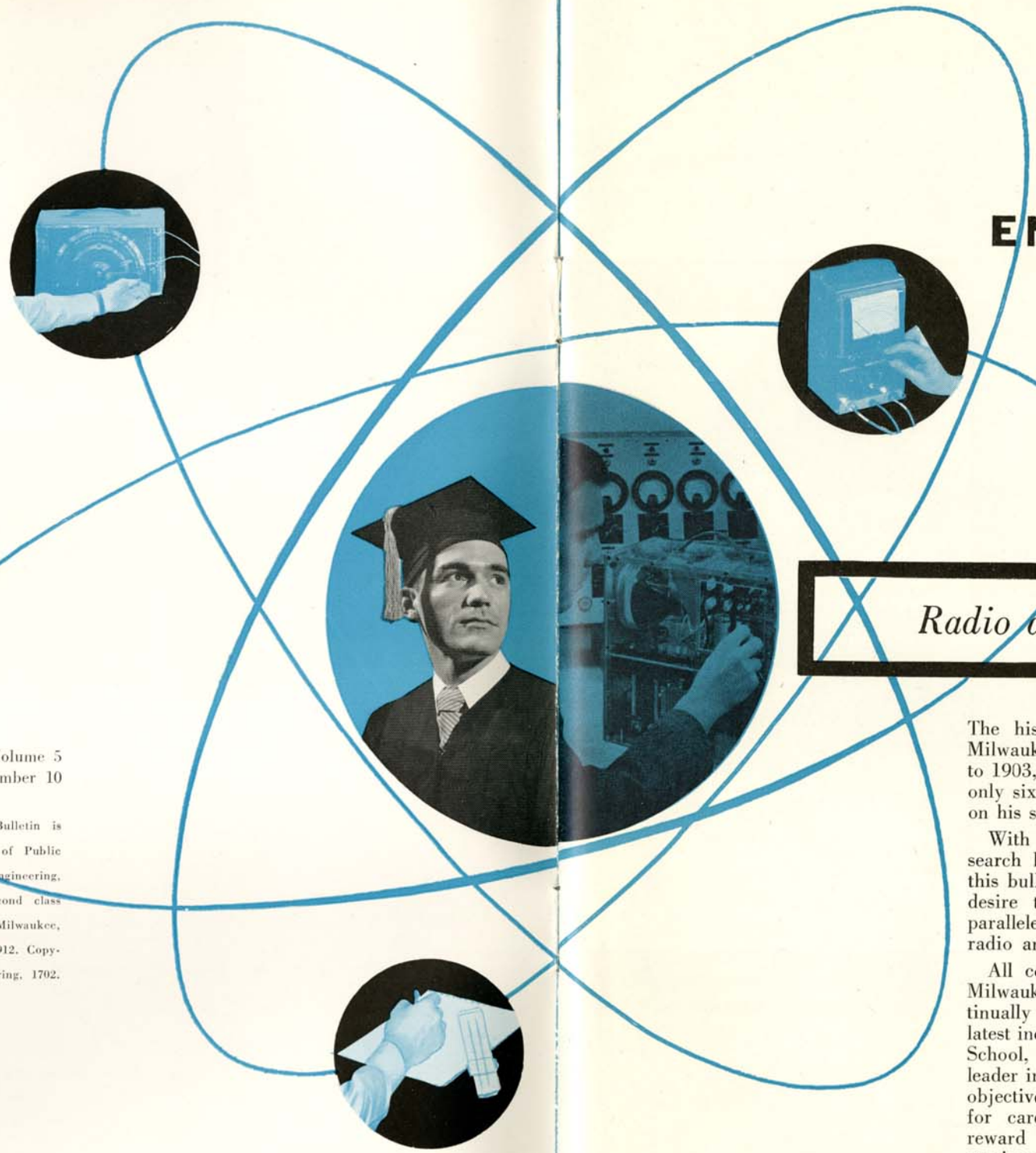
MILWAUKEE SCHOOL OF ENGINEERING

Bulletin

Radio and TeleVision

ISSUE



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Radio and Television Issue

The history of wireless and radio at the Milwaukee School of Engineering goes back to 1903, the year of the School's founding — only six years after Marconi took out patents on his system of wireless telegraphy.

With a half-century of experience and research behind its curricula, MSOE presents this bulletin to give information to men who desire to prepare themselves for the unparalleled opportunities in the vast field of radio and television.

All courses of instruction offered by the Milwaukee School of Engineering are continually being adapted to meet the very latest industrial trends and developments. The School, an eminent pioneer and international leader in technical education, has as its prime objective the educating and training of men for careers destined to bring the highest reward to the individual and the highest service to the industry.

May 15, 1953 | Volume 5 Number 10

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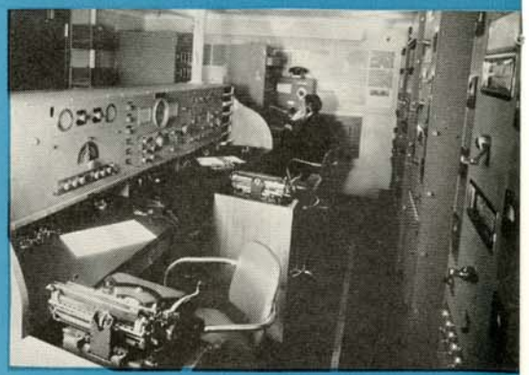
Television Servicing



Air and Marine Communications

Broadcast Station
Radio and TV Shop Owner

Medical Television
Industrial Electronics

YOU *and your future*

in Radio and Television

The Radio and Television Manufacturer's Association reports that millions of television sets and additional millions of radio sets are now being produced each year. With the licensing of new TV stations almost daily, additional millions of TV receivers will be installed across the nation each year. Radio set production also continues to increase at a high rate.

New industrial and military applications of radio, television and related electronics are also making phenomenal strides destined to rival commercial radio and television industries in dollar volume and opportunities for the individual.

All of this means that today we stand on the threshold of a new era in electronics in which the technically trained and qualified individual will find acceptance in the radio and television field.

Will you, either as a serviceman or technician, find a career in this great industry?

Photos courtesy of RCA Service Company, Inc., Television Service Engineers, Northwest Airlines, Radio Corporation of America, Ladish Co., Station WTMJ.

the serviceman

The radio and television serviceman can usually complete his training and be in a good wage-earning position within a year. Upon completion of his training, the serviceman has a choice of careers. He may join the staff of a large service and repair firm, a step which may eventually lead to a supervisory position in management. Or, the individual with service level training may be employed by industry in such phases as the assembly, installation and testing of radio, television or electronic components and units. And finally, the serviceman may operate his own service and repair business where, with great development potential, he may employ other persons in varied capacities.

the technician

While the radio and television technician has a longer and more technical period of training than the serviceman, his employment options are of a more advanced nature.

