgment.

The LPN is prepared to function in a variety of situations: hospitals of all types, nursing homes, clinics, doctors' and dentists' offices and, in some localities, public health facilities. In all situations the LPN functions under supervision of a registered nurse and/or licensed physician. This supervision may be minimal in situations where the patient's condition is stable and not complex; or it may consist of continuous direction in situations requiring the knowledge and skills of the registered nurse or physician.

PRACTICAL NURSE EDUCATION CURRICULUM

Course No. and Title — First Quarter	C-L-CL-CH
PN 101-F Clinical Nursing	0—0—60—2
PN 105-F Vocational Adjustments I	30—0—0—2
PN 109-F Body Structure & Functions	74—6—0—6
PN 107-F Nursing Skills I	60-60—0—7
PN 110-F Medical & Surgical Nursing I	26—0—0—2
PN 118-F Bacteriology	34—6—0—3
PN 111-F Emergency & Disaster Nursing	12—0—0—1
Total Hours Per Quarter	236-72—60-23

Second Quarter	C-L-CL-CH
PN 102-F Clinical Nursing II	0—0-192—6
MA 101-F Mathematics	33—0—0—3
PN 113-F Foods & Nutrition	36-12—0—4
PN 108-F Nursing Skills II	24-24—0—3
PN 122-F Medical & Surgical Nursing II	46—6—0—4
Total Hours Per Quarter	139-42-192-20

Course No. and Title — Third Quarter	C-L-CL-CH
PN 103-F Clinical Nursing III	0—0-192—6
PN 114-F Care of the Newborn	24—0—0—2
ENG 102-F Communicative Skills: Grammar	33—0—0—3
PN 115-F Communicable Diseases	24—0—0—2
PN 116-F Pediatrics	24—0—0—2
PN 117-F Obstetrics	24—0—0—2
PN 112-F Drugs and Administration	27—9—0—2
Total Hours Per Quarter	156—9-192-19

Fourth Quarter	C-L-CL-CH
PN 104-F Clinical Nursing IV	0—0-288—9
PN 119-F Geriatrics	36—0—0—3
PN 120-F Family Units & Skills	16—0—0—2
PN 121-F Psychiatric Nursing	12—0—0—2
PN 106-F Vocational Adjustments II	24—0—0—2
Total Hours Per Quarter	88—0-288-18

C = Class Hrs. Per Qtr. L = Lab. Hrs. Per Qtr. CL = Clinical Hrs. Per Qtr.
CH = Credit Hrs. Per Qtr.

PRACTICAL NURSE EDUCATION

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

PN 101-F Clinical Nursing 60—2

This part of the training period deals with the actual nursing care given to patients at the hospital in Medical and Surgical Areas.

PN 105-F Vocational Adjustments I 30— — —2

A study of the principles of good personal and vocational behavior of the Practical Nursing student to enable her to work with ease and intelligence with the doctor, professional nurse, patient and allied hospital employees. To stimulate interest of the student in public relations acceptable to health of the community.

PN 109-F Body Structure and Functions 74—6— —6

The course consists of a study of the skeletal structure, muscular construction and location, basic neural paths, functional body organs, glands and the corporate functions of the total human body.

PN 107-F Nursing Skills I 60—60— —7

A course designed to teach the Practical Nursing student the skills and principles needed in the nursing care of the patient. Emphasis is placed on meeting the psychological needs of the patient while performing bedside care and treatments.

PN 110-F Medical and Surgical Nursing I 38— — —3

A course of study to help the Practical Nurse student to acquire knowledge for safely caring for the medical and surgical patient. This course deals with causes and methods of disease, common symptoms of illness, responsibilities of the student caring for patients with cancer, inflammations, allergies and conditions of the circulatory, respiratory and digestive systems.

PN 118-F Bacteriology 34—6— —3

This course is designed to study microorganisms, their incubation period and actions, their relationship to disease. Emphasis is placed on principles of sterile techniques when harmful bacteria are isolated to protect the patient, himself, other patients and medical personnel.

Second Quarter

PN 102-F Clinical Nursing II — — 192—6

This part of the training period deals with actual nursing care given to patients at the hospital in Medical and Surgical Areas, with continued depth training.

