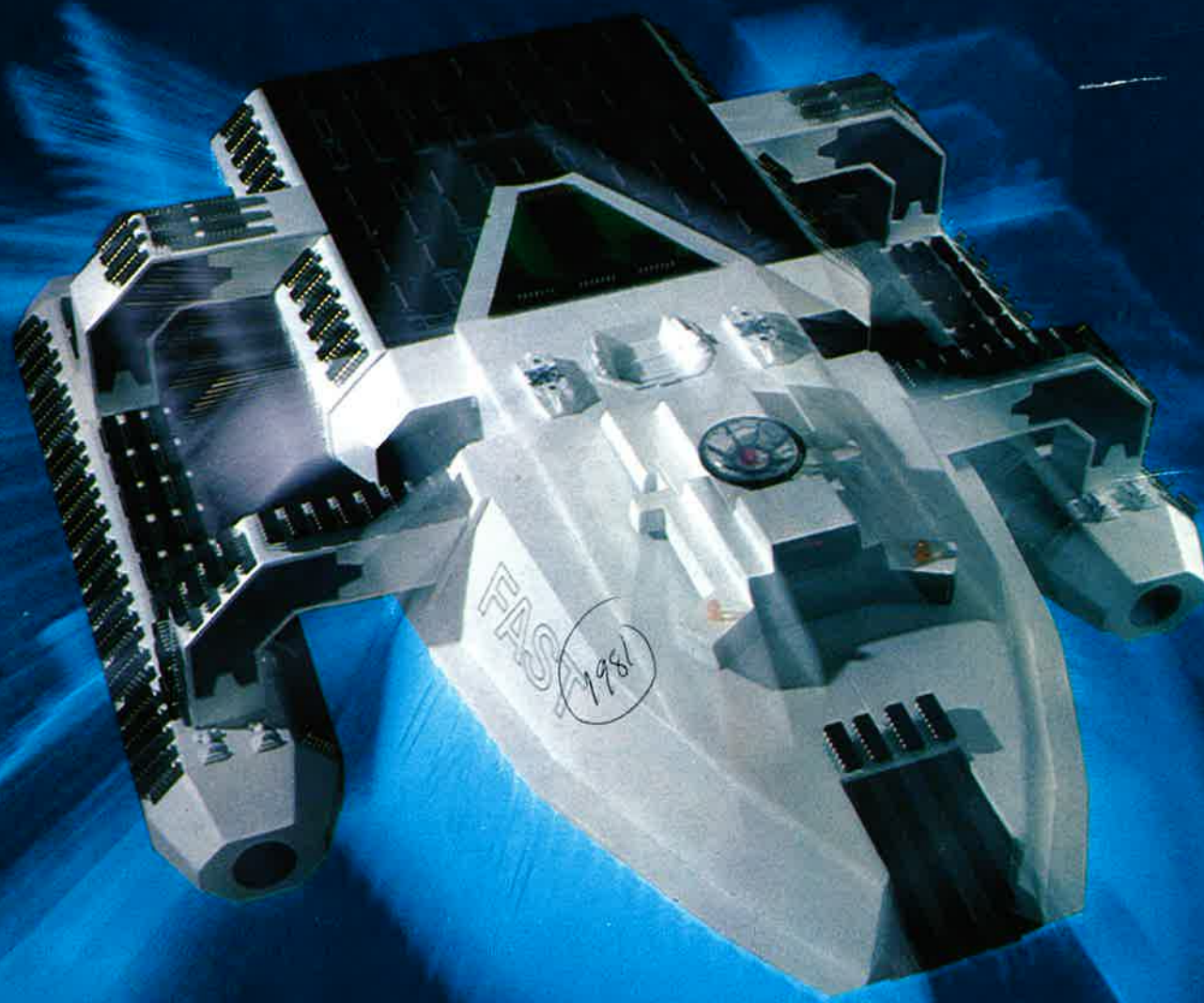


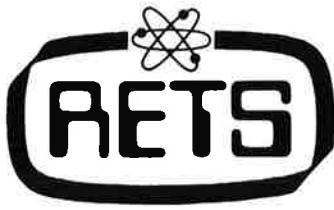
1981



# Electronic Schools

## General Information Catalog

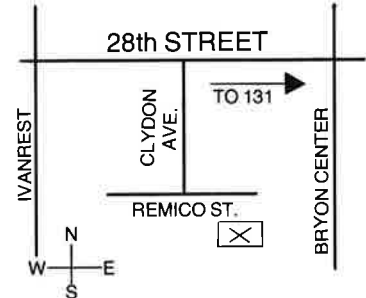




# Electronic Schools



A DIVISION OF: NATIONAL EDUCATION  
AN INTERNATIONAL TRAINING CORPORATION



**2620 REMICO ST. S.W.  
WYOMING, MICHIGAN 49509  
(616) 538-3170**

The above picture is our brand new RETS school which was built and occupied in late 1980. The 12,000 square foot fully air-conditioned building has six administrative offices, six large classrooms for theory and laboratory, and a library. With an average class size of 35 students, the planned enrollment capacity is 600 students. Ample parking space is provided adjacent to the building.



### **LeRoy Broesder — Director—Wyoming**

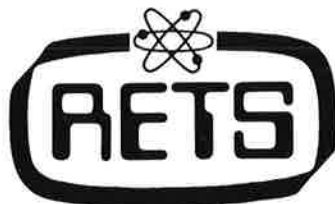
Mr. Broesder brings to his post as school Director, over 25 years of service at the Spartan School of Aeronautics in Tulsa, Oklahoma. Advancing from student to instructor to various positions culminating in the presidency of the school, Mr. Broesder was separated only briefly for military service in the Korean war and work with American Airlines as a flight engineer. He is heavily involved in community activities with memberships in several technical societies. He is married and the father of two children.

## **ADMINISTRATION**

School Director .....	LeRoy H. Broesder
Placement Director .....	Yvonne Wyngarden
Financial Aid Manager .....	Lee Anne Schuler
Office Manager .....	Terry Lenglet

## **ACCREDITATIONS**

RETS is an accredited member of the National Association of Trade and Technical Schools, and also a member of the Michigan Organization of Private Vocational Schools. RETS' courses are approved by the Michigan State Board of Education. RETS is approved for the training of eligible veterans (G.I. Bill) and is authorized by Federal law to enroll non-immigrant alien students.



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*COVER PHOTO: We thank Fairchild Camera and Instrument Corporation, 464 Ellis Street, Mountain View, California, for the use of their interesting photo concept. The electronic devices on the sides and top of the space ship are Fairchild's new family of digital integrated logic circuits. The space ship model was used to dramatize the increased speed of these circuits. We feel that this picture also conveys the importance of electronics in our present and future lives.*



## **R. Wayne Gilpin — President**

Named President of RETS Electronic Schools in March of 1979, Mr. Gilpin has extensive business and management experience in advertising, government, and sales. A native of Maryland and a graduate of the University of Maryland, he has spent the past 10 years in the technical and vocational education industry. Before coming to RETS, he served as the Marketing Director and Vice President of Spartan School of Aeronautics. In addition to his present responsibilities, Mr. Gilpin is a Vice President of National Education, the parent corporation of both RETS and Spartan. A tennis buff, he is the father of three children and is active in various community activities.

It is my pleasure to introduce you to the RETS Electronic Schools. We are proud of the contributions that our schools have made to the American electronics industry since 1935. RETS graduates have assumed positions of leadership and responsibility and have even been pioneers in radio, television, industrial electronics and telecommunications.

However, the future of this exciting industry is just beginning. Electronics and computers are effecting fundamental changes in America that will resemble the industrial revolution of the early 1900's. The progress in electronics during RETS' history has been startling as it has moved into virtually every facet of our lives. This will continue and grow as the incredible abilities of electronics are being applied to medicine, home entertainment, robots, vehicles, and space travel.

Ten years ago we marveled at computers the size of a room that would digest, retain, and remit vast volumes of information. Today, computers costing less than 1/10 of their predecessors and the size of a television set can considerably outperform their ancestors. There are now even operational computers you can hold in the palm of your hand.

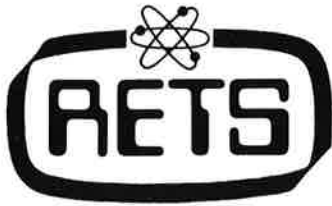
Electronics and computers will be an increasingly vital part of our world for the foreseeable future as they contribute to improving our quality of life. There is little doubt that a secure future will belong to those who are part of the electronic-computer world.

If it is your intent to be a part of that future, then we suggest you consider a RETS education as your key to that opportunity.

The benefits of the experience, knowledge and proud successful history of RETS can be yours if you meet our entrance standards and are willing to apply yourself. I encourage you to read this catalog and give serious consideration to joining the over 45,000 RETS graduates in this exciting field. Our staff will be glad to provide you with any information you may need. I wish you every success.

Sincerely

R. Wayne Gilpin  
President  
RETS Electronic Schools



# Electronic Schools



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AN INTERNATIONAL TRAINING CORPORATION



## Mike Mikhail — Vice President—Finance

Mr. Mikhail, an Egyptian whose real first name is Mohsen, joined RETS Schools in 1978 as Controller. Mike acquired his B.A. in accounting from the University of Cairo and his M.B.A. from Eastern Michigan University. After working for major accounting firms, he became the Accounting Manager for the University of Detroit. He then served as Business Manager for Detroit Institute of Technology before coming to RETS. In addition to being the chief financial officer for RETS, Mike continues to serve as a consultant to other educational and business institutions. Married and the father of two children, Mike relaxes by playing backgammon.



## Glenn Wisniewski — Director of Education

Mr. Wisniewski is recognized as one of the outstanding educational experts in "state of the art" electronics. A graduate of Air Force Electronic Schools, RETS, and Siena Heights College, he is responsible for the constant updating of the RETS curriculum to stay current with the latest developments in electronics. Glenn also maintains constant contact with electronic industry personnel to determine their needs, enabling him to develop curricula that assure RETS graduates are well prepared to enter the industry. An avid sports enthusiast, he is married and the father of three children.



## Mike Golden — Director of Research

Mr. Golden is a RETS graduate with unique electronics skills. He has designed and built electronic equipment in use all over the world and is the inventor of the "analog-digilab," a piece of equipment which has become an integral part of electronics education at all RETS schools. Mike maintains a research lab to help him keep current with the latest developments in electronic technology. His efforts enable RETS students to stay abreast with "state of the art" electronics. Mr. Golden is married and the father of two children. His hobby is designing and building custom furniture.