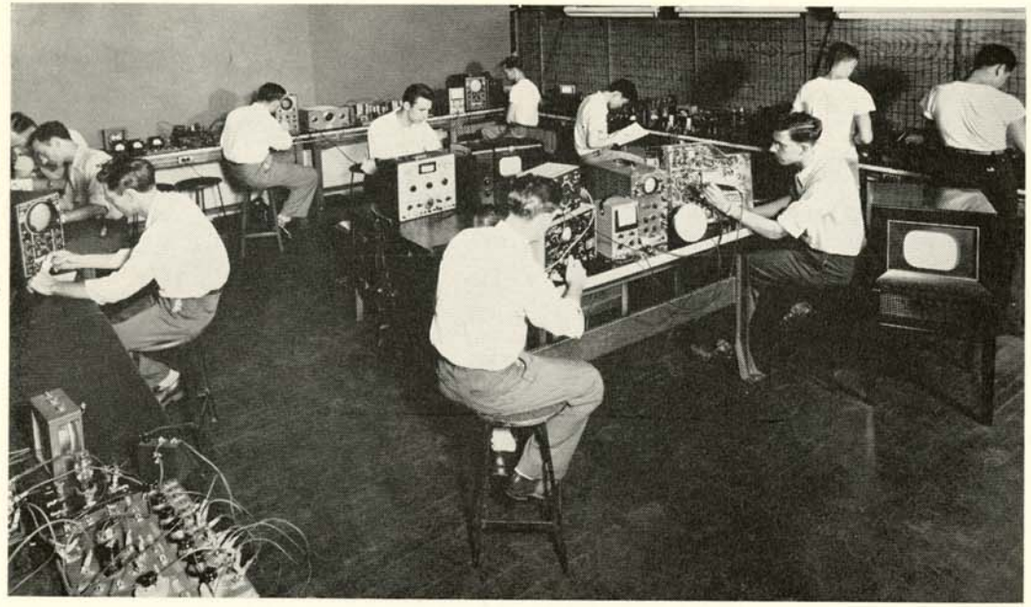
In industry, the technician finds his place in experimental laboratories and engineering departments where his knowledge and skills are put to direct use in a variety of ways, from model-making, testing and drafting, to detailed research work. Often called an *engineering associate*, the technician acts as an assistant to engineers, aiding them in various phases of their work. He is required to be experienced with the basic theories, circuits, and tests of electronic equipment and he must have a practical knowledge of scientific methods and practices so that he can understand the language of engineering.

Industry also uses technicians in such capacities as field engineers, field installation and repair men, factory service technicians and technical representatives. The technician may also specialize in sales and management techniques for employment in industry or in operating a business of his own.

many new careers

Offering additional opportunities to servicemen and technicians are the aviation, commercial and marine communications fields where the use of radio, television and other electronic equipment continues to grow. Federal, state and municipal governments also employ large numbers of technically trained personnel in specialized capacities.

For further typical occupational objectives for servicemen and technicians, see the course outlines on pages 8, 10 and 12 of this bulletin.



Some Milwaukee School of Engineering television students are shown at work in a laboratory. Practical technical training, such as this is the key to the success of graduates from MSOE.

opportunities of the future

The evolutionary path of radio and television is dotted with a number of milestones, the earliest of which is the spark-gap transmitter and coherer of the "wireless" days. The coherer soon was replaced by the crystal detector which, in turn, became obsolete when the vacuum tube made its revolutionary entrance into the field. Since its innovation, the vacuum tube has dominated the electronics industry, being incorporated into each new development up to the present day.

TRANSISTOR

Now, with the recent advent of the transistor, the vacuum tube may be eclipsed in the foreseeable future. Being very much smaller in size and requiring only a fraction of the power necessary for a vacuum tube, the transistor promises to revolutionize the radio and electronics industry. Today, no one doubts that radio and television sets will shrink considerably through the use of transistors and printed circuits. One large manufacturer has already produced a transistor television receiver, demonstrating that this is no longer a dream of the future.

ULTRA HIGH FREQUENCY

Of the thousands of new television stations now being licensed, most will be assigned frequencies in the ultra high bands. To be prepared for these changes, servicemen and technicians will need training in techniques and circuitry quite different from the methods employed in dealing with the very high frequency systems now in use. The latest information and training in this important phase of television will be vital to men seeking careers in this field.

COLOR TELEVISION

Most electronic engineers predict that color television will be prevalent within the next five years. Color telecasting, while adding to the versatility of television, will increase the complexity of circuits to the point where servicemen and technicians will have to be exceptionally well-grounded in fundamentals of direct and alternating currents, electronics, radio and television in order to cope with color television problems.

MSOE will help you meet this challenge

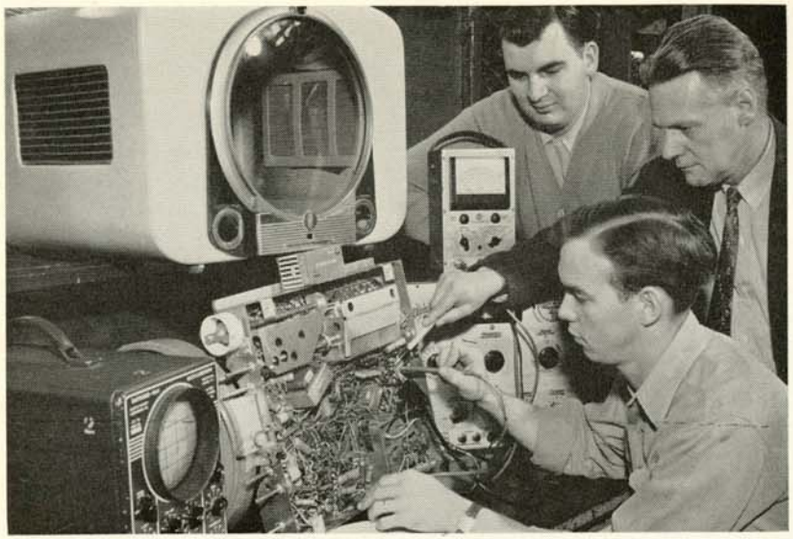
These new developments pile opportunity on opportunity for well-trained servicemen and technicians. *You can meet these challenges for a career in radio, television and electronics through training at the Milwaukee School of Engineering.*

The School has years of experience in design and research in the ultra high frequency range and has a skilled staff and well-equipped laboratories appropriate for this type of study. The unit-chassis system of instruction, developed at MSOE, is the only method that can assure the student that he will be able to understand all types of electronic and television circuits, regardless of the make of set or whether the picture is produced in black and white, or in color.

On the following pages, see the outlines of the MSOE courses which can train you for a successful career as a radio and television serviceman, a radio technician or a radio and television technician.

The Dean of Engineering and the Department Chairmen meet in an academic conference. Clockwise around the table, they are: Robert F. Miller, Physical Sciences; *Emil F. Symonik,* English; *Richard J. Ungrodt,* Electrical Engineering; *Dean Fred J. Van Zeeland; Arnold P. Jones,* Mathematics; *George R. Richards,* Economics and Industrial Commerce; *and Elmer E. Petty,* Drawing.

Members of the Radio and Television Section of the Electrical Engineering Department watch a laboratory demonstration. From left to right are instructors Charles F. Rockey, William C. Winn, Herbert D. Werwath, Assistant Professors Robert J. Banker, William A. Van Zeeland, Student Assistant Ralph W. Heilmann, and Assistant Professor Blayne E. Arneson.



Radio and Television Service Course

Conservative industrial estimates indicate that over 130,000 TV servicemen will be needed within the next few years for the installation and repair of receivers alone. This does not include the many other high-paying job opportunities in this expanding industry.

In addition to training the student to become a competent radio-television serviceman and service shop owner, this course prepares him for a variety of additional occupations with excellent career potentials.

typical occupational objectives

Radio Servicing: Installing and servicing radios, public address systems, recorders and related electronic devices.

Manufacturing: Assembling, inspecting, aligning, testing and servicing.

Merchandising: Installation, sales, buying, technical correspondence, demonstrating, service managing.

Television Servicing: Installing antennas and television sets, home and shop servicing.

Shop Ownership: Managing own business, supervising technical and sales personnel, arranging for advertising, collections, buying and selling.