PN 111-F Emergency and Disaster Nursing 12— — —1

This course is designed to equip the Nursing student with ability to apply first aide in an emergency or disaster in a home, hospital or community, to recognize shock and its symptoms and to care for the patient in any emergency situation until the proper authority arrives.

MA 101-F Mathematics 33— — —3

Basic arithmetic procedures: addition, subtraction, multiplication, division, common fractions, decimal fractions, percentages, ratio and proportion, Roman numerals. Metric and apothecaries systems of weights and measures. Fahrenheit and Centigrade scales Solutions and dosages.

PN 113-F Foods and Nutrition 36—12— —4

This course is designed to study processes by which the living organism receives and utilizes materials necessary for the maintenance, growth and renewal of its components. It also deals with special diets needed to patients as part of the treatment of specific diseases.

PN 108-F Nursing Skills II 24—24— —3

A course designed as a continuation of Nursing Skills I in which the student has more practice with the skills and principles in the techniques needed in the nursing care of the patient.

PN 122-F Medical and Surgical Nursing II 34—6— —3

A course of study to help the Practical Nurse student to acquire knowledge for safely caring for the medical and surgical patient. This course deals with patients with diseases of the skeletal, muscules, endocrine, genitourinary, reproductive, nervous systems, conditions of the eye, ear, skin and female breast conditions.

Third Quarter

PN 103-F Clinical Nursing III — — 192—6

This part of the training period deals with actual nursing care experience in the Obstetrical, Nursery and Pediatric areas of the hospital.

PN 114-F Care of the Newborn 24— — —2

This course deals with the newborn child, admission to the nursery, care while in the nursery and techniques involved in care of premature infants and newborn anomalies.

ENG 102-F Communicative Skills: Grammar 33— — —3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis of grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.

PN 115-F Communicable Diseases 24— — —2

This course is designed to acquaint the Practical Nursing student with common diseases which may be transmitted from one person to another and to teach asepsis isolation technique and the prevention of communicable diseases.

PN 116-F Pediatrics 24— — —2

This course deals with the care of the sick child including premature outside the nursery congenital anomalies, infectious diseases, treatment and nursing care.

PN 117-F Obstetrics 24— — —2

A study of human reproduction specifically as it deals with the female role in conception, pregnancy, labor and the postpartum period.

PN 112-F Drugs and Administration 27—9— —2

A course designed to give the student a knowledge of drugs, the danger involved in handling, laws regarding the use of drugs, side effects and skills in administering common drugs intelligently and safely.

Fourth Quarter

PN 104-F Clinical Nursing IV — — 288—9

This part of the training period deals with actual nursing care experiences in the recovery room area, in a nursing home and also in a re-rotaturn experience in Medical, Surgical, Pediatric, and Obstetrical areas.

PN 119-F Geriatrics 36— — —3

This course is designed to help the student acquire the knowledge of principles involved and skills in applying these principles to attain proficiency in good nursing care of the aged.

PN 120-F Family Units and Skills 16— — —2

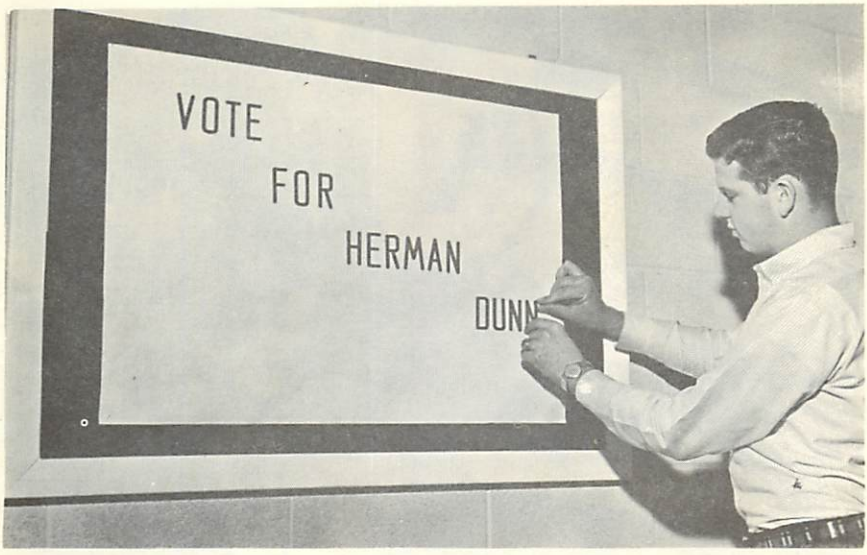
A course designed to acquaint the Practical Nursing student with skills in general home management and family care in home illnesses. Room lighting and ventilation, isolation of other family members and related areas are covered also.