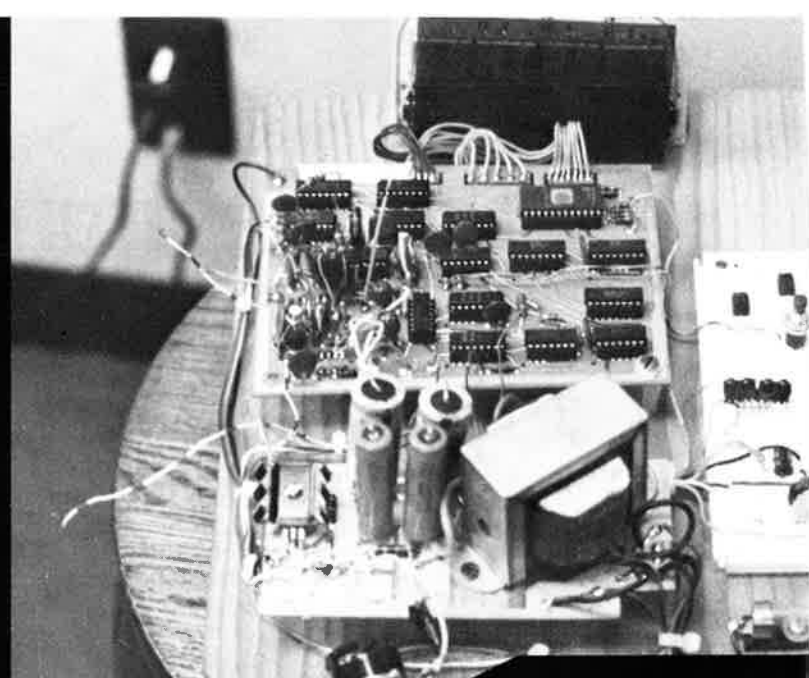
## Thomas DeCoopman — National Sales Manager

Mr. DeCoopman has a degree in Legal Technology and is a graduate of the University of Detroit in Business Administration. His background includes sales, administration, and public service. He also serves as a City Councilman with the city of East Detroit, Michigan. Married with two children, his hobbies include reading, boating, ice hockey and tennis.

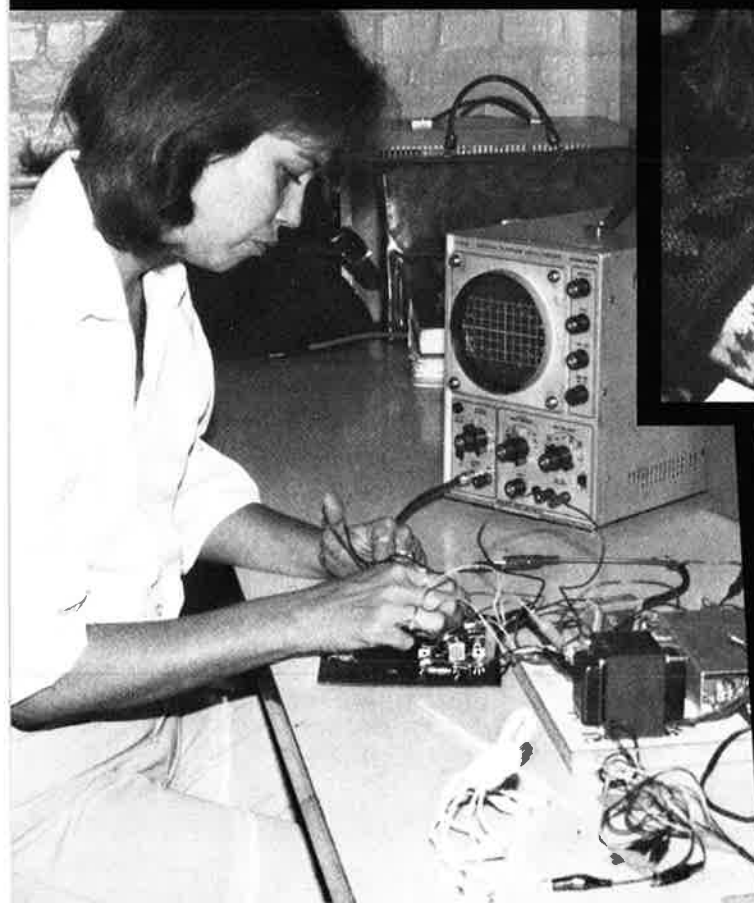


## Norbert H. Opyd — Director of Operations

Mr. Opyd joined RETS in early 1980 and has extensive experience in operations and administration with major corporations such as ITT and LTV. He is an alumnus of the United States Military Academy and the University of Chicago, and holds an MBA with dual emphasis in Computer Science and Personnel Administration. Norb is active in youth programs and enjoys outdoor sports. He is married and has a teenage son.



# Electronic Schools



# ADMISSIONS POLICIES AND PROCEDURES

The Admissions Policies of RETS Electronic Schools are within the guidelines recommended by the National Association of Trade and Technical Schools and by the various state approval agencies where RETS schools are located. They are consistent with the vocation oriented philosophy of our Schools. Viable options are provided for conditional admission to those who desire an electronics vocation, but do not meet the formal requirements for admission.

## ADMISSION REQUIREMENTS

To be admitted for training, you must have a high school diploma or its generally recognized equivalent (GED). In addition, you must achieve a satisfactory score on an entrance examination. The entrance examination used by RETS consists of the Numerical Ability and Mechanical Reasoning sections of the Differential Aptitude Test (DAT). If you do not have a high school diploma or GED, you may be admitted on a conditional basis, if your high school class has graduated, by passing the Entrance Examination and agreeing to obtain a GED prior to entering the third quarter of training. If you do not have a GED prior to entering the third quarter, your training will be discontinued until such time as you obtain a GED. *(NOTE: For admission requirements for the Cable Television Installer, High School Honors, and Continuing Education programs, refer to the course outlines for these programs).*

## ADMISSION REQUIREMENTS FOR INTERNATIONAL STUDENTS

Special admission policies for international students follow. More detailed information may be obtained from the Admissions Department.

1. Because of problems with foreign currency exchange, you should have sufficient funds available to cover the cost of tuition, fees, and living expenses prior to starting school.
2. You must have obtained a minimum score of 425 on the TOEFL (Test of English as a Foreign Language).
3. You must have the equivalent of a U.S. high school education. Proof of educational background should be sent with your application but must be submitted to RETS prior to your formal acceptance and issuance of your I20 Certificate of Eligibility.

## CREDIT FOR PREVIOUS TRAINING OR EXPERIENCE

Students who have previous training or experience will be thoroughly tested upon entrance and will be advanced to the highest level of a program for which they can qualify. Tuition will be pro-rated for the credit allowed. A student who wishes to advance a quarter must do so within the first week of that quarter.

## TUITION

Tuition varies from program to program depending upon its length and operation cost. A separate schedule of tuition, reservation fees, laboratory fees and estimates of books and equipment are included with this bulletin as a supplement. Tuition for audit subjects will be the same as the regular fee.

## CANCELLATION AND REFUND POLICY

Cancellation and Refund Policies vary from state to state due to differing laws and regulations. For a detailed explanation of these policies, ask for a copy of the Enrollment Agreement for your desired program.

# ACADEMIC POLICIES AND PROCEDURES

## ATTIRE

As we are training you for a career in electronics, we expect you to come to School dressed as you would for your future career. Students are often sent directly from the School to an employment interview— the way you look is important.

Prospective employers frequently visit the School to interview graduating seniors. It is important for all of us to create a good impression; therefore, the School requires that the student refrain from wearing tank tops, shorts, hats or any other unconventional attire during class.

## ATTENDANCE

RETS believes that regular and punctual attendance is important to a high standard of work. In order to further this belief, the Office of the Director of Education has established the rule that all students must be in attendance a minimum of 90% of the scheduled class time. Any student whose attendance falls between 80% and 90%, regardless of grades, is liable for (1) an interruption for unsatisfactory attendance, (termination), (2) recycling, or (3) probation. A student who misses more than 20% of the scheduled class time will not be permitted to enter the next quarter of training and must recycle. All students are required to take a report to their instructor after each absence. A student will be classified as terminated after five consecutive days absence. Re-entrance will require an interview by a School official. In case of student prolonged illness or accident, death in the family, or other circumstances that make it impractical to complete the course, the School shall make a settlement which is reasonable and fair to both.

## TARDINESS OR LEAVE EARLY

As we expect you to be here each day, so we expect you to be here on time. Tardiness or leave earlies are recorded in quarter-hour increments and are included in counting absences. You make the record. We record it. Employers refer to it.

## MAKE-UP TIME

Regardless of grades or standing in class, a student must make up all missed time that is in excess of 10% of the scheduled class time. Making up missed time does not alter the student's attendance record.

## MAKE-UP WORK

The student is required to make up work missed as a result of absence. The instructor will assign the work that is to be completed for each absence. This may be assigned as outside work.

## WEATHER EMERGENCIES

The School reserves the right to close the School during a weather emergency or other "acts of God." Under these conditions, the student will not be charged with an official absence. The material that would have been covered during the closed day(s) will be made up during the quarter, which ensures completion of the entire quarter's outside study assignments. Tuition adjustments will not be made when the School is closed for a weather emergency or other "acts of God."

## CLASSROOM HOURS

FULL TIME: 25 hours per week; 5 days at 5 hours per day

MORNINGS: 7:00 AM to 12:00 (or 9:30 AM to 2:30 PM)

AFTERNOONS: 12:30 PM to 5:30 PM

EVENINGS: 6:00 PM to 11:00 PM

PART TIME: EVENINGS. 10 or 15 hours per week depending on course of study. 2 nights at 5 hours per night. Some courses also meet for an additional 5 hours on Saturday.

PART TIME: SATURDAYS. 5 hours per Saturday





## CONTACT HOUR

A contact hour is designated as a training hour of 50 minutes. The remaining 10 minutes out of each clock hour is reserved for changing class rooms.

## CONDUCT AND DISCIPLINE

Students are expected to behave with decorum and to obey the regulations of the School. Unethical or undesirable conduct, wherever it may occur, is held to be sufficient grounds for dismissal.

The attempt of any student to present as his own any work which he has not honestly performed or to pass any examination by improper means is regarded as a most serious offense and renders the offender liable to immediate expulsion. The aiding and abetting of a student in any dishonesty is likewise held to be a grave breach of discipline.

Upon the written request of the student, a review board consisting of the student's instructor, a School supervisor, and a School officer will conduct a hearing before the student is dismissed.

## PROGRESS REPORTS

Student Periodic Progress Reports regarding grades, attendance, and an evaluation of the student's conduct will be furnished at the completion of each quarter to the student or to the person the student designates.