RADIO AND TELEVISION SERVICE CURRICULUM

	Symbol	Subject	Periods Per Week	Lecture	Lab.	Credit In Quarter Hours
TERM I	ELTN 021	DC and AC Theory	5	5	0	5
	ELTN 021A	Electrical Calculations	5	5	0	5
	ELTN 041	DC and AC Laboratory	10	1	9	4
	MATH 03	Electrical Mathematics	5	5	0	5
	COMM 021	General Communications	4	4	0	4
	SR 21F	Slide Rule Practice	1	1	0	0
		Totals	30	21	9	23
TERM II	ELTN 022	Electronics	5	5	0	5
	ELTN 022A	Electronics Calculations	3	3	0	3
	ELTN 042	Electronics Laboratory	7	1	6	3
	MATH 04	Electrical Mathematics	5	5	0	5
	SHOP 02B	Hand and Power Tools	4	1	3	2
	COMM 022	Written Communications	3	3	0	3
	I COM 21B	Applied Psychology	3	3	0	3
		Totals	30	21	9	24
TERM III	ELTN 24D	Radio Servicing Theory	5	5	0	5
	ELTN 024A	Radio Circuits	2	2	0	2
	ELTN 44D	Radio Service Laboratory	10	1	9	4
	COMM 023	Business Communications	3	3	0	3
	I COM 030	Owning and Operating a TV, Radio and Appliance Shop	4	4	0	4
	I COM 23B	Technical Selling	3	3	0	3
	DRAW 040F	Radio Circuit Drawing	3	0	3	1
		Totals	30	18	12	22
TERM IV	ELTN 26B	Television Receivers	5	5	0	5
	ELTN 026A	Television Circuits	4	4	0	4
	ELTN 46B	Television Receivers Laboratory	10	1	9	4
	ELTN 30A	Ultra High Frequency Techniques	2	2	0	2
	ELTN 31A	Pulse Systems	3	3	0	3
	ELTN 32A	Frequency Modulation	2	2	0	2
	I COM 24B	Merchandising and Advertising	4	4	0	4
		Totals	30	21	9	24

Radio Technician Course

ENGINEERING ASSOCIATE IN RADIO

Beginning with the study of direct current and alternating current circuits, the student receives the essential technical knowledge required to analyze and solve such circuits as are used in electronic equipment. Advancing through the curriculum, the student learns the fundamental principles of electronics and basic concepts of the vacuum tube, the theory and operation of radio receivers.

typical occupational objectives

Radio Research and Development Technician: Makes research models of parts and assemblies of radio transmitters, receivers, instruments and accessories.

Radio Interference Investigator: Locates radio interference using automobile equipped with mounted or portable radio and non-directional antenna.

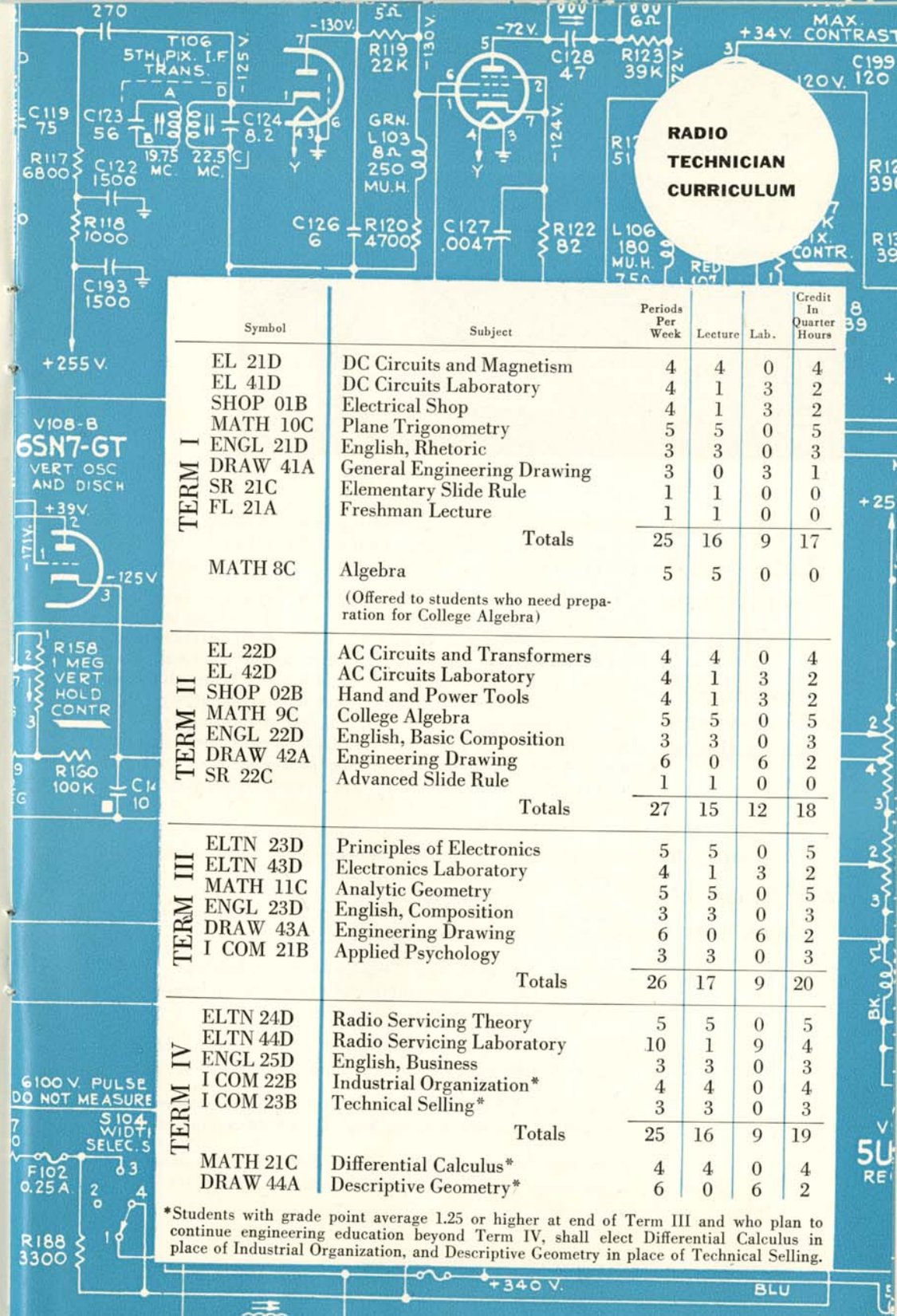
Radio Technician: Tests, repairs and installs all types of car and home radio equipment.

Radio Production Tester: Tests communication and radio receivers in a manufacturing plant.

Radio Production Supervisor: Supervises the assemblage of radio receivers, transmitters and amplifiers.

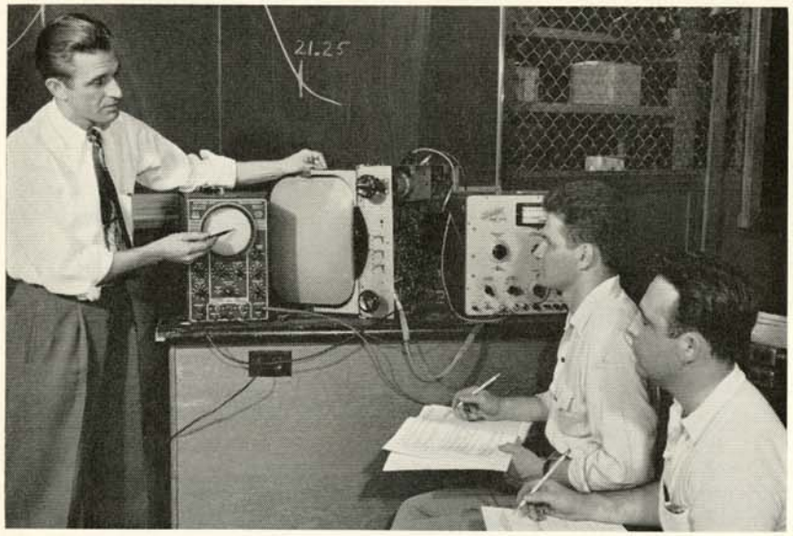
Radio Salesman: Sells radio and electronic components, wholesale and retail.