PN 121-F Psychiatric Nursing 12— — —2

This course deals with the study of personality maladjustments and seeks to acquaint the Practical Nursing student with its principles and the methods of understanding and assisting in handling patients with these emotional problems.

PN 106-F Vocational Adjustments II 24— — —2

A study of the knowledge of ethics for obtaining and holding a position, the responsibility of the Practical Nurse to her patient and employer and the legal aspects of nursing.



ELECTION

END OF DAY

RADIO AND TELEVISION SERVICING

Purpose of Curriculum

Within recent years improved electronic techniques have provided expanded entertainment and educational facilities in the form of monochrome and color television, frequency modulated radio, high fidelity amplifiers and stereophonic sound equipment. These developments require expanded knowledge and skill of the individual who would qualify as a competent and up-to-date serviceman.

This curriculum guide provides a training program which will provide the basic knowledge and skills involved in the installation, maintenance and servicing of radio, television and sound amplifier system. A large portion of time is spent in the laboratory verifying electronic principles and developing servicing techniques.

Job Description

A radio and television serviceman may be required to install, maintain and service amplitude modulated and frequency modulated home and auto radios, transistorized radios, monochrome and color television sets, intercommunication, public address and paging systems, high fidelity and sterephonic amplifiers, record players and tape recorders.

His work will require meeting the public both in the repair shop and on service calls. A serviceman who establishes his own business will also need to know how to maintain business records and inventory.

RADIO AND TELEVISION TRADE CURRICULUM

Course No. and Title — First Quarter	C-L-CH
MA 301-F Technical Mathematics I	5—0—5
ENG 102-F Communicative Skills: Grammar	3—0—3
PHY 301-F Physics: Properties of Matter	3—2—4
ELEC 110-F Electricity: Direct Current	3—6—6
DD 107-F Drafting: Trade I	2—3—3
	16–11–21

Second Quarter	C-L-CH
MA 302-F Technical Mathematics II	5—0—5
ENG 103-F Communicative Skills: Report Writing	3—0—3
PHY 302-F Physics: Work, Energy, Power	3—2—4
ELEC 111-F Electricity: Alternating Current	3—6—6
DD 108-F Drafting: Trade II	2—3—3
	16–11–21

Third Quarter	C-L-CH
MA 303-F Technical Mathematics III	5—0—5
SOC 105 Economics	3—0—3
PHY 304-F Physics: Light and Sound	3—2—4
ELN 112-F Electronics I	3—6—6
	14—8–18

Course No. and Title — Fourth Quarter	C-L-CH
MA 304-F Technical Mathematics IV	3—0—3
ENG 104 Communicative Skills: Industrial Comm.	3—0—3
ELN 122 Vacuum Tubes & Circuits	5—8—9
ELN 123 Amplifier Systems	2—6—4
	13–14–19

Fifth Quarter	C-L-CH
ELN 125 Radio Receiver Servicing	2—6—5
ELN 126 Transistor Theory & Circuits	5—4—7
ELN 127 TV Receiver Circuits & Servicing I	3—6—6
ISc 102 Industrial Organization & Management	3—0—3
	13–16–21

Sixth Quarter	C-L-CH
SOC 110-F Applied Psychology	3—0—3
ELN 128 TV Receiver Circuits & Servicing II	4–10—9
ELN 129 Single Side-band Systems	3—2—4
ELN 130 Two-way Mobile Maintenance	2—4—4
	12–16–20

C = Class Hrs. Per Wk. L = Lab Hrs. Per Wk. CH = Credit Hrs. Per Qtr.

*Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

RADIO AND TELEVISION SERVICING

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 301-F Technical Mathematics I **5—0—5**

The real number system is developed as an extension of natural numbers, integers, and rational numbers. Insight into the processes of arithmetic and algebra is provided. Additional topics include sets, equations, number bases, number lines, coordinate systems, trigonometry of the right triangle, vectors, dimensional analysis and the derivative.
Prerequisite: None.

ENG 102-F Communicative Skills: Grammar **3—0—3**

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis of grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.
Prerequisite: None.