## RELEASE OF INFORMATION

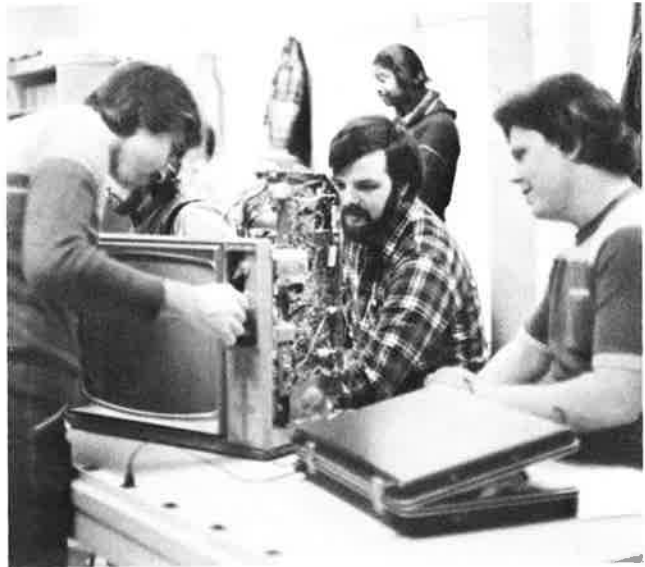
Student educational records are confidential. The student has the right to inspect, review and, in some cases, challenge the records kept. No educational information will be given to third parties, including grade reports to parents, unless authorized by law or in writing by the student. Parents of dependent students (as defined by the Internal Revenue Service) may obtain grade reports.

## OUTSIDE STUDY ASSIGNMENTS

Students are responsible for reading and studying materials issued by their instructors. Many times it is necessary for students to spend extra hours out of School studying assigned text material. Our instructors are aware that many students hold full-time jobs while attending School. Whenever possible, outside assignments will be made prior to a weekend.

## PERSONAL PROPERTY

RETS assumes no responsibility whatsoever for loss or damage to a student's personal property, or for any damage to any car; nor loss by theft of any vehicle or any of its contents, in, on, or adjacent to School property.



## GRADING

A letter-mark system of grading is used for recording student progress:

- A — Excellent (90-100)
- B — Good (80-89)
- C — Fair (70-79)
- D — Passing (65-69)
- E — Failing (64-below)
- INC — Incomplete

## STUDENT COUNSELING

Educational objectives, grades, and attendance are normally reviewed upon entering a new quarter of training by a member of the staff other than the student's instructor. If a student desires counseling between quarters, the Chief Instructor or Director of Education should be contacted for an appointment.

## TUTORING

The school maintains a support staff, including Instructors, Junior Instructors, and Senior Students, to be utilized as tutors. A student may obtain additional help in an area of concern by contacting the Chief Instructor or Director of Education.

## **PROBATION**

A student may be placed on probation for poor grades or unsatisfactory attendance. If a student receives a final grade in any subject below a C, he will be placed on probation for the following quarter. Also, if a student has attendance below the 90% standard in a quarter, he will be placed on probation for the following quarter. To remove probationary status, the student must attain at least a C in all subjects if the probation is on academic grounds. He cannot miss more than 10% of scheduled class time and must make up all required missed time from the prior violation.

A student who does not remove his probation as specified will be interrupted and required to recycle.

## **SUBJECT FAILURES**

A student who fails any subject in any quarter will not be permitted to enter the next quarter of training. Under these conditions, the student will be required to repeat the quarter of training failed (see repeat time). Any student who receives a grade of INC (incomplete) for any subject in any quarter of training may be allowed to continue training on probation, provided arrangements are made to remove the incomplete grade within a reasonable period of time.

## **REPEAT TIME**

A student who elects or is required to repeat a quarter of training for academic or attendance reasons will be required to sign a new enrollment agreement reflecting the tuition rates being paid by the class being joined. Tuition is required to be paid during repeat time; however, the student will not be charged for more than the number of quarters in the course, regardless of the number of quarters required for completion. Should a student terminate during the training program, tuition paid during repeat time is non-refundable. While repeating, the student must pass all subjects and maintain at least 90% attendance, regardless of his original grades or attendance record. No student will be allowed to repeat the same quarter more than once.

## **GRADUATION REQUIREMENTS**

To graduate, a student must complete each subject in every quarter with a D or better grade and maintain a 90% attendance record. Students satisfactorily completing their course will receive a diploma upon graduation.



## **TRANSFER OF CREDIT**

Students successfully completing the Electronic Engineering Technology Course may, according to an Agreement of Articulation between Siena Heights College and RETS Electronic Schools, transfer to Siena Heights, leaving approximately fifty credit hours to complete before being awarded a Bachelor of Applied Science degree. Many other colleges accept RETS training for credit. Contact the Education Office for information on a particular school.

## **TRANSCRIPTS**

One transcript is provided at no charge during the first six months after graduation. Transcripts requested at other times are assessed an administrative fee of three dollars for a single transcript and one dollar each for additional transcripts ordered at the same time.

## **TRANSFER FEE**

Transfers are permitted between sections on a space available basis. There is an administrative fee of fifteen dollars payable upon approval of the transfer request.

# STUDENT SERVICES



The School maintains several offices to provide assistance to you in a broad range of services and out-of-school activities.

The Student Services Department offers assistance with housing, job placement, personal counseling, community activity information, etc. You may seek academic advice by contacting the Chief Instructor.

## HOUSING ASSISTANCE

If you are relocating, our Housing Assistance Department will advise and assist you with the following services:

1. Lists of available apartments and rental homes.
2. Information on tenant rights and obligations.
3. Directory assistance, including maps and other information to familiarize you with the city.
4. Roommate referral.
5. Referrals to temporary accommodations.

## GRADUATE PLACEMENT

The Placement Assistance Department actively seeks jobs for graduates.

This service includes:

1. Job opportunities to graduating classes.
2. On-campus recruitment by employers who elect to visit the School.
3. Individual counseling on the preparation of your personal resumes and how to participate in an interview.
4. Career guidance workshops.

Graduate placement information is forwarded upon request to any alumnus who is unemployed, or in the process of terminating from a company, and is available for immediate employment.

The Placement Assistance Department requires that alumni who accept employment notify RETS in writing of the name and address of the employer and the position accepted.

## PART-TIME PLACEMENT

The Placement Assistance Department maintains an up-to-date file of employers in need of part-time and full-time personnel and interested in employing our students.

Placement assistance includes:

1. Individual counseling in preparation for an interview.
2. Assistance with securing an interview.
3. Individual counseling assistance.

## STUDENT ATHLETICS

The School Intramural Sports Program is directed by the Student Services Department. The Program provides an opportunity for you to participate in athletic competition as an extra-curricular activity.

## STUDENT ORGANIZATIONS AND PUBLICATIONS

A variety of student organizations are available to complement outside activities. Students also have an opportunity to submit articles for the school newspaper that highlight achievements and share ideas. Further information can be obtained from the Student Services Department.

In addition to these services, our offices will be available to assist you in attaining personal or academic counseling, and help with any individual requests.

## STUDENT IDENTIFICATION

Student ID Cards are issued by Student Services. These ID Cards identify you as a RETS student and entitle you to student discounts offered at participating business, entertainment and transportation organizations.

## CAR POOLING

If you are interested in driving in a car pool or need a ride to school, see your Student Services Representative. You will receive the help you need to solve your transportation problem.

# FINANCIAL AID

It is our philosophy that it is the responsibility of all students to meet their tuition obligation. However, the financial aid program at RETS Electronic Schools is designed to assist you in meeting that obligation. Financial aids consist of grants, loans, VA Assistance, and part-time needs. In determining the extent of your need, the School must consider the financial support which may be expected from the income, assets, and other resources of your family. Financial aid is considered supplementary to the efforts of you or your family in assisting with school costs. (These financial aid programs are available only to permanent residents and citizens of the United States.) For application forms and further information about any of these programs, you should contact the Financial Aid Manager.

## **STATE GUARANTEED STUDENT LOAN PROGRAM (GSL)**

This loan program makes it possible for you to borrow money for your training from commercial lenders in your home state, or directly from the state. If you qualify, the interest on these loans will be paid by the state while you are in school. You must begin repayment of this loan after you complete your studies or discontinue training, at a low simple interest rate. Your repayments will be in installments over a period of not more than ten (10) years. See the Financial Aid Manager for the current rate and payback terms.

## **PELL GRANT (FORMERLY BASIC EDUCATIONAL OPPORTUNITY GRANT-BEOG-)**

The amount is determined on the basis of family financial information submitted on the BEOG application form. Application forms are available in high schools and financial aid offices. Within six weeks, you should receive your notification of eligibility. The Student Eligibility Report (SER) will inform you of the amount of your grants. This SER must be submitted to RETS' Financial Aid Manager.



## **NATIONAL DIRECT STUDENT LOANS LOANS (NDSL)**

To apply for this loan program, you must be enrolled in an eligible course of study. The loan amount is determined by an approved needs analysis and repayment begins after termination of your status as a student. During the repayment period, low simple interest is charged on the unpaid balance of the loan principal. You should allow from four to six weeks for processing. See the Financial Aid Manager for the current rate and payback terms.

## **SUPPLEMENTAL EDUCATIONAL OPPORTUNITY GRANT (SEOG)**

To qualify for the SEOG program, you must demonstrate "exceptional financial need" as determined by your approved needs analysis. You must be enrolled in an eligible course of study and be making measurable progress toward completion of that course. You should allow four to six weeks for processing your application.

## **VETERANS EDUCATIONAL ASSISTANCE**

There are a variety of educational assistance programs available to eligible veterans including monthly educational benefits, V.A. Vocational Rehabilitation for disabled veterans, educational benefits for dependents of deceased veterans, and V.A. Education loans. To apply for V.A. benefits, the application for a Certificate of Eligibility (VA 1990 or VA 1995 form) should be completed and sent to RETS' Financial Aid Manager with your copy of a DD214 discharge paper for processing through the Veterans Administration Regional Office. It is recommended that the veteran process his V.A. papers through RETS in order to expedite payment. Additional detailed information on all V.A. programs can be obtained by contacting the Financial Aid Manager.

## **COMPREHENSIVE EMPLOYMENT AND TRAINING ACT (CETA)**

Those who are unemployed, under employed, or economically disadvantaged may qualify for CETA. This program provides a realistic opportunity for career employment after training. Students who qualify can be compensated while attending classroom and on-the-job training with subsidized wages to the employer, thus enhancing employment opportunities. Special programs are also available for youth, elderly, handicapped, veterans, and those with limited English speaking ability. For further information on CETA programs, contact the Financial Aid Manager.

## **VOCATIONAL REHABILITATION PROGRAM**

The cooperative effort of RETS and the Department of Vocational Rehabilitation in many states has resulted in the training and rehabilitation of a great number of persons into the computer-electronics field. There they are able to earn their livelihood and become an integral part of this nationally important industry. There are many jobs in electronics that can be performed by the physically handicapped.

If you are vocationally handicapped, you may apply for educational assistance through the Vocational Rehabilitation Office nearest you.

## **NON-GOVERNMENTAL FINANCIAL AID PROGRAMS**

RETS has additional tuition financing programs for those who do not qualify for government guaranteed loans, or those who need additional financing to their grants or insured loans. These additional programs are through private sources associated with RETS and further information may be obtained by contacting the Financial Aid Manager.