Radio and Appliance Shop Owner, Operator: Manages own business, supervises technical and sales personnel.



	Symbol	Subject	Periods Per Week	Lecture	Lab.	Credit In Quarter Hours
TERM I	EL 21D	DC Circuits and Magnetism	4	4	0	4
	EL 41D	DC Circuits Laboratory	4	1	3	2
	SHOP 01B	Electrical Shop	4	1	3	2
	MATH 10C	Plane Trigonometry	5	5	0	5
	ENGL 21D	English, Rhetoric	3	3	0	3
	DRAW 41A	General Engineering Drawing	3	0	3	1
	SR 21C	Elementary Slide Rule	1	1	0	0
	FL 21A	Freshman Lecture	1	1	0	0
		Totals	25	16	9	17
	MATH 8C	Algebra (Offered to students who need preparation for College Algebra)	5	5	0	0
TERM II	EL 22D	AC Circuits and Transformers	4	4	0	4
	EL 42D	AC Circuits Laboratory	4	1	3	2
	SHOP 02B	Hand and Power Tools	4	1	3	2
	MATH 9C	College Algebra	5	5	0	5
	ENGL 22D	English, Basic Composition	3	3	0	3
	DRAW 42A	Engineering Drawing	6	0	6	2
	SR 22C	Advanced Slide Rule	1	1	0	0
		Totals	27	15	12	18
TERM III	ELTN 23D	Principles of Electronics	5	5	0	5
	ELTN 43D	Electronics Laboratory	4	1	3	2
	MATH 11C	Analytic Geometry	5	5	0	5
	ENGL 23D	English, Composition	3	3	0	3
	DRAW 43A	Engineering Drawing	6	0	6	2
	I COM 21B	Applied Psychology	3	3	0	3
		Totals	26	17	9	20
TERM IV	ELTN 24D	Radio Servicing Theory	5	5	0	5
	ELTN 44D	Radio Servicing Laboratory	10	1	9	4
	ENGL 25D	English, Business	3	3	0	3
	I COM 22B	Industrial Organization*	4	4	0	4
	I COM 23B	Technical Selling*	3	3	0	3
		Totals	25	16	9	19
	MATH 21C	Differential Calculus*	4	4	0	4
	DRAW 44A	Descriptive Geometry*	6	0	6	2

*Students with grade point average 1.25 or higher at end of Term III and who plan to continue engineering education beyond Term IV, shall elect Differential Calculus in place of Industrial Organization, and Descriptive Geometry in place of Technical Selling.



Radio and Television Technician Course

ENGINEERING ASSOCIATE IN RADIO AND TELEVISION

Frequency modulated broadcasting and telecasting pose many more technical problems than confront the AM radio technician. FM is the connecting link between radio and television.

One of the highlights of the Radio and Television Technician Curriculum is the "Unit Chassis System" of teaching television receivers, as developed at MSOE. This system "breaks down" the TV receiver by stages, each stage construced on a separate chassis. The student studies a stage at a time. When all chassis are electrically connected, they result in a complete, operating television receiver. Thus, the student learns thoroughly the relationship, location and function of every component in a TV receiving set. This intimate knowledge enables the student to quickly and accurately analyze the symptoms displayed by a faulty set.

typical occupational objectives

Audio Operator: Regulates volume level of sound during radio or television broadcasts.

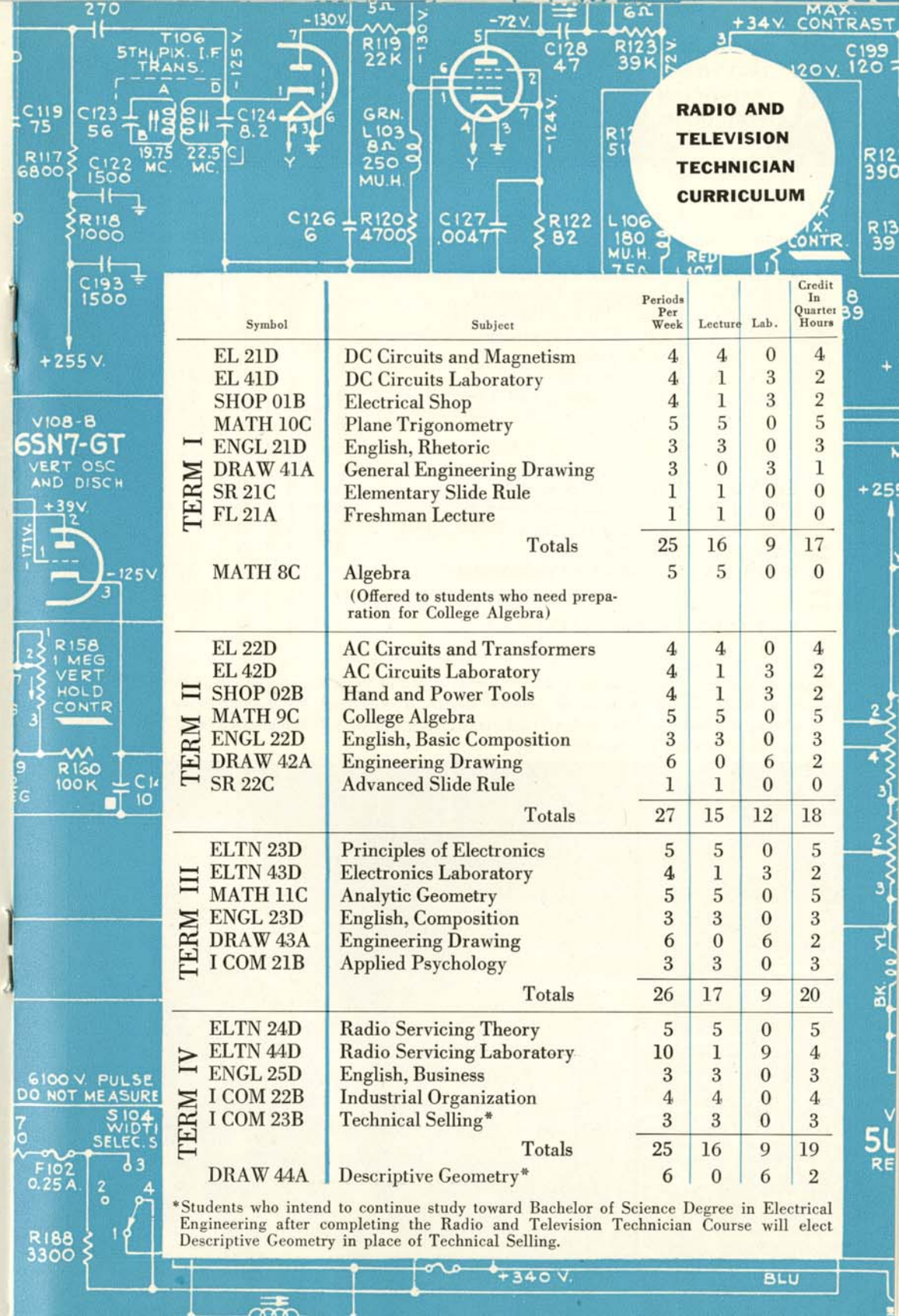
Television Technician: Installs, tests, adjusts and repairs television receivers, instruments and accessories.