PHY 301-F Physics: Properties of Matter **3—2—4**

A fundamental course covering several basic principles of physics. The divisions included are solids and their characteristics, liquids in motion, gas laws and applications. Laboratory experiments and specialized problems dealing with these topics are part of this course.
Prerequisite: None.

ELEC 110-F Electricity: Direct Current **3—6—6**

Basic electricity subjects include: structure of matter, electrical terminology and symbols, electron theory of current flow, magnets and magnetic fields. Rigorous mathematical analysis of direct current resistive circuits. Ohm's Law, Kirchhoff's Laws, Thevenin's Theorem, Norton's Theorem, the Superposition Principle and loop current methods. Solution of complex resistive networks. Fundamental principles of inductors, capacitors, and time constants circuits are introduced.
Prerequisite: None.

DD 107-F Drafting: Trade I **2—3—3**

Fundamental drafting principles with instruction and practice in lettering, orthographic projection, working drawings. Introduction to the principles of sectioning, dimensioning, use of drawing instruments and the solution of geometrical problems are covered. This is an introductory course in drafting for students needing a knowledge of drawing principles for reading and describing objects in the graphic language.
Prerequisite: None.

Second Quarter

MA 302-F Technical Mathematics II **5—0—5**

Algebraic operations are applied to linear, quadratic, and polynomial functions and special equations of second degree. Complex numbers are introduced and the study of the derivative is continued. Selected applications involving rates of change, maxima and minima, approximation, areas and volumes are considered.
Prerequisite: MA 301.

ENG 103-F Communicative Skills: Report Writing **3—0—3**

Brief review of English grammar, spelling, and punctuation. Concentrated effort will be applied to the fundamentals of good writing; sentence structure, proper development of descriptive reporting, and the mechanics of report construction. Practice in writing letters and various report forms will be given and some time will be devoted to oral speech and note taking.
Prerequisite: ENG 102-F.

PHY 302-F Physics: Work, Energy, Power **3—2—4**

Major areas covered in this course are work, energy, and power. Instruction includes such topics as statics, forces, center of gravity, and dynamics. Units of measurement and their applications are a vital part of this course. A practical approach is used in teaching students the use of essential mathematical formulas.
Prerequisite: MA 301.

ELEC 111-F Electricity: Alternating Current **3—6—6**

Alternating current and voltage: alternating current theory. Mathematical analysis is made of both sine and non-sine wave forms. Inductive reactance, capacitive reactance, and impedance characteristics of alternating current circuits are investigated. The use of vector and complex numbers in circuit impedance. Series and parallel resonant circuit conditions are compared and practical application of these conditions explained.
Prerequisite: ELEC 310, MA 301, PHY 301.

DD 108-F Drafting: Trade II 2—3—3

The student continues the study of orthographic projection with emphasis on working drawings, detailing, isometric drawings, oblique drawings and principles of design. Study and practice is provided in elements of increased complexity. Also included is an introduction to fasteners, structures, welds, freehand sketching and schematic diagrams where applicable.
Prerequisite: DD 107-F.

Third Quarter

MA 303-F Technical Mathematics III 5—0—5

Ideas of algebra are used in a study of trigonometric logarithmic and exponential functions. Selected applications of calculus reinforce this approach. Polar coordinates are introduced and their applications expanded. Complex numbers, vectors, coordinate systems and their applications constitute other areas of study.
Prerequisite: MA 302.

SOC 105 Economics 3—0—3

Designed to help the student understand present day economic problems. Topics include: production, consumption, exchange and distribution, money and credit, business fluctuations, labor and management relations, and challenges to our system of free enterprise.
Prerequisite: None.

PHY 304-F Physics: Light and Sound 3—2—4

A study of sound and wave motion and its technical applications to industry and related fields. Light and illumination. Principles of optical instruments. Practical aspects are emphasized.

ELN 112-F Electronics I 3—6—6

A treatment of electron tubes, semi-con-
Prerequisite: MA 301.

ductors and their associated circuitry; thermionic emission; diode, triode, tetrode and pentode characteristics. Theory of semiconductor diode and transistor operation is studied in detail. Application of vacuum tubes and semi-conductors in power supplies, voltage amplifiers, power amplifiers, and the advantages and disadvantages of each considered.
Prerequisites: ELEC 310, MA 301, PHY 301.