## **PART-TIME JOB PLACEMENT ASSISTANCE FOR STUDENTS**

The Student Services Department maintains a current listing of employers who need part-time personnel in their business. You may seek these jobs through this Department. In addition to the job listing, the Student Services Department will assist you in individual counseling to prepare for and secure an interview. The responsibility is yours for securing the job and RETS does not guarantee employment through this service. This department is pledged to your service if you are in need of part-time work to supplement other incomes and if you are serious in seeking employment. Some of these part-time jobs are available on campus after school hours.



# FULL-TIME PROGRAMS



## ELECTRONIC ENGINEERING TECHNOLOGY (EET)

**OBJECTIVE:** The Electronic Engineering Technology Course was developed by RETS Electronic Schools in conjunction with industry to meet the continuing demand for trained electronic personnel to fill entry level positions in industry. Employment opportunities in the following areas are within the scope of our graduates: Electronic Technician, Field Service Engineer/Customer Service Engineer, Industrial Maintenance Technician, Computer Board/Systems Repair Technician, Research and Development Technician, Microprocessor Applications Specialist, etc. The nature of each position may include the assembly, installation, repair, prototyping and development of electronic products.

The management and instructional staff are guided by this objective; consequently, this institution is constantly updating its current program and developing new curriculum areas which prepares us to meet the educational demands of the expanding and everchanging electronics industry.

Employment and advancement after employment often requires more than technical skills. As a result, the philosophy, policies, rules and regulations of RETS Electronic Schools were developed to also aid in the generation of good personal habits and attitudes, communication skills, logic and reasoning capabilities.

COURSE	WEEKS	CONTACT HOURS
<b>Quarter I</b>		
Electronics 101		120.0
Laboratory 101		108.0
Mathematics 101		60.0
Total	12	288.0
<b>Quarter II</b>		
Electronics 102		120.0
Laboratory 102		86.4
Mathematics 102		60.0
Engineering Drawing 101		21.6
Total	12	288.0
<b>Quarter III</b>		
Electronics 103		96.0
Laboratory 103		86.4
Mathematics 103		60.0
Engineering Drawing 102		21.6
Technical Writing 101		24.0
Total	12	288.0
<b>Quarter IV</b>		
Electronics 201		96.0
Laboratory 201		108.0
Mathematics 201		60.0
Technical Writing 201		24.0
Total	12	288.0
<b>Quarter V</b>		
Electronics 202		96.0
Laboratory 202		108.0
Mathematics 202		60.0
Physics 201		24.0
Total	12	288.0
<b>Quarter VI</b>		
Electronics 203		96.0
Laboratory 203		108.0
Mathematics 203		60.0
Communications 201		24.0
Total	12	288.0
<b>Quarter VII</b>		
Electronics 301		96.0
Laboratory 301		108.0
Mathematics 301		48.0
Communications 301		36.0
Total	12	288.0
<b>COURSE TOTALS</b>	<b>84</b>	<b>2016</b>

**FULL-TIME PROGRAMS**

**SPECIALIZED ELECTRONIC  
SERVICING TECHNOLOGY  
(SES)**

OBJECTIVES: The Specialized Electronic Servicing Technology Course was developed by RETS Electronic Schools to meet the continuing demand for trained electronics personnel to fill entry level jobs in this vast industry. Employment opportunities in the following areas are within the scope of our graduates: installation and repair of radio and television systems, hi-fidelity sound systems, intrusion alarm systems, closed-circuit television systems, recording systems, automated dispensing and copy equipment, electronic organs, industrial instrumentation and testing.

Since the terminal objective is employment in the service industry, this course is of an extremely practical nature. The ability of the graduate should be such that he will be immediately profitable to his employer. This is not a design engineering course. The mathematics included in the course is limited to that required to understand the operation of practical circuits and systems, which allows as much of the available time as possible to be devoted to practical subject matter.

COURSE	WEEKS	CONTACT HOURS
Quarter I		
Electronics 111		150.0
Laboratory 111		138.0
Total	12	<u>288.0</u>
Quarter II		
Electronics 112		150.0
Laboratory 112		138.0
Total	12	<u>288.0</u>
Quarter III		
Electronics 211		150.0
Laboratory 211		138.0
Total	12	<u>288.0</u>
Quarter IV		
Electronics 212		150.0
Laboratory 212		138.0
Total	12	<u>288.0</u>
<b>COURSE TOTALS</b>	<b>48</b>	<b>1152</b>

**CLIMATE CONTROL  
TECHNOLOGY (CCT)**  
(TOLEDO SCHOOL ONLY)

OBJECTIVES: The Climate Control Technology program was developed by RETS Electronic School to meet the continuing demand for entry level service personnel in the field of air conditioning, sheet metal, heating, and refrigeration, and fulfills all academic requirements for city licensing. Employment opportunities in the following areas are within the scope of our graduates: air conditioning, heating, sheet metal, and refrigeration in such positions as installer, service technician, comfort heating and cooling technician, maintenance technician, or refrigeration mechanic.

Heat load calculations, residential duct work design, electrical wiring, and blue print reading are just a few of the areas taught to supplement the theory of the systems that will be encountered.

Since the terminal objective is employment in the service industry, this course is of an extremely practical nature. The ability of the graduate should be such that he will be immediately profitable to his employers.

COURSE	WEEKS	CONTACT HOURS
Quarter I		
CCT-101		150.0
CCL-101		138.0
Total	12	<u>288.0</u>
Quarter II		
CCT-102		150.0
CCL-102		138.0
Total	12	<u>288.0</u>
Quarter III		
CCT-201		150.0
CCL-201		138.0
Total	12	<u>288.0</u>
Quarter IV		
CCT-202		150.0
CCL-202		138.0
Total	12	<u>288.0</u>
<b>COURSE TOTALS</b>	<b>48</b>	<b>1152</b>

## COMPUTER PROGRAMMING

**OBJECTIVES:** The Computer Programming course was developed to meet the continuing heavy demand for trained programmers to fill entry level positions in industry. Employment opportunities in small to medium size computer operations as a business applications Programmer-Operator, Programmer, and Programmer Analyst fall within the scope of our graduates. These jobs range from operating small computers and writing computer programs from specifications to preparing the specifications to meet user needs.

The instructional technique emphasizes hands-on training on computer equipment typically found in our target size installations. Training includes the three computer languages most common in business applications.

**LENGTH OF COURSE:** 600 contact hours. Twenty-four weeks; five hours per day, and five days per week.

MODULE	CLASS WEEKS	CONTACT HOUR
I. Introduction to Business Data Processing and beginning BASIC Programming Language	4	100
II. Business Data Processing in RPG II Programming Language	6	150
III. Business Data Processing in COBOL Programming Language	6	150
IV. Computer Utilities and additional Programming	4	100
V. Business Systems Analysis	4	100
<b>COURSE TOTALS</b>	<u>24</u>	<u>600</u>

## SPECIAL ENTRANCE REQUIREMENTS

1. Two years of directly applicable business experience, ie, accounting, procedure writing, etc. (Two years of college level courses may be considered as a substitute for above.)
2. Passing score on the Programmers Aptitude Test (PAT).
3. Pass an interview in person.

## TELECOMMUNICATION INSTALLER

**COURSE OBJECTIVE:** The Telecommunication Installer Course was developed by RETS Electronic Schools in conjunction with industry to meet the continuing need for entry level personnel within this industry. Employment opportunities in the following areas are within the scope of our graduates: Telecommunication/ Telephony Installer, Installer/Technician, Installer/Repairman, Customer Service Repairman. A Telecommunication Installer will be typically responsible for the installation, maintenance, and repair of single line, multi-line and key system equipment.

All principles discussed in lecture will be reinforced with practical, hands-on training with emphasis placed on installation and repair, conforming to industry standards. (See TIC 101 for job and course outline.)

**COURSE LENGTH:** 150 Contact Hours. The course meets for six weeks, five hours a day, five days per week.

**ENTRANCE REQUIREMENTS:** Enrollees will have to demonstrate, through testing, proficiency in mechanical aptitude and basic electricity. All enrollees must possess a valid driver's license, cannot be color blind and will be interviewed individually prior to being admitted to the course. All enrollees must possess a high school diploma or its generally-recognized equivalent, the GED.



NOTE: These courses may not be available in all schools.



# CABLE TELEVISION

## CABLE TV CONSTRUCTION (CTVC)

**OBJECTIVES:** The Cable TV Construction course was developed by RETS Electronic Schools to meet the demand for entry level personnel to erect cable systems. The program assumes no prior knowledge of Cable TV and provides the theoretical and hands-on training which can be utilized to gain employment as a Construction Lineman or Splicer in the Cable TV Industry. (See CATV-101 for job and course content).

**COURSE LENGTH:** 100 Contact Hours. The course meets for four weeks, five hours per day, five days per week.

## CABLE TV CONSTRUCTION / INSTALLER (CATV)

**OBJECTIVES:** This course is a combination of the Cable TV Construction course and the Cable TV Installer course. It is offered in those areas where industry demand is high for a dual trained graduate. Employment opportunities for graduates are as Construction Linemen, Splicers, and Installers. (See CATV-103 for job and course content).

**COURSE LENGTH:** 175 Contact Hours. Course meets seven weeks, five hours a day, five days per week.



## CABLE TV INSTALLER (CTVI)

**OBJECTIVES:** The Cable TV installer course was developed by RETS Electronic Schools to meet the demand for entry level installers in the Cable TV industry. The program assumes no prior knowledge of Cable TV and provides the theoretical and hands-on training which can be utilized to gain employment as a Cable TV Installer in the Cable TV industry. (see CATV-102 for job and course content).

**COURSE LENGTH:** 100 Contact Hours. The course meets for four weeks, five hours per day, five days per week.

## ADMISSION REQUIREMENTS

1. High school diploma or GED
2. Basic physical examination (back x-ray preferred)
3. Valid driver's license (will be needed for employment)
4. No fear of heights
5. Must be bondable
6. Must pass the Mechanical Reasoning section of the Differential Aptitude Test (DAT). Applicants for Cable TV Installer must also pass the Numerical Ability section of the DAT.



Since the objectives of these courses is preparation for employment in the Cable TV industry, they are extremely practical in nature. The abilities of the graduates should be such that they will be immediately profitable to their employers.

**NOTE:** These courses may not be available in all schools.

# PART-TIME PROGRAMS

## APPLIED ELECTRONIC TECHNOLOGY (AET)

**OBJECTIVES:** The Applied Electronic Technology program was developed by RETS Electronic Schools to provide a vehicle by which serious students could acquire comprehensive training in electronics on a part time basis. It will be assumed that the enrollee has sufficient time outside of class to complete the assigned homework. Each class day will be divided into approximately 60% lecture and a discussion of the assigned homework, and 40% lab. The lab is an extension of the theory in which the students actually construct and test the circuits discussed in lecture, and learn the use of the appropriate test equipment.

