

Republika ng Pilipinas
(Republic of the Philippines)
MINISTRI NG EDUKASYON, KULTURA AT ESPORTS
(MINISTRY OF EDUCATION, CULTURE AND SPORTS)
Manila

September 1, 1982

M E C S O R D E R
No. 36, s. 1982

MINIMUM STANDARDS FOR DIPLOMA IN INDUSTRIAL AND ENGINEERING
TECHNICIAN, BACHELOR OF INDUSTRIAL TECHNOLOGY AND TEACHERS
TRAINING CURRICULA FOR TRADE TECHNICIAN INSTITUTE

To: Bureau Directors
Regional Directors
Presidents, State Colleges and Universities
Vocational School Superintendents

1. This Office, cognizant of the urgent need for a trade technician education curriculum which shall be offered in lieu of the existing two-year trade technical and three-year technology program, has approved the inclosed minimum standards for the two-year, three-year, and four-year technician training programs. The two-year program leads to the Diploma in Industrial Technician (D.I.T.), the three-year program leads to the Diploma in Engineering Technician (D.E.T.), and the four-year program leads to the degree of Bachelor in Industrial Technology (B.I.T.). For teachers of technicians, a Master in Technician Education (M.T.E.) Curriculum is hereby prescribed. The in-service program for teachers of technicians shall be implemented effective the school year 1982-1983.
2. The standards have been evolved after a series of consultative meetings and workshops with school heads and participants from both the government and the private sectors who will eventually be the end-users of the program.
3. For a more systematic implementation of the program, the effectivity of the prescribed standards for the technician education curriculum shall be as follows:

<u>Implementation Year</u>	<u>Calendar School Year</u>	<u>Activity</u>
First Year	1982)	Fellowship, re-training of
Second Year	1983)	teachers and other person-
Third Year	1984)	nel, rehabilitation of
		facilities; procurement of
		equipment and facilities

Fourth Year	1984- 85	Implementation of first year of technician cur- riculum
Fifth Year	1985- 86	Full implementation of technician curriculum
Sixth Year	1986- 87	Program expansion and project evaluation

4. The two-year technician curriculum shall be implemented in the 23 project institutions. The teacher training curriculum (Master of Technician Education) shall be implemented in the National Center for Teacher Education and Staff Development.

5. Other trade/technical schools may implement the technician program upon approval by the Minister of Education, Culture and Sports but not earlier than the school year 1985-86.

6. It is desired that this Order be widely disseminated.

(SGD.) ONOFRE D. CORPUZ
Minister

Incl. As stated

References:
BPS Circulars: Nos. 18, s. 1958 and
15, s. 1961
Department Order: No. 28, s. 1975

Allotment: L-3-4--(D.O. 1-76)

To be indicated in the Perpetual Index
under the following subjects:

CURRICULUM	SCHOOLS
DIPLOMA	VOCATIONAL EDUCATION
PROGRAM, SCHOOL	

LOCATIONS OF 23 PROJECT TEIs

Name of Institute	Location	
	City	Region
1. Marikina Institute of Science and Technology (National CTESD in Luzon) <u>a/</u>	Marikina	NCR
2. Regional Center for Technical Education and Staff Development (RCTESD) <u>b/</u>	Manila	NCR
3. Cebu School of Arts and Trades CSAT (Regional CTESD in Visayas) <u>a/</u>	Cebu	VII
4. University of South East Philippines USEP (Regional CTESD in Mindanao) <u>a/</u>	Davao	XI
5. Zamboanga School of Arts and Trades (ZSAT) <u>a/</u>	Zamboanga	IX
6. Cavite College of Arts and Trades	Cavite	IV
7. Bataan School of Arts and Trades <u>a/</u>	Bataan	III
8. Pablo Borbon Memorial Institute <u>a/</u>	Batangas	IV
9. Don Honorio Ventura College of Arts and Trades <u>a/</u>	Bacolor	III
10. Xavier University <u>c/</u>	Cagayan de Oro	X
11. Samar School of Arts and Trades <u>a/</u>	Samar	VIII
12. Kidapawan Trade School	Kidapawan	XII
13. Camarines Sur National College of Arts and Trades <u>a/</u>	Naga City	V
14. Nueva Viscaya School of Arts and Trades	Bambang	II
15. Iloilo School of Arts and Trades	Iloilo	
16. La Union School of Arts and Trades <u>a/</u>	San Fdo.	I
17. Bacolod City National Trade School	Bacolod	II
18. East Visayas School of Arts and Trades <u>a/</u>	Dumaguete	VII
19. Surigao School of Arts and Trades <u>a/</u>	Surigao	X
20. Cagayan State University <u>a/</u>	Tuguegarao	II
21. Mariano Marcos State University <u>a/</u>	Laoag	I
22. Sorsogon College of Arts and Trades	Sorsogon	V
23. Emilio Aguinaldo College <u>c/</u>	Dasmariñas	IV
Total		