Fourth Quarter

MA 302-F Technical Mathematics IV 3—0—3

A further study of analytical geometry, algebra, and calculus: the binomial expansion, arithmetic and geometric progressions, polynomial functions and methods of solution, integration techniques and use of integral tables, polar equations, and an introduction to solid analytical geometry.
Prerequisite: MA 303.

ENG 104 Communicative Skills: Industrial Communications 3—0—3

Development of trainee's ability to communicate effectively with other individuals through the medium of good language usage in speaking and writing, to think more clearly, and to reason more forcefully in work problems pertaining to his job.
Prerequisite: None.

ELN 122 Vacuum Tubes & Circuits 5—8—9

An introduction to vacuum tubes and their development; the theory, characteristics and operation of vacuum diodes, semi-conductor diodes, rectifier circuits, filter circuits, triodes and simple voltage amplifier circuits.
Prerequisite: ELEC 122 MA 125.

ELN 123 Amplifier Systems 2—6—4

An introduction of commonly used servicing techniques as applied to monophonic and stereophonic high fidelity amplifier systems and auxiliary equipment. The operation and servicing of inter-communication amplifiers and switching circuits will also be taught.
Prerequisites: MA 125, ELEC 122.

Fifth Quarter

ELN 125 Radio Receiver Servicing 2—6—5

Principles of radio reception and practices of servicing; included are block diagrams of radio receivers, servicing techniques of AM and FM receivers by resistance measurements, signal injection, voltage analysis, oscilloscope methods of locating faulty states and components and the alignment of AM and FM receivers.
Prerequisite: ELN 122, ELN 123.

ELN 126 Transistor Theory & Circuits 5—4—7

Transistor theory, operation, characteristics and their application to audio and radio frequency amplifier and oscillator circuits.
Prerequisite: ELN 123.

ELN 127 TV Receiver Circuits & Servicing I 3—6—6

A study of principles of television receivers, alignment of radio and intermediate frequency amplifiers, adjustment of horizontal and vertical sweep circuits will be taught. Techniques of troubleshooting and repair of

TV receivers with the proper use of associated test equipment will be stressed. Additional study of more specialized servicing techniques and oscilloscope waveform analysis will be used in the adjustment, trouble-shooting and repair of the color television circuits.
Prerequisites: ELN 125, ELN 126.

ISc 102 Industrial Organization and Management **3—0—3**

Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost.
Prerequisite: None.

Sixth Quarter

SOC 110-F Applied Psychology **3—0—3**

This course studies the procedures of building an efficient enthusiastic business team and deals with the nature of the problems which arise in business organizations. The individual and his behavior are discussed, as well as the problems of influence and authority.
Prerequisite: None.

ELN 128 TV Receiver Circuits and Servicing II **4—10—9**

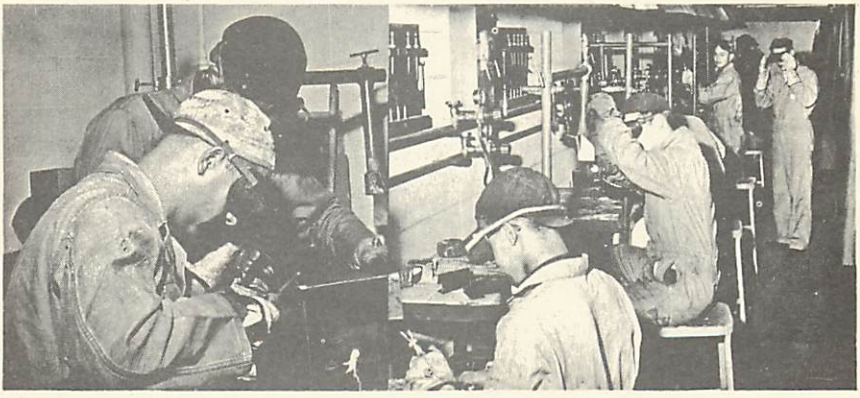
This course, taught in conjunction with an elective, will be a shortened version of ELN 127.
Prerequisites: ELN 125, ELN 126.

ELN 129 Single Side-band Systems **3—2—4**

An introductory course of single side-band transmission system with carrier frequency or without and the associated balanced modulator of phasing system used to produce this type of transmission. Time will be allotted also to the necessary circuitry in the receiver to receive this type transmission.
Prerequisites: ELN 125, ELN 126.