Television Research and Development Technician: Creates models of parts and assemblies of transmitters, receivers, instruments and accessories.

Television Production Tester: Tests receivers and other components in television production plant.

Radar and High Frequency Technician: Works in manufacturing, testing and maintaining high frequency equipment.

Television Production Supervisor: Supervises the assemblage of television receivers and other electronic equipment.



	Symbol	Subject	Periods Per Week	Lecture	Lab.	Credit In Quarter Hours
TERM I	EL 21D	DC Circuits and Magnetism	4	4	0	4
	EL 41D	DC Circuits Laboratory	4	1	3	2
	SHOP 01B	Electrical Shop	4	1	3	2
	MATH 10C	Plane Trigonometry	5	5	0	5
	ENGL 21D	English, Rhetoric	3	3	0	3
	DRAW 41A	General Engineering Drawing	3	0	3	1
	SR 21C	Elementary Slide Rule	1	1	0	0
	FL 21A	Freshman Lecture	1	1	0	0
		Totals	25	16	9	17
	MATH 8C	Algebra (Offered to students who need preparation for College Algebra)	5	5	0	0
TERM II	EL 22D	AC Circuits and Transformers	4	4	0	4
	EL 42D	AC Circuits Laboratory	4	1	3	2
	SHOP 02B	Hand and Power Tools	4	1	3	2
	MATH 9C	College Algebra	5	5	0	5
	ENGL 22D	English, Basic Composition	3	3	0	3
	DRAW 42A	Engineering Drawing	6	0	6	2
	SR 22C	Advanced Slide Rule	1	1	0	0
		Totals	27	15	12	18
TERM III	ELTN 23D	Principles of Electronics	5	5	0	5
	ELTN 43D	Electronics Laboratory	4	1	3	2
	MATH 11C	Analytic Geometry	5	5	0	5
	ENGL 23D	English, Composition	3	3	0	3
	DRAW 43A	Engineering Drawing	6	0	6	2
	I COM 21B	Applied Psychology	3	3	0	3
		Totals	26	17	9	20
TERM IV	ELTN 24D	Radio Servicing Theory	5	5	0	5
	ELTN 44D	Radio Servicing Laboratory	10	1	9	4
	ENGL 25D	English, Business	3	3	0	3
	I COM 22B	Industrial Organization	4	4	0	4
	I COM 23B	Technical Selling*	3	3	0	3
		Totals	25	16	9	19
	DRAW 44A	Descriptive Geometry*	6	0	6	2

*Students who intend to continue study toward Bachelor of Science Degree in Electrical Engineering after completing the Radio and Television Technician Course will elect Descriptive Geometry in place of Technical Selling.

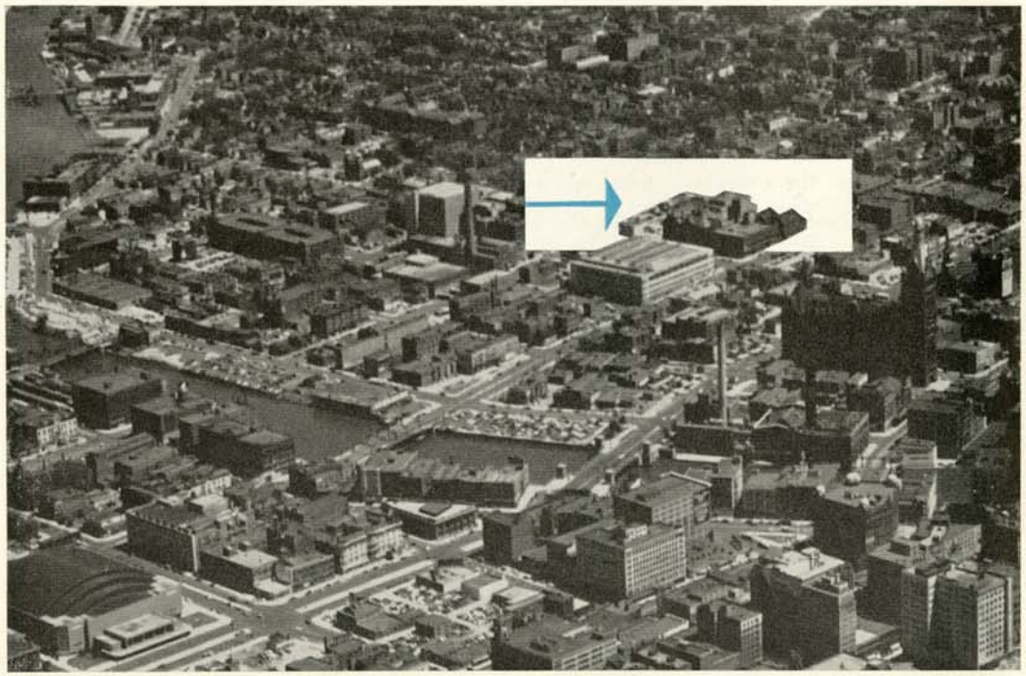
General Information

ABOUT THE SCHOOL

organization

The Milwaukee School of Engineering, an institution of higher learning, is incorporated under the laws of the State of Wisconsin. It is the purpose of the School to present programs of education in engineering. The School has the authority by charter of the State of Wisconsin to confer appropriate certificates and degrees. Organized as a nonprofit, nonstock corporation, it is operated by a governing Board of Regents elected from the members of the MSOE Corporation who are leaders in commerce and industry. Since the School is not tax supported, tuition and support from the resources of industry are its only income.

An airview of downtown Milwaukee, including the location of the Milwaukee School of Engineering.



Milwaukee Journal Photo

facilities

The instructional facilities of MSOE, occupying 102,204 square feet of floor space, include specially equipped laboratories, lecture and class rooms. A visual aid theater of the latest design is used to supplement lecture and laboratory discussion with moving pictures and slides.

A specialized, technical reference library, supported by the MSOE Alumni Library Fund, is located at the School. Including the most recent technical text materials and periodicals, the library augments general facilities available in the metropolitan Milwaukee area. Students also have access to rich study and research sources through exchange agreements with private, industrial and public library facilities located in the city.

Among other facilities provided by the School are a cafeteria, an information and guidance center, study and relaxation lounges, a merchandise center, and various student club rooms, including a completely equipped photographic dark room and a modern amateur radio station.

location

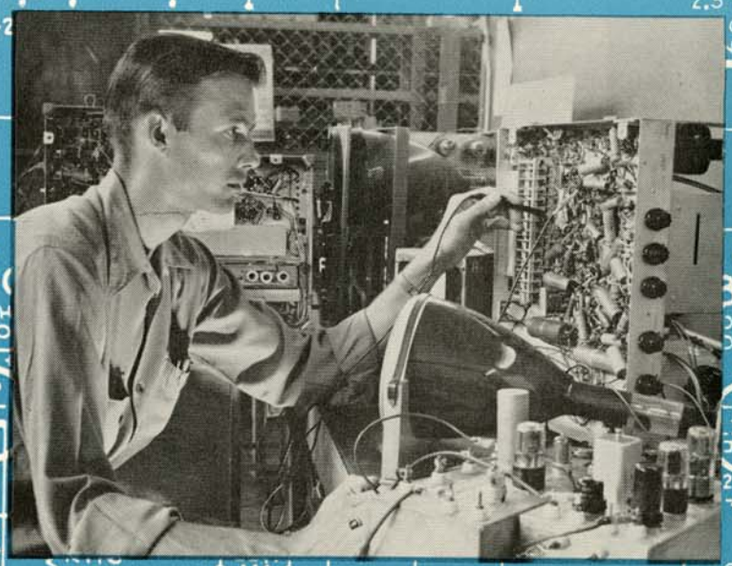
Located in a group of four buildings, the Milwaukee School of Engineering occupies the major portion of a city block near the heart of downtown Milwaukee. General offices are at 1025 North Milwaukee street. The School is ideally situated, being close to both the principal business and industrial centers of the city. Lake Michigan, with its beautiful park-bordered shoreline just six blocks from the School, is a picturesque year-round attraction.