Source: MEC and EDPITAF

- a/ Institutions offering pre-service technical teacher education (BSIE degree programs).
- b/ To be located in the Campus of Manila Technician Institute (MTI) in Taguig, Metro Manila. This institute does not offer two-year industrial technician program.
- c/ Private institutions.

(Inclosure No. 2 to MEC Order No. 38, S. 1982)

MINIMUM STANDARDS FOR DIPLOMA IN INDUSTRIAL
AND ENGINEERING TECHNICIAN, BACHELOR OF INDUSTRIAL
TECHNOLOGY AND TEACHER TRAINING CURRICULA FOR TRADE
TECHNICIAN INSTITUTE

A. Guidelines and Minimum Standards for Two-Year Industrial Technician

I. Curriculum Goal and Objectives

1. Goal

The program aims to prepare individuals for entrance to, and advancement in, the middle-level technical positions in industry that will provide liaison, linkages and coordination between the tradesmen in the workshops and the engineers or technologist.

2. Objectives

- a. To inculcate desirable values and work ethics as a crucial factor in national development.
- b. To develop tradesmen and broad technician skills in a particular field of technology.
- c. To provide technical/technological knowledge and information which will enable the individual to analyze job problems, to determine appropriate solutions, and to perform problem-solving tasks.
- d. To provide general education that will enable the individual to behave and interact effectively and efficiently within his social and occupational milieu.

- e. To develop entrepreneurial competencies that will lead to self-employment.

B. Program

1. Guiding Principles

The proposed two-year industrial technician and the three-year engineering technician curriculum is designed and structured under the following principles:

a. Supportive of national/regional development goals.

The thrust in an accelerated agriculture-based regional industrialization has continuously imposed increasing requirements for more technical types of skills such that a major concern is matching the quality and quantity of manpower to the demands and requirements of national/regional development.

b. Production-oriented. Provisions include the strengthening of technician curriculum in order to produce graduates with increased capabilities for entrepreneurial endeavors.

c. Flexibility, Economy and Viability. The curriculum provides for more flexibility to meet current and emerging needs. It includes requirements for minimal additional inputs in terms of available operational outlay and training staff. Viability is assured in that this curricular revision fits into the existing structures of the institutions that will implement it.

- d. Immediacy of needs. The technician curriculum is envisioned to meet the immediate needs of industrial establishments for adequately trained technicians to fill the void resulting from exodus of trained manpower to foreign countries.
- e. Balance between theory and practice to meet domestic and foreign standards and requirements. The curriculum provides for a balance between theory and practice as required by new trends in domestic and foreign employment situations.
- f. Adaptability to higher level of technician programs. This two-year industrial technician/three-year engineering technician program serve as a basis for evolving higher levels of technician education curricula.

2. Course Offerings

The level of industrial development of the country indicates the need for trained technicians along the following fields of specialization:

- a. Electrical Technology
- b. Electronics Technology
- c. Automotive Technology
- d. Carpentry and Construction Technology
- e. Refrigeration and Airconditioning Technology
- f. Mechanical Technology
- g. Welding and Fabrication

3. Production, On-The-Job Training and Community Services

Production projects and community services should be undertaken to meet the development needs of the service area of the school as well as to strengthen the instructional program.

Fund for facilities must be provided by the institution to effectively carry out its production, on-the-job training and community service activities.

Funding for these instruction-related activities may come from internal and/or external sources.

The program and resources of the institution for the Industrial and Engineering Technician Curriculum should be organized in such a way that the instructional, production, and community service activities could be carried out in an integrated manner.

C. Academic Rules

I. Entrance Requirements

The requirements for entrance to the Technician Curriculum are:

- a. The applicant must be at least sixteen (16) years of age.
- b. The applicant must be a secondary school graduate.
- c. The applicant must be physically fit as certified by a government physician.