ELN 130 Two-way Mobile Maintenance **2—4—4**

A course to acquaint the student with the theory and maintenance of fixed station and mobile station transmitters and receivers. Except for radio laws, sufficient information will be given to qualify the student to take the FCC second class radio-telephone license examination.
Prerequisites: ELN 125, ELN 126.



WELDING

Purpose of Curriculum

This curriculum was developed to fill the tremendous need for weldors in North Carolina. The recently completed Manpower Survey shows quite clearly that many weldors will be needed annually to fill present and projected vacancies in the State.

The content of this curriculum is designed to give students sound understanding of the principles, methods, techniques and skills essential for successful employment in the welding field and metals industry.

The field of welding offers a person prestige, security and a future of continuous employment with steady advancement. It offers employment in practically any industry: shipbuilding, automotive, aircraft, guided missiles, railroads, construction, pipe fitting, production shop, job shop and many others.

Job Description

Weldors join metals by applying intense heat, and sometimes pressure, to melt the edges to form a permanent bond. Closely related to welding is "oxygen cutting." Of the more than 35 different ways of welding metals, arc, gas, and resistance welding are the three most important.

The principle duty of the weldor using manual techniques is to control the melting by directing the heat, from either an electric arc or gas welding torch, and to add filler metal where necessary to complete the joint. He should possess a great deal of manipulative skill with a knowledge of jigs, welding symbols, mathematics, basic metallurgy, and blueprint reading.

WELDING TRADE CURRICULUM

Course No. and Title — First Quarter	C-L-CH
MA 120 Mathematics: Fundamentals	5—0—5
MECH 124 Structure of Metals	3—2—4
DD 122 Blueprint Reading I	2—3—3
WELD 110 Hand and Power Tools	0—3—1
WELD 120 Oxyacetylene Welding & Cutting	3—9—6
	13–17–19

Second Quarter	C-L-CH
MA 121 Geometry	3—0—3
ISc 102 Industrial Organization & Management	3—0—3
ENG 102-F Communicative Skills: Grammar	3—0—3
DD 127 Blueprint Reading II	1—3—2
ELEC 117 Basic Electricity	3—0—3
WELD 111 Arc Welding	3–12—7
	16–15–21

Course No. and Title — Third Quarter	C-L-CH
SOC 110-F Applied Psychology	3—0—3
WELD 112 Mechanical Testing & Inspection	0—6—3
WELD 113 Inert Gas Welding	1—3—2
WELD 114 Introduction to Pipe Welding	3–11—7
	7–20–15

Fourth Quarter	C-L-CH
WELD 120-F Metal Forming & Shaping	1—6—3
WELD 121-F Certification Practices	3—6—4
WELD 122-F Commercial & Industrial Practices	2–12—6
	6–24–13

C = Class Hrs. Per Wk. L = Lab Hrs. Per Wk. CH = Credit Hrs. Per Qtr.

*Electives: Student schedule, including electives, not to exceed 30 contact hours per week.

WELDING

COURSE DESCRIPTIONS BY QUARTERS

First Quarter

MA 120 Mathematics: Fundamentals 5—0—5

Practical number theory. Analysis of basic operations: addition, subtraction, multiplication and division. Fractions, decimals, powers and roots, percentages, ratio and proportion. Plane and solid geometric figures used in industry; measurement of surfaces and volumes. Introduction of algebra used in trades. Practice in depth.
Prerequisite: None.

MECH 124 Structure of Metals 3—2—4

Elementary and practical approach to metals, their structure, markings, classifications and uses. Interpretation of properties and specifications of steels by use of manuals, catalogs, charts, etc.
Prerequisite: None.

DD 122 Blueprint Reading I 2—3—3

Interpretation and reading of blueprints. Information on the basic principles of the blueprint; lines, views, dimensioning procedures and notes.
Prerequisite: None.

WELD 110 Hand and Power Tools 0—3—1

Designed to introduce the students to the correct use of hand tools found in the metalworking industry. Demonstrations show the proper procedure and safe use of power tools used in the welding and metal shop. Each student is required to complete a series of small projects utilizing hand and power tools.
Prerequisite: None.