Called "the machine shop of America," the city of Milwaukee ranks thirteenth in size in the nation and is the country's eighth largest producer of manufactured goods. Its industrial plants turn out nearly 2 billion dollars worth of products annually. This production record is built on a solid foundation of technicians and engineers such as are trained at the Milwaukee School of Engineering.

RADIO AND TELEVISION TECHNICIAN CURRICULUM

	Symbol	Subject	Periods Per Week	Lecture	Lab.	Credit In Quarter Hours
TERM V	ELTN 27A	AM Transmitters, FCC Regulations	5	5	0	5
	ELTN 47A	Transmitter Laboratory	7	1	6	3
	ELTN 29A	Control Room Procedures	3	3	0	3
	ELTN 30A	Ultra High Frequency Techniques	2	2	0	2
	ELTN 31A	Pulse Systems	3	3	0	3
	ELTN 32A	Frequency Modulation	2	2	0	2
	I COM 24B	Merchandising and Advertising	4	4	0	4
		Totals	26	20	6	22
TERM VI	ELTN 26B	Television Receivers	5	5	0	5
	ELTN 46B	Television Receivers Laboratory	10	1	9	4
	ELTN 28A	FM and Television Transmitters	5	5	0	5
	LAW 20A	Business Law	3	3	0	3
	I COM 25A	Accounting Fundamentals*	4	4	0	4
		Totals	27	18	9	21
	MATH 21C	Differential Calculus*	4	4	0	4

*Students with grade point average of 1.25 or higher at end of Term V, and who intend to continue study toward Bachelor of Science Degree in Electrical Engineering after completing the Radio and Television Technician Course, will elect Differential Calculus in place of Accounting Fundamentals.



concentric curriculum

During the last fifty years, the Milwaukee School of Engineering has pioneered a program of technical education called the Concentric Curriculum.

Designed in a series of courses to prepare the student at successive terminal levels for specific occupational objectives, this program is at the same time planned as a whole to fulfill the requirements for the undergraduate degree of Bachelor of Science.

Courses in the Concentric Curriculum combine, in a balanced schedule, practical and theoretical technical training with the basic sciences, mathematics, and studies in the humanities. Subjects progress from emphasis on practical applications in manufacturing, testing and operation in the early terms, to advanced studies in engineering technology in the later terms.

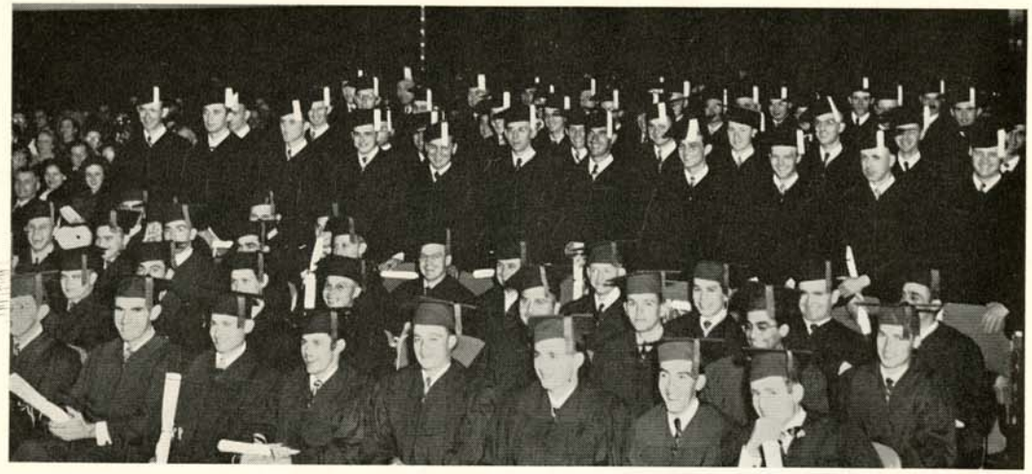
degree of associate in applied science

The degree of Associate in Applied Science is conferred on students who qualify by satisfactorily completing the Radio and Television Technician course.

college of engineering

While the technician courses at MSOE are complete in themselves and prepare the student for specific occupational objectives, under the concentric curriculum they are also the first third of the full credit study in the College of Engineering. Qualified students, upon successful completion of a technician course, may continue their studies in engineering to attain a Bachelor of Science degree.

A few of the typical occupational objectives of the course in electrical engineering with electronics major are: design engineer, electronics research engineer, radio or television engineer, audio engineer, applications engineer, and electronic sales engineer.



A typical graduating class of MSOE-trained technicians and engineers.

student organizations

The Student Activities Department of the Student Service Division is the advisory center for all MSOE undergraduate organizations. This office helps such groups plan and coordinate their social programs and business affairs. The Student Activities Department also assists committees of student organizations with arrangements for such all-School functions as the annual Homecoming and St. Patrick's Day observances, freshman mixers, and other events.

Students are encouraged to participate in some part of the varied program of extra-curricular activities at the School but are advised not to allow such activities to hinder their academic development.

Self-governed by their own officers and committees, with the aid of individual faculty advisors, the following are active student organizations at MSOE:

Delta Alpha Epsilon—fraternity for refrigeration, heating and air conditioning students

Delta Phi Zeta—fraternity for electrical engineering students

Kappa Gamma Phi—fraternity for electronics students

Phalanx—fraternity for general student body

Sigma Pi Rho—fraternity for engineering students majoring in electrical power

Tau Iota Epsilon—fraternity for technician students

Tau Omega Mu—fraternity for honorary student tutors

Chess Club—all-student group.

Glee Club—all-student musical group

Photography Club—all-student group with complete darkroom facilities

Radio Club—all-student group operating amateur transmitter W9HHX

Student Congress — elected by student body to organize all-student affairs such as intramural basketball, bowling and softball and other events

A portion of the W9HHX transmitter

student services

In addition to general counseling and advice available to all students from any of the academic and administrative division heads, department chairmen, and other members of the faculty and staff, the MSOE Student Service Division provides other sources of assistance to students.

HOUSING

A Housing Bureau to assist students in locating living quarters in Milwaukee is maintained by the Student Service Division. The Division also provides a Part-time Employment Bureau since a majority of the MSOE student body is employed on a part-time basis while carrying a full academic schedule.

EMPLOYMENT

The School, through the Relations with Industry Division, maintains an employment service to help graduating students and alumni in locating suitable employment. This Division is in constant contact with the executives and employment departments of local and national industries and makes arrangements for personal interviews with their representatives.

academic information

THE SCHOOL YEAR

The school year is divided into four quarters or terms of twelve weeks each with classes scheduled for forty-eight of the fifty-two weeks of the calendar year. The four remaining weeks are set aside as vacation periods between quarters. Students are accepted in new classes which are formed at the beginning of each quarter. Although courses are offered the year around, attendance in the summer quarter is optional.

ADMISSION REQUIREMENTS

SERVICE COURSES—There are no formal entrance requirements for admission to Service Courses. Recommendations for admission are made by the Committee on Admissions.

TECHNICIAN COURSES—Admission to the Technician Courses is by one of the following methods: (1) by transcript indicating graduation from an approved secondary school; (2) by transfer and admission with advanced standing from another institution of higher learning; (3) by successful completion of a Service Course at MSOE; (4) by entrance examination; and (5) by removal of deficiencies.