- d. The applicant must be of good moral character as certified to by the school principal.
- e. The applicant must pass an oral and written entrance examination.
- f. For entrance into the Engineering Technician applicants must belong to the upper fifty percent (50%) of graduates of the Industrial Technician Curriculum.

2. Attendance

Student's attendance shall be governed by the set of rules and regulations prescribed by the school administration.

A student shall be dropped from the class/roll when the hours lost through absence, and/or late enrolment is ten percent of the total prescribed number of hours of recitation, lecture, laboratory/technology in one semester.

A student who is absent from the final examination in any course shall be given a grade on Inc.. However, a special examination may be given upon request if his class standing within the semester is passing. If the absence is not justifiable and the class standing is below 3, a grade of 5.0 or failure is given.

3. Study Load

A student shall carry only a load equivalent to the maximum number of units prescribed for the semester in which he is enrolled.

Strict adherence to the sequence of subjects as prescribed should be observed. Pre-requisite subjects must be completed first before taking the succeeding subjects.

Candidates for graduation may be allowed to take three units more than the prescribed number during the last two semesters of the curriculum provided the student has time to take additional load.

4. Grading System

The following grading system shall be applied.

1.0 to 1.5	-	Superior
1.6 to 2.0	-	Very Good
2.1 to 2.5	-	Good
2.6 to 3.0	-	Fair or Passing
3.1 to 4.0	-	Conditional Failure
4.1 to 5.0	-	Failure
Inc.	-	Incomplete

A conditional failure in any course may be removed by passing a re-examination, and a grade of 3.0 may be given. Failure in the re-examination means a grade of 5.0. Only one re-examination is allowed. A re-examination is never given for the purpose of improving a passing grade. A conditional failure must be cleared within one year from the date of receipt of the grade. Conditional failure not removed within the prescribed length of

time automatically becomes a failure.

Incomplete (Inc.) is the grade given to a student who fails to complete the work in any course due to illness and other reasons beyond his control. A student who received a grade of Inc. in any course is allowed to make up for his deficiency within one year from the time he received such grade. Any student who drops after the mid-term shall be given a grade of 5.0 or failure.

A student who fails in two (2) subjects, cultural and professional, or one (1) technology course of 5 units within a semester shall be dropped from the rolls.

5. Scholarship

The students of the program who graduated as valedictorian or salutatorian from the secondary schools shall enjoy scholarship in the form of free tuition and miscellaneous fees upon entrance. Students who maintain a weighted average grade of 1.5 or higher shall enjoy full scholarship during the next semester.

6. Requirements for Graduation

- a. A diploma for Industrial Technician is awarded to the candidate upon completion of the curricular requirements prescribed for the Industrial Technician Curriculum and a Diploma for Engineering Technician is awarded to the candidate who completes the curricular requirements prescribed for the Engineering Technician Curriculum.

II. Minimum Standards

A. Program

1. Instruction/Curriculum

- a. The Diploma for Industrial Technician shall require a minimum credit of 92 units*, 22 of which are general education, and 70 units of technician and allied courses including applied science, applied mathematics, and on-the-job training.
- b. For effective instruction, the class size per shop/laboratory courses should not exceed 16 students (teacher-student ratio of 1:16). For classes other than shopwork/laboratory, a ratio of 1:30 shall be the maximum limit.

B. Resources

1. Faculty

Inclusive of the general education faculty, the following are required:

- a. A minimum of six (6) fulltime faculty members with practical experience and training to teach in the technology courses (electrical, electronics, automotive, carpentry and construction, refrigeration and air-conditioning, and mechanical).

*Exclusive of PE and CMT

- b. There shall be at least six (6) instructors for general education and related subjects.
- c. In addition, two (2) fulltime faculty members with practical experience and advance training shall be required. One of them should have competence in educational technology and the other with expertise in vocational guidance.
- d. The qualification of any faculty member should include the following: technical skill, methodology/pedagogical skill, experience in industry related to the subject to be taught, and educational attainment (MTE).

2. Physical Facilities and Equipment

A. Building Requirements

- (1) School buildings should comply with appropriate zoning and building regulations.
- (2) the laboratory floor/space should be 4.5 sq. meters per student^{*/}.
- (3) The shop floorspace should be 10.5 sq. meters per student^{*/}.
- (4) The classroom floor space should be 2.5 sq. meters per student^{*/}.
- (5) The residential floor space should be 6.5 sq. meters per student plus 25% for sanitary accomodation and storage.