WELD 120 Oxyacetylene Welding and Cutting 3—9—6

Introduction to the history of oxyacetylene welding, the principles of welding and cutting, nomenclature of the equipment, assembly of units. Welding procedures such as practice of puddling and carrying the puddle, running flat beads, butt welding in the flat, vertical and overhead position, brazing, hard and soft soldering. Safety procedures are stressed throughout the program of instruction.
Prerequisite: None.

Second Quarter

MA 121 Geometry 3—0—3

Fundamental properties and definitions; plane and solid geometric figures, selected general theorems, geometric construction of lines, angles and plane figures. Dihedral angles, areas of plane figures, volumes of solids. Geometric principles are applied to shop operations.
Prerequisite: None.

ISc 102 Industrial Organization and Management 3—0—3

Methods, techniques, and practices of modern management in planning, organizing and controlling operations of a manufacturing concern. Introduction to the competitive system and the factors constituting product cost.
Prerequisite: None.

ENG 102-F Communicative Skills: Grammar 3—0—3

Designed to aid the student in the improvement of self-expression in business and technical composition. The approach is functional with emphasis on grammar, diction, sentence structure, punctuation, and spelling. Intended to stimulate students in applying the basic principles of English grammar in their day-to-day situations in industry and social life.

DD 127 Blueprint Reading II 1—3—2

A thorough study of trade drawings in which welding procedures are indicated. Interpretation, use and application of welding symbols, abbreviations, and specifications.
Prerequisite: DD 122.

ELEC 117 Basic Electricity 3—0—3

Study of the basic theories of electricity, types of electricity, methods of production, and the transmission and transforming of electricity. The course includes the following topics: electron theory, electricity by chemical action, friction and magnetism, induction, voltage, horsepower, amperage, wattage, transformers, wiring, and resistance.
Prerequisite: None.

WELD 111 Arc Welding 3—12—7

The operation of A. C. transformers and D. C. motor generator arc welding sets. Studies are made of welding heats, polarities, and electrodes for use in joining various metal alloys by the arc welding process. After the student is capable of running beads, butt and fillet welds in all positions are made and procedures are emphasized throughout the course.
Prerequisite: WELD 110.

Third Quarter

SOC 310 Applied Psychology 3—0—3

A study of the principles of psychology that will be of assistance in the understanding of inter-personal relations on the job. Motivation, feelings and emotions, are considered with particular reference to on-the-job problems. Other topics investigated are: employee selection, supervision, job satisfaction, and industrial conflicts. Attention is also given to personal and group dynamics so that the student may learn to apply the principles of mental hygiene to his adjustment problems as a worker and a member of the general community.
Prerequisite: None.

WELD 112 Mechanical Testing and Inspection 0—6—3

The standard methods for mechanical testing of welds. The student is introduced to the various types of tests and testing procedures and performs the details of the test which will give adequate information as to the quality of the weld. Types of tests to be covered are: bend, destructive, free-bend, guided-bend, nick-tear, notched-bend, tee-bend, nondestructive, V-notch, Charpy impact, etc.
Prerequisite: WELD 111.

WELD 113 Inert Gas Welding 1—3—2

Introduction and practical operations in the use of inert-gas-shield arc welding. A study will be made of the equipment, operation, safety and practice in the various positions. A thorough study of such topics as: principles of operation, shielding gases, filler rods, process variations and applications, manual and automatic welding.
Prerequisite: WELD 112.

WELD 114 Introduction to Pipe Welding 3—11—7

Designed to provide practice in the welding of pressure piping in the horizontal, vertical, and horizontal fixed positions using shielded metal arc welding processes according to Section IX of the ASME code.
Prerequisite: WELD 111.

Fourth Quarter

WELD 120-F Metal Forming and Shaping 1—6—3

Methods used in layout of sheet steel: cutting, forming and shaping to achieve a finished product. Emphasis is placed on the study of how to visualize an object from a blueprint and proceed through all the operations necessary to produce the completed object.

WELD 121-F Certification Practices 3—6—4

This course involves practice in welding materials to meet certification standards. The student uses the guided bend test and the tensile strength test to check the quality of his work. Emphasis is placed on attaining skill in producing quality welds.

WELD 122-F Commercial and Industrial Practices 2—12—6

Designed to build skills through practices in simulated industrial processes: Design, sketch, laying out in paper the steps of procedures necessary to build the product, then actually building the product himself.