The objective of this program is to provide a method by which an individual may obtain entry level employment in the electronics industry, or to serve as a means by which existing industrial electronic technicians can update to the current state-of-the-art technology, or to provide a method by which employees in unskilled occupations can obtain a lateral transfer to the electronics department within their companies. This course also prepares the student for entry into one of the specialized programs offered by RETS such as: Industrial/Computer Electronic Technology, Home Entertainment Technology, or Communications Technology. Employment opportunities in the following areas are within the scope of our graduates: automotive electronics, installation and maintenance of electro-mechanical copying and dispensing machines, electronic test technician, industrial maintenance technician, electronic security technician, etc.



## HOME ENTERTAINMENT TECHNOLOGY (HET)

**PREREQUISITE:** Completion of the Applied Electronic Technology program or equivalency.

**OBJECTIVES:** The Home Entertainment Technology program, offered two nights a week, was developed by RETS Electronic Schools to provide a vehicle by which graduates of the Applied Electronic Technology program, or existing electronic technicians, may upgrade their skill levels in Home Entertainment Technology.

This course was designed to meet the continuing demand for entry level personnel trained to maintain and repair entertainment electronic equipment, such as color television, high-fidelity sound systems, tape recorders, stereo multiplex, closed circuit television systems, and electronic organs. This course also provides the electronic service industry with a general purpose electronic servicing technician. Since the terminal objective of the course is employment in the service industry, the course is of an extremely practical nature. The ability of the graduate should be such that he will be immediately profitable to his employer with minimal "on-the-job" training.

<u>Two Nights a Week</u>		
COURSE	WEEKS	CONTACT HOURS
TL100 — Basic		
Electronic Principles	12	108.0
TL101 — Electronic		
Circuit Concepts	12	108.0
TL200 — Digital/Analog		
Principles and Systems	12	108.0
Totals	36	324.0

<u>Saturday Only</u>		
COURSE	WEEKS	CONTACT HOURS
TL100 — Basic		
Electronic Principles	24	108.0
TL101 — Electronic		
Circuit Concepts	24	108.0
TL200 — Digital/Analog		
Principles and Systems	24	108.0
Totals	72	324.0

COURSE	WEEKS	CONTACT HOURS
TL400 — Black & White		
TV and Audio Systems	12	108.0
TL401 — Color Television		
& Electronic Systems	12	108.0
Totals	24	216.0

# ELECTRONIC COMMUNICATIONS TECHNOLOGY (ECT)

**PREREQUISITE:** Completion of the Applied Electronic Technology Program or equivalency.

**OBJECTIVES:** The Electronic Communications Technology program, which is offered two nights a week, was developed by RETS Electronic Schools to meet the continuing demand for trained electronic personnel to fill entry level positions in the commercial and noncommercial communications industry. Two-way mobile communications, commercial radio and television broadcast engineering, CB transceiver repair and installation, electronic instrumentation and test, marine two-way communications installation and maintenance, and microwave communications are just a few of the employment opportunities that graduates would qualify for. FCC Radio/Telephone License preparation is an integral part of this course. The mathematics included in this course is limited to that required for the preparation needed to take the FCC exams.

Since this course is offered on a part time basis only, it will be assumed that the student has sufficient time outside of class to complete the assigned homework.

COURSE	Saturdays Only	
	WEEKS	CONTACT HOURS
TL500 — Transmitter Principles	12	108.0
TL501 — Transceiver Theory and Repair	12	108.0
Totals	24	216.0

## COMPUTER PROGRAMMING

**OBJECTIVES:** This Computer Programming course is identical to the Full Time Program and is offered on a part-time basis as a vehicle to allow serious students to acquire comprehensive training for an entry level programming position in industry. It is assumed that the student has sufficient time outside of class to adequately prepare assignments. Please refer to the full time program in this catalog for further information and entrance requirements.

**LENGTH OF COURSE:** 40 weeks at 15 hours per week. Classes meet two nights and on Saturday in five-hour sessions.



## RESIDENTIAL and COMMERCIAL AIR CONDITIONING, HEATING, and REFRIGERATION

*(Toledo School Only)*

**OBJECTIVES:** The Residential and Commercial Air Conditioning, Heating, and Refrigeration program was developed by RETS Electronic Schools to provide a vehicle by which serious students could acquire comprehensive training in air conditioning, heating, and refrigeration on a part time basis. It will be assumed that the student has sufficient time outside of class to complete the assigned homework. The lab portion of each class day is an extension of the theory in which students actually perform many of the tests, constructions, and fabrications that would be expected of a maintenance person working in the field.

Employment opportunities in the following areas are within the scope of our graduates: air conditioning, heating, sheet metal, and refrigeration in such positions as installers, service technicians, comfort heating and cooling technicians, maintenance technicians, or refrigeration mechanics.

COURSE	WEEKS	CONTACT HOURS
CCP-111	12	108.0
CCP-112	12	108.0
CCP-211	12	108.0
CCP-212	12	108.0
Totals	48	432.0

## INDUSTRIAL/COMPUTER ELECTRONIC TECHNOLOGY (IET)

**PREREQUISITE:** Completion of the Applied Electronic Technology program or equivalency.

**OBJECTIVES:** The Industrial/Computer Electronic Technology program offered two days a week, was developed by RETS Electronic Schools to provide a method by which graduates of the Applied Electronic Technology program, or existing electronic technicians, may attain the skills suitable for entry into the industrial or computer industry. Since this course is offered on a part time basis, it will be assumed that the student has sufficient time outside of class to complete the assigned homework. Each class day will be divided into approximately 60% lecture and a discussion of the assigned homework, and 40% lab. The lab is an extension of the theory in which the student actually constructs and tests the circuits discussed in lecture, and learns the use of the appropriate test equipment.

Computer installation and maintenance, computer peripherals, numerical control, instrumentation, applications engineering, and industrial electronics are just a few of the occupational areas that are available to graduates of this program. Existing electronic technicians who take this course for upgrading should expect to see new avenues of upward mobility opening for them within their present companies.

COURSE	WEEKS	CONTACT HOURS
TL300 — Microprocessors	12	108.0
TL301 — Industrial Electronics & Computers	12	108.0
Totals	24	216.0

## HIGH SCHOOL HONORS PROGRAM (HSH)

**OBJECTIVES:** This program was designed by RETS Electronic Schools to give high school seniors the opportunity to start their training in electronics while still attending high school. Meeting on Saturdays, the students will have the opportunity to experience the same labs and lectures that are offered in our full-time resident programs. Since this program is offered part time, it will be assumed that the students have the necessary time outside of class to complete the assigned homework.

Upon successful completion of this course, a student may advance up to two quarters of training in the Electronic Engineering Technology program, provided that he or she can demonstrate the necessary math proficiency. Additional math lessons will be issued to help prepare the students for this course of study.

In order to qualify for enrollment, an applicant should be maintaining a 'B' average in his/her high school work and present a letter of recommendation from their high school counselor or Industrial Arts instructor.

COURSE	WEEKS	CONTACT HOURS
TL100 — Basic Electronic Principles	24	108.0
TL101 — Electronic Circuit Concepts	24	108.0
Totals	48	216.0



# CONTINUING EDUCATION

Advancements in electronic technology occur on a daily basis. The technology that was considered to be revolutionary five years ago may well be considered obsolete today. This poses a serious problem for many engineers and technicians. If their present employment does not allow for the continuing education necessary to keep pace with the changing technology, they may well find the state-of-the-art slipping away from them. Quite often, industry sponsors employees in the attendance of seminars. Unfortunately, only a limited amount of education can be obtained in this fashion. A three-day crash course is no substitute for proper resident training. Addressing this problem, RETS Electronic Schools makes available several courses for existing technicians and engineers for the primary purpose of upgrading their technical expertise. These courses have specific prerequisites and are current with today's technology. As these courses are offered on a part-time basis, it will be assumed that the student has sufficient time outside of class to complete the assigned homework. Upon completion of these courses, the graduate will have obtained the skill levels necessary to implement the application of these technologies in their present position or to prepare for employment in other areas that would demand such expertise.

## MICROPROCESSOR:

**OBJECTIVES:** The Microprocessor Course was designed by RETS in conjunction with industry to upgrade the technical skills of the Electronic Technicians and Engineers in the area of microprocessors. Employment opportunities in the following areas are within the scope of our graduates: Product development specialist, industrial maintenance specialist, microprocessor applications specialist, electronic technician, etc. These and similar positions require the application of microprocessor technology in design, programming, repair, prototyping and development of electronic products.

**LENGTH:** Twelve weeks, two nights per week, with nine contact hours per week.

**PREREQUISITE:** All enrollees must have a sound understanding of analog and digital electronics and must possess a minimum of one year of experience in the field as an engineer or technician, or must have completed the Applied Electronic Technology program.

**CONTENT:** This course will concentrate on microprocessors, their hardware, software and applications. The topics of in-depth discussion will be:

- A. Tri-state and open collector technology
- B. Microprocessor-systems overview
- C. Bus structures
- D. Specific block diagrams of microprocessors
- E. Internal block diagrams
- F. Analysis of specification sheets of processor chips
- G. Hardware
- H. Machine language programming; addressing modes, structure, interrupt routines, considerations of writing an executive (monitor) program and timing loops.
  - I. Assembler language programming (introduction)
  - J. Memory devices and architecture
  - K. Memory decoding and buffering
  - L. Memory organization (small vs. large system)

- M. Support ICs; serial outputs, parallel outputs, support software and analysis of specification sheets
- N. Hardware vs. software
- O. Applications; industrial, minicomputers, transducers, keyboards and seven segment displays
- P. Lab involves machine language programming and construction of interfacing circuits
- Q. Latest innovations in microprocessor research

**NOTE:** See TL300-Microprocessors

## DIGITAL AND ANALOG INTEGRATED CIRCUIT CONCEPTS

**OBJECTIVES:** The Digital and Analog Integrated Circuit Concepts course was designed by RETS in conjunction with industry to upgrade the technical skills of existing technicians and engineers in the field of digital electronics and analog ICs. Employment opportunities in the following areas are within the scope of our graduates: Industrial maintenance specialist, applications engineer/technician, electronic technician, etc. These and similar positions require the application of digital and analog IC technology in the design, maintenance, prototyping, and development of electronic products.

**LENGTH:** Twelve weeks, two nights per week, with nine contact hours per week.

**PREREQUISITE:** All students must have a thorough understanding of analog electronics, the use of oscilloscopes and other test equipment, and at least one year of experience in the field.

**CONTENT:** Basic Gates, Arithmetic Groups, Flip-Flops, Registers, Counters, Multiplexers, Comparators, Specification Sheets (state-of-the-art), MSI, LSI, Op Amps, D/A and A/D Conversion Techniques, Analog and Digital Applications

**NOTE:** See TL200—Digital and Analog Principles and Systems.

# COURSE DESCRIPTIONS

## ELECTRONIC ENGINEERING TECHNOLOGY

### ELECTRONICS 101

A study of the fundamental principles of electrical conduction includes the effects of series and parallel resistors, capacitors and inductors on voltage, current and power. The principles of magnetism and electromagnetism will be explored through solenoids, alternators, generators and motors. The operating characteristics of rectifiers will be studied and applied to power supply circuits. Some of the electrical principles studied in this quarter will be illustrated with the automotive electrical system.