^{*/} British Council Final Report - Philippines TECHVOC project proposal for ADB, 1980.

- (6) Circulation area should be approximately 30% of the sum of the areas of all teaching accommodation (including storage), library, communal, administrative and other facilities.

B. Laboratory and workshop equipment and facilities for instruction and production in the following course shall at least conform with the minimum standards prescribed by the MEC.

- (1) Electrical Technology
- (2) Electronics Technology
- (3) Automotive Technology
- (4) Carpentry and Construction Technology
- (5) Refrigeration and Air-conditioning Technology
- (6) Welding and Fabrication
- (7) Mechanical Technology
- (8) Physics/Chemistry Laboratory

C. Library

- (1) The library seating capacity should be 10% of the combined total of students and academic staff.
- (2) A minimum of two (2) book titles (less than five (5) years old) per subject for the general education and technical/technological courses shall be available.
- (3) A minimum of 2 technical journals (current) for each of the technical courses should be available.

D. Support Services

(1) Health Services

There should be adequate functional medical and dental clinics for students, staff and their dependents.

(2) Placement and Auxiliary Services

There should be adequate student accommodation, food services, recreational facilities and counselling and graduate placement services. Placement services shall include adequate coordination with industry for an effective on-the-job training program.

(3) Budget

There should be a fund exclusively to provide adequately for the operation and maintenance of the program. In any case expenditures for personal services shall not exceed 70% of the total allotment.

C. Output Competencies

The following minimum levels of competencies are suggested:

At the end of the First Year

1. Mastery of the nomenclature, function and care of the basic hand and portable power tools used in industry.

2. Measure accurately with rules, calipers, squares, gauges and similar instruments.
3. Draw free-hand working sketches of simple objects; read and interpret orthographic drawings.
4. Sharpen chisels, drills, lathe and other cutting tools.
5. Perform the basic hand tools processes of the metal working and construction trades.
6. Perform basic shopwork calculations correctly.
7. Perform metal drill press work and plain turning operations
8. Work and move safely.
9. Communicate ideas briefly and understandably in oral, graphical or written forms.
10. Maintain cordial and friendly relationship with peers and superiors.

Upon completion of the Second Year

1. Draw free-hand working sketches and mechanical drawing of complex objects; read and interpret plans and specifications
2. Measure and/or test accurately with precision testers and instruments of the specialized technology.
3. Retrieve and apply needed data from engineering manuals and tables.
4. Mastery of the characteristics, properties and uses of engineering materials used in one's area of specialization.
5. Operate properly the basic machines and equipment involve in the specialized technology.

Distribution of Credit Units by Subject Area

(Industrial Technician)

<u>Courses</u>	<u>Units^{1/}</u>
I. General Education	
Work Ethics	4
Language	12
Social Science ^{2/}	<u>6</u>
TOTAL	22
II. Specialization and Related Subjects	
Technology ^{3/}	32
Technical Drawing	4
Applied Science	12
Applied Mathematics	<u>12</u>
TOTAL	60
III. On-the-Job Training ^{4/} TOTAL	<u>18</u>
GRAND TOTAL	()

On-the-Job Training in Industry for at least 18 weeks or 1008 hours. (This is scheduled during the first semester of 3rd year)

^{1/} 1 unit credit is equivalent to 1 hour per week of lecture and/or recitation in a semester; or 3 hours per week of laboratory.

^{2/} Excludes other MEC prescribed courses

^{3/} Specialized technology courses should be any of the following: Electronics, Electrical, Automotive, Carpentry and Construct, Refrigeration and Air-conditioning, Mechanical Technology, Welding and Fabrication.

^{4/} On-the-Job Training is accredited with 1 unit per 56 hours of programmed activity certified to by the school head and the manager of the cooperating firm.