TUITION

Tuition and fees are payable by the term according to the following schedule:

Basic tuition for a Service Course.....per term $175.00

Basic tuition for a Technician Course.....per term [redacted]

Tuition, as quoted, includes laboratory fees for the stated periods.

BOOKS, EQUIPMENT AND SUPPLIES

All laboratory equipment required by students is furnished by the School. Drawing instruments, books, and other equipment and supplies required in each course are purchased by the student to meet his individual needs. These items may be obtained at the Merchandise Center operated by the School for the convenience of the student body.

FOR FURTHER INFORMATION

The MSOE Annual Catalog contains complete information on the School. For your free copy, write to the Director of Admissions, Milwaukee School of Engineering, 1025 North Milwaukee Street, Milwaukee 1, Wisconsin.

—Milwaukee Sentinel Photo

Left to right above, Vice-chairman Frey, President Werwath and Chairman Harnischfeger.

the MSOE Corporation and Board of Regents

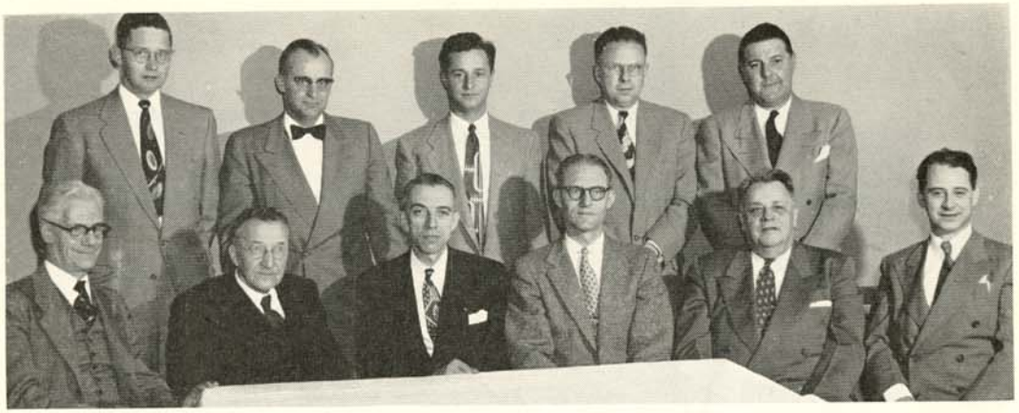
OFFICERS

*Walter Harnischfeger	Chairman . . . *President, Harnischfeger Corporation*
*Frank T. Frey	Vice-chairman . . . *Vice-president, Geuder, Paeschke & Frey Co.*
*John Herzfeld	Secretary . . . *Mercantile Executive*
*Heinz M. Werwath	Treasurer . . . *Milwaukee School of Engineering*
*Karl O. Werwath	President . . . *Milwaukee School of Engineering*

MEMBERS

Dudley B. W. Brown	*President, Milwaukee Gas Light Company*
Philip G. Brumder	*Vice-president, Blackhawk Mfg. Company*
*E. C. Cahill	*President, RCA Service Company, Inc.*
George J. Callos	*Executive Vice-president, Klau-Van Pietersom-Dunlap, Inc.*
L. S. Crandall	*Assistant Sales Manager, International Business Machines Corporation*
*William F. Eichfeld	*President, William F. Eichfeld & Sons Co.*
A. F. Gallun, Jr.	*Industrialist*
Fred V. Gardner	*President, Fred V. Gardner and Associates*
Frank W. Greusel	*President, Greusel Distributing Corporation*
*K. L. Hansen	*Consulting Engineer*
Joseph F. Heil	*President, The Heil Co.*
Hans U. Hjermstad	*President, Electro-Seal Corporation*
Harry G. Hoffman	*President, Hoffman & York, Inc.*
Roy W. Johnson	*President, A-P Controls Corporation*
George F. Kasten	*Vice-president, First Wisconsin National Bank of Milwaukee*
Arthur C. Keene	*Vice-president, Wausau Iron Works*
Charles H. Klingler	*Manufacturer (retired)*
James H. Kuehn	*Vice-president, Wisconsin Cold Storage Co.*
T. O. Liebscher	*President, Le Roi Company*
*M. J. Maiers	*Manager, Sales Service Department, Commonwealth Edison Company*
James B. Morrison	*President, Wisconsin Telephone Company*
Harold P. Mueller	*President, L. J. Mueller Furnace Co.*
Greta W. Murphy	*Director, Public Relations, MSOE*
*John H. Murphy	*Attorney, Schmitz, Wild and Gross*
*A. C. Schmidt	*Coordinator, MSOE*
William C. Scott	*Vice-president in Charge of Merchandising, Evinrude Motors, Division of Outboard, Marine and Mfg. Co.*
*E. W. Seeger	*Vice-president and Assistant Secretary, Cutler-Hammer, Inc.*
J. H. Smith	*General Manager of the X-Ray Department General Electric Company*
George J. Swart	*Treasurer, Olson Implement Company*
Hannah W. Swart	*Registrar, MSOE*
*V. Robins Tate	*Executive Vice-president and Secretary, Perfex Corporation*
*J. Rex Vernon	*Vice-president, Johnson Service Company*
C. O. Wanvig, Jr.	*Vice-president, Globe-Union, Inc.*
*John Weiland	*Works Manager, Milwaukee Body Plant, Nash-Kelvinator Corporation*
Hannah S. Werwath	*Assistant Treasurer, MSOE*
Arthur A. Wetzel	*President, Wetzel Bros. Printing Co.*

**Members of the MSOE Board of Regents*



Present at a recent joint meeting of the MSOE Industrial Advisory Committees for Engineering Electronics and Radio-Television were (front row, left to right): Daniel W. Gellerup, Vice-president, Albertson Electric Company; K. L. Hansen, General Chairman, MSOE Industrial Advisory Committee, *Consulting Engineer; N. J. Richard,* Chairman, MSOE Radio-Television Committee, *Assistant to the Chief Engineer, Station WISN; William H. Elliot,* Chairman, MSOE Engineering Electronics Committee, *Supervising Development Engineer, Cutler-Hammer, Inc.; J. Rex Vernon,* General Secretary, MSOE Industrial Advisory Committee, *Vice-president, Johnson Service Company; and Fred J. Van Zeeland, Dean of Engineering, MSOE; (back row, left to right) Richard J. Ungrodt, Chairman, Department of Electrical Engineering, MSOE; Philip B. Laeser, Manager, Engineering Department, Stations WTMJ and WTMJ-TV; Ralph H. Eder, President, Television Service Engineers; Dorr C. Snoyenbos, Director of Training and Safety, AC Spark Plug Division, General Motors Corporation; and Ray F. Lutz, Service Manager, Admiral Corporation, Milwaukee Distribution Division, Inc. Members E. C. Cahill, President, RCA Service Company, Inc.; E. T. Sherwood, Electrical Engineer, Globe-Union, Inc.; and E. J. Auxer, Branch Manager, International Business Machines Corporation, were unable to attend.*

Industrial Advisory Committee

The educational programs of the Milwaukee School of Engineering are closely geared to the latest manpower needs of industry and governmental agencies through the recommendations of the Industrial Advisory Committee which constantly studies each of the areas covered by the curricula of the School.