### ELECTRONICS 102

A comprehensive study of solid state principles and circuits which includes the static and dynamic characteristics of low and high frequency amplifiers. The operation and function of basic electronic circuits, such as AF amplifiers, RF amplifiers, detectors, AGC, various sinewave oscillators, various relaxation oscillators, mixers, antenna input circuits, FET amplifiers, and regulated power supplies will also be studied. In addition, basic trouble-shooting will be presented.

### ELECTRONICS 103

Design techniques for discrete solid state components are studied with emphasis on power supplies and amplifiers. This quarter also provides an extensive study of linear integrated circuits and their applications, such as active filters, comparators, differentiators, function generators, inverting and noninverting amplifiers, oscillators, regulated power supplies, and summing amplifiers. Manufacturer's data sheets and application notes are thoroughly discussed and interpreted.

### ELECTRONICS 201

A presentation of the building blocks of digital electronics which includes basic gates, encoders, decoders, flipflops, counters, shift registers, multiplexers, demultiplexers, digital readouts, basic arithmetic units, and digital integrated circuits. Applications of digital electronics are also examined. Analog-to-digital and digital-to-analog conversion techniques, along with IC timers and phase locked looped principles, are also studied.

### ELECTRONICS 202

The theory and operation of microprocessors are thoroughly examined. Assembly language programming with program debugging techniques are also studied. Several families of microprocessors are examined. The hardware and software implications of using different families are compared. All the necessary support hardware is also taught such as, memory devices and architecture, drivers, decoders, executive programs, etc.

### ELECTRONICS 203

This quarter is an introduction to the application of electronics in the industrial environment. With the use of all previously learned material, the student studies industrial systems and transducers. All previously studied material will be applied to motor controls, conversion devices, proximity controls, sequence timing, induction and dielectric heating, temperature controls, etc. Numerical controlled machines and programmable controllers are taught in detail. Television concepts are also taught as needed for the development of CRT terminals. Several other terminals are also taught.

### ELECTRONICS 301

This quarter provides a comprehensive study of computers and computer peripherals which includes the theory and operation of card punches, card readers, cassette, data communications equipment, disk packs, floppy disks, line printers, magnetic recording devices, magnetic tape stations and modems. Basic programming is extensively taught along with an introduction to several business languages.

### ELECTRONICS LABORATORY 101

Resistors, capacitors and inductors are utilized to construct DC and AC circuits and then pertinent voltage, current and power measurements are performed. There are also laboratory projects to demonstrate the principles of electromagnetism and automotive electrical systems. Halfwave, fullwave, bridge and doubler power supplies are constructed. Appropriate test equipment, such as the oscilloscope and the volt-ohm-milliammeter, are used to either troubleshoot or analyze circuit conditions.

### **ELECTRONICS LABORATORY 102**

A solid state superheterodyne receiver is constructed which affords the student an opportunity to test and examine many of the circuits that are discussed in lecture. Besides the circuits in the radio, various other amplifiers, oscillators, and power supplies are constructed and pertinent measurements are performed. Practical trouble-shooting techniques that utilize the signal generator, oscilloscope and VOM are emphasized throughout this phase.

### **ELECTRONICS LABORATORY 103**

Many of the power supplies and amplifiers designed and discussed in theory are constructed and tested. Measurements of gain, input and output impedance, frequency response, etc. are performed. Linear integrated circuits and specialized ICs are also used as the student learns to interpret manufacturer's data sheets and application notes.

### **ELECTRONICS LABORATORY 201**

The digital circuits discussed in theory are constructed using digital ICs. The student will learn through the construction of several prototypes, the importance of decoupling, fan-in and fan-out limitations and interfacing techniques. Through the designing, construction and trouble-shooting of these prototypes, the student will experience many of the same problems that will be encountered when later working in the field.

### **ELECTRONICS LABORATORY 202**

During this phase, the students will write machine language programs, enter and debug these programs, and construct many various interfaces as they learn microprocessors. Hands-on experience with RAMS, ROMS, and other microprocessor support chips will enable the student to better understand the microprocessor based systems that he/she will encounter in industrial electronics and computers. Serial to parallel and parallel to serial conversion techniques, as well as digital to analog and analog to digital conversion as they apply to microprocessors, are also examined in lab.

### **ELECTRONICS LABORATORY 203**

Industrial circuits and systems are constructed during this phase, utilizing the technologies previously learned. Logical test procedures and trouble-shooting techniques are emphasized throughout this quarter. Practical experience is also gained through exposure to on-site computer peripherals.

### **ELECTRONICS LABORATORY 301**

The students breadboard digital circuits that are representative of the individual sections of the computer. Hands-on experience with computer hardware is achieved through extensive examination and troubleshooting of various on-site computers. During the last half of this phase, the students select a project which they individually must conceive, research, design, prototype, debug and present to their class.

### **MATHEMATICS 101**

The basic fundamentals of arithmetic, which include addition, subtraction, multiplication, division, fractions, decimals, powers, roots, scientific notation, ratio and proportion, are reviewed and applied to Ohm's Law, the power formulas, voltage divider theorems, and the reactance formulas. The calculator and its applications are also presented in this phase. Basic algebra is reviewed and applied to linear equations, graphs, factoring, exponents and radicals, which provides preparation for comprehension of advanced electronic formulas.

### **MATHEMATICS 102**

This phase applies the Pythagorean theorem to resistive-capacitive, resistive-inductive, and resistive capacitive-inductive circuits. The techniques for solving linear equations and story problems are emphasized through a continuation of basic algebra. The trigonometric functions are introduced and applied to simple and complex AC circuits.

### **MATHEMATICS 103**

This phase provides a thorough study of common logarithms and their applications. Logarithms are used to solve multiplication, division, roots and power problems. They are also extensively applied to voltage, current and power calculations through decibel problems.

### **MATHEMATICS 201**

The binary, octal and hexadecimal numbering systems and conversion techniques between the systems are studied during this phase. Digital arithmetic and codes are also covered including Boolean algebra and Karnaugh mapping. In addition, the Thevenin, Norton and Superposition theorems are studied and applied to electronic circuit analysis.

### **MATHEMATICS 202**

This phase provides additional study in algebra which includes transposition, binomial and trinomial factoring, and solution of multi-variable linear equations. The fundamentals of trigonometry and J operators are reviewed and utilized.

### **MATHEMATICS 203**

This phase provides an introduction to calculus, which includes algebraic graphs, functions, limits, increments and derivatives. These early principles of calculus are applied to average and instantaneous rate of change problems including transient waveform analysis.

### **MATHEMATICS 301**

This phase provides additional studies in calculus with emphasis on differentiation and integration. The terminal objective of this quarter is to enable the student to pursue advanced electronics theory.

### **ENGINEERING DRAWING 101**

A study and application of basic drafting techniques which includes graphic symbols, basic lines and line weights, lettering, geometrical constructions, various types of views and projections, dimensioning, notes, and a familiarization with JIC standards.

### **ENGINEERING DRAWING 102**

This phase applies the basic drafting techniques that were studied in Drawing 101 to schematic diagrams. Schematics of solid state devices are emphasized and the layout and design of printed circuit boards is taught.

### **TECHNICAL WRITING 101**

The basic principles of grammar, punctuation, sentence and paragraph construction are reviewed in preparation for technical report writing.

### **TECHNICAL WRITING 201**

During this phase, the student will study the fundamentals of technical writing which include methods for logical organization of ideas and a format for technical reports. Experience is achieved in this area by submitting technical reports on the laboratory projects that are conducted throughout the quarter.

### **COMMUNICATIONS 201**

This course emphasizes the accurate and effective communication by written word of data and/or ideas. Resumes, technical and business correspondence are also studied during this phase.

### **COMMUNICATIONS 301**

The basic principles of oral expression are explored during this phase. The students receive experience in this area by giving oral presentations on technical topics. Particular emphasis is given throughout the quarter to communications within the work environment beginning with the employment interview.

### **PHYSICS 201**

This phase explores the basic principles of force, motion, work, energy, power, friction, rotation, torque, gears, and pulleys, which provide preparation for the mechanical aspects of electronic devices. The nature of light and the principles of optical instruments are also studied.

## **SPECIALIZED ELECTRONICS SERVICING**

### **ELECTRONICS 111**

A study of the fundamental principles of electrical conduction which includes the effects of series and parallel resistors, capacitors and inductors on voltage, current and power. The principles of magnetism and electromagnetism will be explored through solenoids, alternators, generators and motors. The operating characteristics of rectifiers will be studied and applied to power supply circuits. Additionally, the student will be exposed to soldering techniques and an introduction to solid state principles and devices.

### **ELECTRONICS 112**

A comprehensive study of solid state circuits which includes the static and dynamic characteristics of low and high frequency amplifiers. The operation and function of basic electronic circuits, such as AF amplifiers, RF amplifiers, detectors, AGC circuits, various sinewave oscillators, mixers, antenna input circuits, various relaxation oscillators, FET amplifiers, regulated power supplies, high fidelity sound systems, and FM stereo multiplex systems will be covered. In addition, the student will study the following specialized solid state devices: SCRs, UJTs, diacs, and triacs.

### **ELECTRONICS 211**

This quarter includes a study of the building blocks of digital electronics which encompasses basic gates, encoders, decoders, flipflops, counters, shift registers, multiplexers, demultiplexers, digital readouts, basic arithmetic units, and digital integrated circuits. Linear ICs including op amps, timers, audio output ICs, etc. are also covered.

### **ELECTRONICS 212**

Solid state, black and white, and color television is thoroughly examined by extensive analysis of television tuners, IF amplifiers, sound circuits, sync circuits, AGC circuits, video amplifiers, vertical and horizontal sweep circuits, vertical and horizontal output circuits, and low and high voltage supplies. Service procedures for black and white, and color television will also be covered.



### **ELECTRONIC LABORATORY 111**

Resistors, capacitors, and inductors are utilized to construct DC and AC circuits, and then pertinent voltage, current, and power measurements are performed. There are also laboratory projects to demonstrate the principles of electromagnetism. Halfwave, fullwave, bridge and doubler power supplies are constructed. Appropriate test equipment, such as the oscilloscope and the volt-ohm-milliammeter, are used to either trouble-shoot or analyze circuit conditions.

### **ELECTRONIC LABORATORY 112**

A solid state superheterodyne receiver is constructed which affords the student an opportunity to test and examine many of the circuits that are discussed in lecture. Besides the circuits in the radio, various other amplifiers, oscillators, and power supplies are constructed and pertinent measurements are performed. Experiments with specialized solid state devices, such as UJTs, SCRs, diacs, triacs, and linear ICs are also performed. Practical trouble-shooting techniques that utilize the signal generator, oscilloscope and VOM are emphasized throughout this quarter.