This Committee reports to department chairmen, the Dean of Engineering, the administrative officers of the School, and the Board of Regents on overall educational policies and development of specific curricula and subjects. Such close cooperation, the result of effective liaison between MSOE and the representatives of industry on the Committee, has been in effect since the School was founded in 1903. It has been a vital factor in the growth of MSOE and insures the quality of service rendered both to the students and the industries which employ MSOE graduates.

some typical employers of MSOE Radio-TV graduates

AC Spark Plug Division	
General Motors Corporation	*Milwaukee, Wis.*
Allis-Chalmers Manufacturing Company	*West Allis, Wis.*
Association of American Railroads	*Chicago, Ill.*
Beech Aircraft Corporation	*Wichita, Kans.*
Bell Aircraft Corporation	*Buffalo, N. Y.*
Bell Telephone Laboratories	*Murray Hill, N. J.*
Bendix Aviation	*Kansas City, Mo.*
Boeing Airplane Company	*Seattle, Wash.*
Bonded Television Service	*Milwaukee, Wis.*
Collins Radio Corporation	*Cedar Rapids, Iowa*
Cook Research Laboratories	*Skokie, Ill.*
Crosley Corporation, Division of Avco	*Cincinnati, Ohio*
Electronic Secretary Industries, Inc.	*Milwaukee, Wis.*
General Electric Company	*Richland, Wash.*
General Electric X-Ray Corporation	*Milwaukee, Wis.*
Globe-Union, Inc.	*Milwaukee, Wis.*
Goddard's Distributors, Inc.	*West Palm Beach, Fla.*
Goodyear Aircraft Corporation	*Akron, Ohio*
Herge Radio and Electric Shop	*Ellwood City, Pa.*
Hiller Company	*Fond du Lac, Wis.*
International Business Machines Corporation	*Endicott, N. Y.*
Kettle Moraine Broadcasting Co.	*Hartford, Wis.*
Krahns Radio & Television	*Hustisford, Wis.*
Link Aviation, Inc.	*Binghamton, N. Y.*
Magnavox Company	*Fort Wayne, Ind.*
Nash-Kelvinator Corporation	*Milwaukee, Wis.*
Naval Research Laboratory	*Washington, D. C.*
Perfex Corporation	*Milwaukee, Wis.*
Philco Radio Corporation	*Philadelphia, Pa.*
Radio Corporation of America	*Camden, N. J.*
Radio Station WISN	*Milwaukee, Wis.*
Reliance Radio & Television	*Milwaukee, Wis.*
Samsons Enterprises Inc.	*Milwaukee, Wis.*
Sandia Corporation	*Albuquerque, N. M.*
Square D Company	*Milwaukee, Wis.*
Stoddart Aircraft & Radio Corp.	*Los Angeles, Calif.*
Sylvania Electric Products Corp.	*Woburn, Mass.*
The Glenn L. Martin Co.	*Baltimore, Md.*
Television Service Engineers	*Milwaukee, Wis.*
U. S. Civil Service	*Washington, D. C.*
U. S. Time Corporation	*Middlebury, Conn.*
Westinghouse Electric Corporation	*Baltimore, Md.*
Wisconsin Sound Equipment Co., Inc.	*Milwaukee, Wis.*
Wright-Nagl TV Service	*Milwaukee, Wis.*
Yankton Television Service	*Yankton, S. D.*
YVKA-National Broadcasting Station	*Caracas, Venezuela*

in these typical occupations

Calibrator
Construction and Development Technician
Customer Engineer
Development Technician
Electronic Assembler
Electronic Inspector
Electronic Technician
Engineering Aide
Equipment Technician
Field Service Representative
Firm Owner
Junior Technician
Technical Representative
Technical Sales Engineer
Television Field Service
Television Serviceman
Television Technician
Test Engineer
Test Technician
Type-test Technician

CALENDAR

1955 - 1956

	CALENDAR	1955	1956
WINTER TERM	Registration, new and advanced, begins	Dec. 20, '54	Dec. 20, '55
	Classes begin	Mon. Jan. 3	Tues. Jan. 3
	Winter Term ends	Fri. Mar. 25	Fri. Mar. 23
SPRING TERM	Registration, new and advanced, begins	Mar. 21	Mar. 19
	Classes begin	Mon. Apr. 4	Mon. Apr. 2
	Memorial Day recess	Mon. May 30	Wed. May 30
	Spring Term ends	Fri. June 24	Fri. June 22
SUMMER TERM	Registration, new and advanced, begins	June 20	June 18
	Classes begin	Tues. July 5	Mon. July 2
	Fourth of July recess		Wed. July 4
	Labor Day recess	Mon. Sept. 5	Mon. Sept. 3
	Summer Term ends	Fri. Sept. 23	Fri. Sept. 21
FALL TERM	Registration, new and advanced, begins	Sept. 14	Sept. 17
	Classes begin	Wed. Sept. 28	Mon. Oct. 1
	Thanksgiving recess begins 9:55 P. M.	Wed. Nov. 23	Wed. Nov. 28
	Classes resume	Mon. Nov. 28	Mon. Dec. 3
	Fall Term ends	Tues. Dec. 20	Fri. Dec. 21

MILWAUKEE SCHOOL OF ENGINEERING CURRICULA

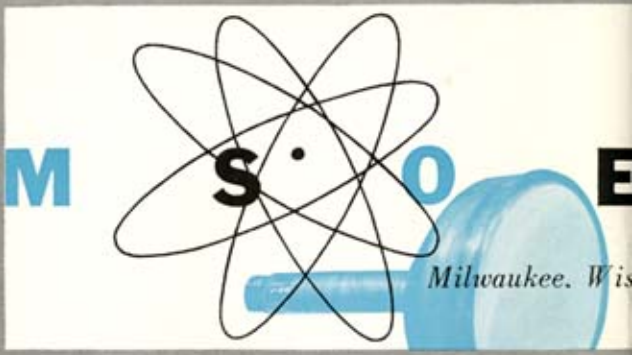
	Preparatory Course (For either electrical or mechanical technology)	*3 months*
ELECTRICAL TECHNOLOGY — RADIO AND TELEVISION	Radio and Television Service	*12 months*
	Radio Technician (Engineering Associate in Radio)	*12 months*
	Radio and Television Technician (Engineering Associate in Radio and Television)	*18 months*
	Electrical Engineering, electronics major (Bachelor of Science degree)	*36 months*
ELECTRICAL TECHNOLOGY — INDUSTRIAL ELECTRONICS	Electronic Technician (Engineering Associate in Industrial Electronics)	*12 months*
	Electrical Engineering, electronics major (Bachelor of Science degree)	*36 months*
ELECTRICAL TECHNOLOGY — ELECTRICAL POWER	Electrical Service	*6 months*
	Electro Technician (Engineering Associate in Electrical Power)	*12 months*
	Electrical Engineering, power major (Bachelor of Science degree)	*36 months*
MECHANICAL TECHNOLOGY — PLANT ENGINEERING	Refrigeration Service	*6 months*
	Heating Service	*6 months*
	Air Conditioning Technician (Engineering Associate in Air Conditioning)	*12 months*
	Mechanical Engineering, plant engineering major (Bachelor of Science degree)	*36 months*
MECHANICAL TECHNOLOGY — METAL FABRICATION	Welding Operator	*6 months*
	Welding Technician (Engineering Associate in Welding Fabrication)	*12 months*
	Mechanical Engineering, metal fabrication major (Bachelor of Science degree)	*36 months*
MECHANICAL TECHNOLOGY — MECHANICAL DESIGN	Mechanical Technician (Engineering Associate in Mechanical Technology)	*12 months*
	Mechanical Engineering, mechanical design major (Bachelor of Science degree)	*36 months*

Industrial Research Institute

Applied research in electrical and mechanical engineering and allied fields.

Evening Division

Specialized technical and industrial training.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Milwaukee, Wis