### **ELECTRONIC LABORATORY 211**

In the first half of the quarter, all of the digital circuits discussed in lecture are constructed during lab with integrated circuits. In the last half of the quarter, the students learn to trouble-shoot and install intrusion alarm systems and various other automated systems involving both analog and digital techniques.

### **ELECTRONIC LABORATORY 212**

During this quarter, the students are furnished a solid state television. The laboratory projects are designed to produce an understanding of the dynamic analysis of the television's circuits with appropriate test equipment, such as DVMs, dot bar generators, triggered sweep oscilloscopes, and sweep and marker generators. Extensive familiarization with color television receiving systems and trouble-shooting techniques is a requirement for this quarter. Both static and dynamic convergence adjustments must be performed along with both luminance and chroma channel alignment procedures. In addition, the student becomes familiar with the servicing techniques employed in organ equipment.

### **CATV-101 CABLE TV CONSTRUCTION**

Course content includes an introduction to Cable TV, use and care of pole climbing equipment, safety, tools and equipment, system design, mapping, coaxial cable, installation of integrated messenger cable, lashed cable, and underground cable. Cable splicing is also taught. Laboratories include pole climbing and use of

tools and cables to construct mock typical cable segments.

### **CATV-102 CABLE TV INSTALLATION**

Course content includes an introduction to Cable TV, how a typical Cable TV system operates, materials, responsibilities and hardware, basic electricity, tools, equipment and safety, utility company regulations, use and care of pole climbing equipment, installation procedures, meters and their usage, problems installers may encounter, cable size and run consideration, TV setup and picture analysis, and customer relations. Laboratories include pole climbing and use of tools and cables to install typical house drops under simulated conditions.

### **CATV-103 CABLE TV CONSTRUCTION / INSTALLER**

This course combines the content of CATV-101 and CATV-102, above. The resulting course is one week shorter due to elimination of overlapping sections of CATV-101 and CATV-102.

### **CPR-101**

(MOD I) At the conclusion of this module, the student should have an understanding of computer hardware and peripheral devices, use of computer operating systems, basic techniques of business programming, and be able to write simple business application programs in the BASIC programming language.

(MOD II) At the conclusion of this module, the student should be able to write programs in the RPG II programming language which incorporate data listings with headings, totals, level breaks, matching input files, handling tables and arrays and create and access ISAM file organizations.

(MOD III) At the conclusion of this module, the student should be able to write programs in the COBOL programming language, incorporating data listings with totals, headings, control breaks; using multiple output files, using tables and be able to provide complete documentation for the programs written.

(MOD IV) During this module, the student will become familiar with utility programs and software and will practice writing more complex programs in the BASIC language.

(MOD V) At the conclusion of this module, the student should understand the duties of a system analyst, be familiar with the specific methods and techniques for conducting a systems project, and understand security control and file integrity as well as the sequence in which events must occur. The student also will have participated in a team project to design, program, implement and document a small data processing system.

# **CLIMATE CONTROL TECHNOLOGY**

## **CCT-101**

The fundamental electrical laws and elements are studied and applied to single phase motor theory, testing, protection, and starting circuits. Basic household wiring, schematic reading and low voltage control systems are also covered. Hermetic compressors and the electrical components in air conditioners are taught this quarter.

## **CCT-102**

The fundamental principles of refrigeration which are taught this quarter include, but are not limited to, the following topics: refrigerants, compressors, metering devices, thermostatic expansion valves, defrost time clocks, commercial condensing units, evaporator defrost methods, commercial load calculation, and refrigeration piping design.

## **CCT-201**

A study of heating equipment and control devices, basic installation procedures, and an in-depth look at service and repair of several types of heating equipment is included in this quarter of training. An outline of procedures for installation of proper chimneys and flues on gas and oil fired equipment is also included. The types of heating equipment covered are: gas fired furnaces, oil furnaces, heat pumps, time guard circuits, oil, gas and electric fired boilers. Humidification, humidifiers, and electronic air cleaners are also covered this quarter.

## **CCT-202**

The principles and procedures used for the calculations of heat loss and heat gain surveys are covered in this quarter. This information equips the student with the expertise necessary to determine the proper size of equipment required to efficiently perform the job expected. Air distribution, warm air heating plans, and residential duct work design are some of the topics covered, along with basic blue print reading, insulation, and fiberglass ducts. Also, the introduction of sheet metal tools and equipment is covered along with the fabrication methods of some common sheet metal fittings, such as a takeoff, 90° elbow, transition, offset, square-to-round, and others.

## **CCL-101**

The lab equipment used during this quarter consists of: basic electrical training boards, low voltage control trainers, window air conditioners, central air conditioning equipment, and a variety of commercial refrigeration equipment. The scope of this quarter allows for a concentration on electrical breadboarding and repair with the use of the appropriate test equipment.

## **CCL-102**

The student will be trained to repair both electrical and refrigeration failures which are typical of those found in the field. Examples of the types of equipment that the student will have "hands-on" training on are: window air conditioners, central air conditioners, commercial ice machines, open type display cases, walk-in coolers, etc.

## **CCL-201**

The lab projects in this quarter consist of dismantling and repairing of heat pumps, oil, gas, and electric hydronic boilers, oil furnaces, and gas furnaces. Proper troubleshooting procedure and testing of a unit's efficiency are also practiced in the lab along with the repair and installation procedures for electronic air cleaners and humidifiers.

## **CCL-202**

The proper use of most sheet metal hand tools and various equipment commonly used in the heating and air conditioning industry is covered during this phase. Typical of some sheet metal equipment used are: rotary machine, cleat benders, box and pan brakes, flanging attachments, stomp shear, and more. The student will fabricate a project which will allow him to obtain practical experience on some equipment which normally would only be found in a sheet metal shop.

## **TIC-101 — TELECOMMUNICATION INSTALLER COURSE 101**

This course includes a comprehensive study of the following topics: single line telephones, multi-line telephones, key system equipment, PBX installation, installation procedures, troubleshooting and repair techniques, cable running and termination, customer relations, and an overview of the industry and its regulations.

## **PART-TIME PROGRAMS**

### **APPLIED ELECTRONIC TECHNOLOGY AND OTHER PART-TIME PROGRAMS**

#### **TL 100 — BASIC ELECTRONIC PRINCIPLES**

A study of the fundamental principles of electrical conduction, which includes the effects of series and parallel resistors, capacitors and inductors on voltage, current and power is accomplished by exploring the following topics: generation of electricity, units and symbols, electrical laws, series and parallel circuits, measuring equipment, fundamentals of AC and oscilloscopes, inductance, capacitance, reactance, resonance, power supplies, electronic systems concepts, and soldering techniques. Basic AC and DC circuits will be constructed in lab as the student learns to use multimeters, oscilloscopes, and other test equipment. Some of the electrical principles studied in this quarter will be illustrated by the study of the automotive electrical system.

#### **TL-101 — ELECTRONIC CIRCUIT CONCEPTS**

A comprehensive study of solid state principles and circuits which includes the static and dynamic characteristics of low and high frequency amplifiers. The function and operation of basic circuits is studied through the following topics: solid state principles, audio amplifiers, detectors, automatic gain control schemes, filter circuits, RF amplifiers, oscillators, signal tracing and electronic devices, FETs, regulated power supplies, specialized solid state devices, blocking oscillators and multivibrators, and vacuum tubes. A solid state superheterodyne receiver is constructed during lab which allows the student to test and examine many of the circuits discussed in theory. Signal generators, VOMs, oscilloscopes and other test equipment are utilized in the construction and testing of the receiver.

#### **TL200 — DIGITAL/ANALOG PRINCIPLES AND SYSTEMS**

The principles of digital and analog ICs and some of their applications in common electronic circuits and systems are studied through an examination of the following topics: relay logic, motors and motor controls, sequence timing, basic gates and logic circuits, arithmetic units, flipflops, counters and shift registers, digital readouts, multiplexing and comparators, solid state memory, transducers, operational amplifiers, and A to D and D to A converters. Analog and digital ICs are used in lab to construct many of the circuits discussed in theory. Electro-mechanical devices and basic industrial circuits are used to illustrate the applications for all previously studied material.

#### **TL300 — MICROPROCESSORS**

Hardware, software, firmware, and microprocessor applications are thoroughly examined. Tri-state and open collector technology are reviewed as the concepts of bus structuring are developed. Memory devices and architecture, machine language programming, assembly language programming, and microprocessor support chips are thoroughly discussed as micro-based systems are developed. Many of the common microprocessors are examined and manufacturers' data sheets and manuals will be used. The student will learn to write programs (including an examination of monitors and interrupt subroutines), build interfaces, and debug micro-based systems. This course assumes a sound understanding of analog and digital principles and these principles will not be covered as part of this course.

#### **TL301 — INDUSTRIAL ELECTRONICS AND COMPUTERS**

Basic electronics, analog/digital principles and microprocessors are applied to common industrial circuits and systems. The following topics will be studied during this quarter: power control, induction and dielectric heating, resistance welding, ultrasonic systems, automatic process systems, numerical control concepts, N/C systems, synchro and servo systems, processor controlled systems, programmable controllers, interfacing schemes, and peripherals. Computer fundamentals which includes the operation, function, and typical circuitry of the arithmetic unit, the control unit, the input/output units and memory are studied. During lab, many of the circuits discussed in theory are constructed.

#### **TL400 — BLACK & WHITE TELEVISION AND AUDIO SYSTEMS**

The principles of and service procedures for both tube-type and solid state black and white TV are thoroughly examined through the following topics: TV systems, block diagrams, RF tuners, stagger-tuned circuits, video amplifiers, sync circuits, vertical circuits, horizontal circuits, solid state tuners, wide-band solid state amplifiers, solid state sweep circuits, and black and white TV service. Solid state, black and white TV is thoroughly examined by extensive analysis of television tuners, IF amplifiers, sound circuits, sync circuits, AGC circuits, video amplifiers, vertical and horizontal sweep circuits, vertical and horizontal output circuits, and low and high voltage supplies. AM receivers, FM and FM stereo receivers, and other audio systems are examined.

## **TL401 — COLOR TELEVISION AND ELECTRONIC SYSTEMS**

In this quarter, the parallels between black and white TV and color TV are developed. The color television and its service procedures are thoroughly examined through the following topics: color signal characteristics, setup procedures, color generators, video signal circuits, color signal circuits, color picture tubes and associated circuits, alignment of video circuits, alignment of color circuits, specialized TV service.

## **TL500 — TRANSMITTER PRINCIPLES**

This quarter provides preparation for the 2nd Class FCC (Federal Communications Commission) license, which is required by the Federal government for certain types of employment in broadcast stations and in the repair of transmitters and transceivers. Basic transmitter principles and circuits are studied through an examination of the following topics: DC Theory review, AC Theory review, math as applied to AC and DC theory, resonance and filters, low and high frequency amplifiers, solid state devices, power supply theory, measuring devices, oscillators, basic transmitters, amplitude modulation systems, frequency modulation systems, and motors and generators.

## **TL501 — TRANSCEIVER THEORY AND REPAIR**

This quarter provides preparation for the 1st Class FCC (Federal Communications Commission) license and a study of citizen-band (CB) radio and microwave systems through an examination of the following topics: antennas and transmission lines, transmitter frequency measuring methods, CB installation and SWR checks, broadcast station logs and equipment, FCC regulations, frequency synthesis and phase lock loops, television broadcasting and receiving, and microwave systems.

## **AIR CONDITIONING, HEATING REFRIGERATION**

### **CCP-111**

The fundamental principles of electricity and their applications to single phase motors, motor starting circuits, low voltage control circuits, electric components in the air conditioner and schematic diagrams are studied during this quarter. In lab, the principles discussed in theory are clarified by hands-on projects with window air conditioners, central air conditioners, commercial wiring and the proper use of appropriate test equipment.

### **CCP-112**

A study of additional topics includes commercial evaporators, cooling towers evaporative condensers, low ambient controls, compressor capacity controls, and commercial load calculations. Lab projects consist of tube bending, flaring, brazing, evacuation, and charging of various types of refrigeration equipment. Troubleshooting of refrigeration failures and learning the proper use of refrigeration hand tools and test equipment are also studied.

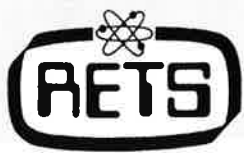
### **CCP-211**

The theory of operation of various types of heating systems, trouble-shooting procedures, repair and/or replacement of their components is the subject matter for this quarter. Emphasized are: oil and electric hydronic boilers, humidifiers, and electronic air cleaners. Also covered are proper venting procedures, combustion efficiency instruments, and fuel pumps. Both trouble-shooting and repair of heating systems will be experienced by the student in lab. Combustion efficiency tests are taken on various types of equipment to help determine the degree of economical operation.

The student has the opportunity to repair and observe the operation of heat pumps, oil furnaces, gas furnaces, electric, gas and oil fired boilers, humidifiers, and electronic air cleaners.

### **CCP-212**

During this phase of training, basic procedures for heat loss/heat gain calculations are discussed along with residential duct work design, heating plans, and general sheet metal work. An explanation of various types of sheet metal, hand tools, and equipment will also be covered. An explanation of sheet metal projects and the use of the tools and equipment will be given. A good percentage of lab time during this phase will be spent on the fabrication of several sheet metal projects. These projects will be interconnected and completely fabricated by the student from the layout plans in the lessons. Some of the sheet metal equipment used are as follows: rotary machine, box and pan brake, slip roll forming machine, various stakes, flanging attachments, and more. When this project is completed it becomes the property of the student.



# Electronic Schools

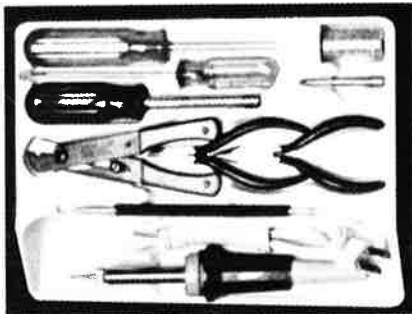
## FUTURE RETS STUDENTS

LOOK AT WHAT IS INCLUDED  
IN OUR FULL TIME ELECTRONIC ENGINEERING  
AND SPECIALIZED ELECTRONIC SERVICING COURSES!!!

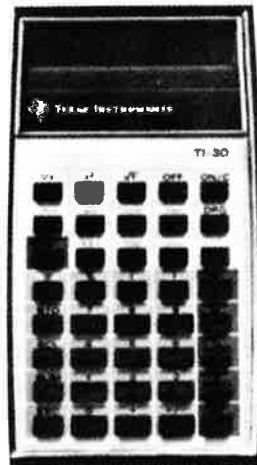
The following equipment will be given to all students  
in these programs and will be yours to keep!  
Estimated Value of EET Equipment \$500 — SES Equipment \$250

### ITEMS ISSUED

#### FIRST QUARTER BOTH COURSES

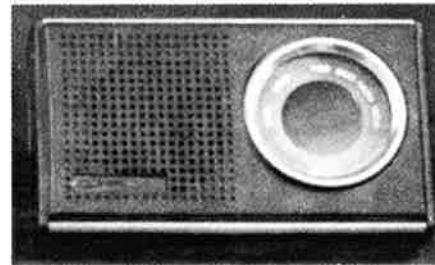


Weller - Xcelite  
Electronic Tool Set



Texas Instrument  
T130 Scientific  
Calculator

#### SECOND QUARTER BOTH COURSES

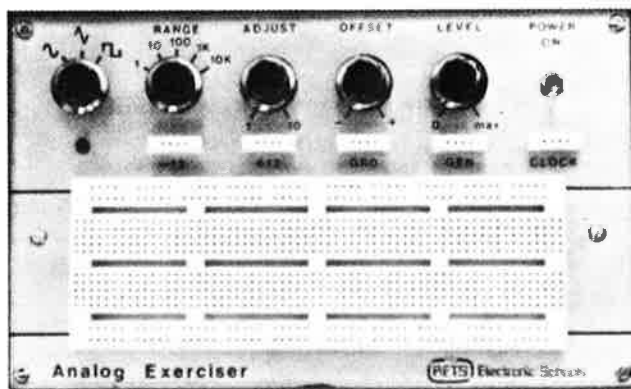


Transistor  
AM Radio Kit  
(Student will build)



Keithley  
130 Digital  
Meter

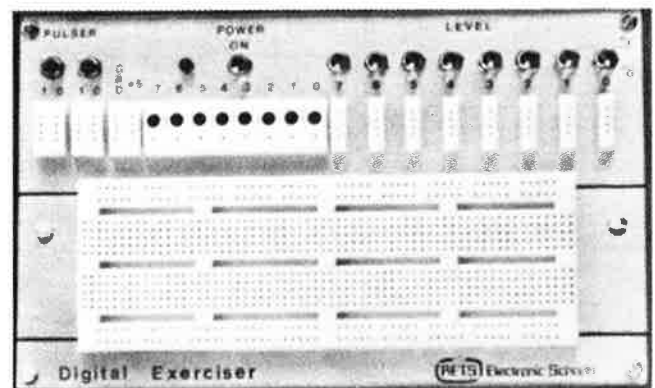
#### THIRD QUARTER EET ONLY



Analog Exerciser Kit

Designed exclusively by RETS to be the ultimate in compact analog design trainers with dual power supply, continuous variable function generator and digital clock.

#### FOURTH QUARTER EET ONLY



Digital Exerciser Kit

Also designed by RETS to accommodate Digital Integrated Circuit and Microprocessor design and experimentation. Containing its own power supply, level and pulse switches, and LED indicator lamps, it is used in combination with the Analog Exerciser.

In addition, all students in the EET program will be issued a large allotment of resistors, capacitors, transistors, and integrated circuits to be used in quarters 3-7 during class and lab work.

Please Note that RETS reserves the right to change or update equipment supplied to RETS students as is deemed necessary.

## PARTIAL LISTING OF EMPLOYERS WHO HAVE RECENTLY HIRED RETS GRADUATES

Advanced Micro Devices	ITT Avionics
Aero of Detroit	Jet Electronics
Allied Chemicals Corporation	Kelvinator
American Telephone and Telegraph	Laser Alignment Incorporated
Bechtel Power Co.	L D J Electronics
Bell & Howell	Lectron Products
Bendix Corporation	Leslie Sound Systems
Bio-Med Inc.	Lockheed
Burroughs Corporation	Lundy Electronics
CEC Controls	3 M Business Products
Chrough Communications	McDonald Douglas
Chrysler Tank Plant	Memorex
City of Detroit	Merrimac Industries
City X-Ray, Inc.	Michigan Bell Telephone
Computer Periperals	Modular Data Systems
Datapoint Corp.	Motorola
Data Scope	National Semiconductor Corp.
Detroit Diesel Corporation	New Jersey Bell
Detroit Edison Co.	New Jersey Business Systems, Inc.
Digital Equipment Corporation	Northern Telecom
Dow Jones	Pitney Bowes
Eastman Kodak	Radio Station WGPR
E. I. DuPont De Nemours Co.	Radio Station WJLB
Electro-Matic	Ray-Chem Corp.
Exide Electronics, Inc.	Robotron
Fairchild Xincom Systems	Rowe International
Ford Aerospace and Communications Corp.	Singer Kearsott Division
Fundimensions	Singer-Link, Inc.
Galco Industrial Electronics	Technical Systems Inc.
General Electric	Tektronix
Gestetner Corporation	Texas Instruments
Glass-Tech	TRW
Harris Semiconductors	TV Channel WGPR
Heath (KIT) Company	TV Channel WTVS
Henry Ford Hospital	United Airlines
Herrud and Company	Universal Manufacturing Company
Honeywell	Xerox Corporation
Hughes Aircraft	Xycon Corporation
IBM	

# 1981-2 ENROLLMENT CALENDAR

RETS — WYOMING, MICHIGAN (616) 538-3170

## FULL-TIME PROGRAMS

<b>ELECTRONIC ENGINEERING TECHNOLOGY</b>	<b>SPECIALIZED ELECTRONIC SERVICING</b>
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<b>START DATE</b>	<b>START DATE</b>
7-6-81	9-28-81
9-28-81	9-27-82
1-4-82	
3-29-82	
7-6-82	
9-27-82	

## PART-TIME PROGRAMS

<b>APPLIED ELECTRONIC TECHNOLOGY (2 Nights a Wk.)</b>	<b>HIGH SCHOOL HONORS (Saturdays)</b>
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<b>START DATE</b>	<b>START DATE</b>
9-28-81	9-12-81
9-27-82	9-11-82



## **OTHER PROGRAMS**

In addition to the above, there may be courses offered in FCC Radiotelephone license preparation, Digital and Analog Electronics, Microprocessor Technology, Cable Television and Computer Programming. These courses will be offered only if there is a sufficient number of students enrolled to justify beginning the program. For further information on these courses and their availability, contact a RETS Admissions Representative or the Admissions Office.

## **VACATION PERIODS**

JUNE 22 through JULY 4, 1981  
 JUNE 21 through JULY 5, 1982

DECEMBER 21 through JANUARY 1, 1982  
 DECEMBER 20 through JANUARY 3, 1983

All full time students are excused from class on the last school day of each quarter.

## **SCHEDULED HOLIDAYS**

New Year's Day - Good Friday - Memorial day - Independence Day - Labor Day  
 Christmas Day - Thanksgiving and following Friday

**NOTE:** RETS reserves the right to make changes in curriculum to reflect latest technology, to reset class schedules and hours, to consolidate classes, and change locations in order to better serve our students.