ANNEX B

List of Prescribed Courses as Categorized in Annex A

<u>Courses</u>	<u>Units</u>
I. General Education	
A. Work Ethics	
1. Work Ethics 101	1
2. Work Ethics 201	1
3. Work Ethics 202	<u>2</u>
SUB-TOTAL	4
B. Language	
1. Technical English 101 (Grammar and Composition)	3
2. Technical English 102	3
3. Technical English 201 (Technical Writing & Reporting)	3
4. Technical English 202 (Language of Technology)	<u>3</u>
SUB-TOTAL	12
C. Social Science	
1. Social Science 101 (Psychology)	3
2. Social Science 102 (Philippine Social and Economic Life)	<u>3</u>
SUB-TOTAL	6
TOTAL	

<u>Courses</u>	<u>Units</u>
II. Specialization and Related Subjects	
A. Technology Courses	
1. Technology 101	5
2. Technology 112 (Basic Course)	5
3. Technology 122	2
4. Technology 201 (Advance Machine Processes)	5
5. Technology 212 (Entrepreneurship)	5
6. Technology 222 (Terotechnology)	2
SUB-TOTAL	24
B. Technical Drawing	
1. Technical Drawing 101 (Fundamentals of Technical Sketching and Instruments Drawing)	1
2. Technical Drawing 102 (Technical Sketching and Instrument Drawing in the Field)	1
3. Technical Drawing 201 (Technical Sketching, Instrument Drawing and Blueprint Reading in Specialized Field)	1
4. Technical Drawing 202 (Advance Technical Sketching, Instrument Drawing, and Blue- Print Reading in Specialized Field)	1
SUB-TOTAL	4

<u>Courses</u>	<u>Units</u>
C. Applied Science	
1. Applied Science 101 (General Chemistry)	3
2. Applied Science 102 (Properties and Characteristics of Materials)	3
3. Applied Science 201 (Selected Topics in Mechanics and Heat)	3
4. Applied Science 202 (Selected Topics in Magnetism, Electricity, Sound and Light)	3
SUB-TOTAL	12
D. Applied Mathematics	
1. Applied Mathematics 101 (Algebra)	3
2. Applied Mathematics 102 (Trigonometry)	3
3. Applied Mathematics 201 (Analytic Geometry)	3
4. Applied Mathematics 202 (Advanced Industrial Mathematics)	3
SUB-TOTAL	12
III. On-the-Job Training (18 weeks or 1008 hours during the First Semester of Second Year)	18
SUB-TOTAL	18
TOTAL	92

ANNEX C

Proposed Curriculum for Diploma in Industrial Technician

FIRST YEAR

<u>FIRST SEMESTER</u>	<u>Hours/Week</u>		<u>Credit</u>
	<u>Lecture</u>	<u>Lab.</u>	
Technology 101 (Basic Operations)		15	5
Technical Drawing 101 (Fundamentals of Technical Sketching and Instrument Drawing)	0	3	1
Work Ethics 101 (Social Values)	1	0	1
Applied Science 101 (General Chemistry)	2	3	3
Applied Mathematics 101 (Algebra)	3	0	3
Technical English 101 (Grammar and Composition)	3	0	3
Social Science 101 (Psychology)	3	-	3
	<hr/>	<hr/>	<hr/>
	12	15 6	19
Physical Education 101 (Fundamentals of Gymnastics)	(0.5)	(1.5)	(1)
CMT (Basic Military Science II)	0	(3)	(1.5)

SECOND SEMESTER	Hours/Week		Credit
	Lecture	Lab.	
Technology 112 (Basic Course for Specialized Field)		15	5
Technology 122 (Basic Electronics/ Electricity)	1	3	2
Technical Drawing 102 (Technical Sketching and Instrument Drawing in Field of Specialization)	-	3	1
Applied Science 102 (Properties and Characteristics of Materials)	2	3	3
Applied Mathematics 102 (Trigonometry)	3	-	3
Technical English 102 (Effective Speech)	3	-	3
Social Science 102 (Philippine Social and Economic Life)	3	0	3
Work Ethics 102 (Industrial Values)	1	0	1
	11	15	9
Physical Education 102 (Games and Sports I)	(0.5)	(1.5)	(1)
CMT (Basic Military Science 12)		(3)	(1.5)

<u>Summer Term (After First Year)</u>	<u>Hours/Week</u>		<u>Credit</u>
	<u>Lecture</u>	<u>Lab.</u>	
Technology 201 (Advanced Machine Processes)	15		5
Technical Drawing (Working Drawing)	-	3	1
Applied Science 201 (Selected Topics in Mechanics and Heat)	2	3	3
Applied Mathematics 201 (Analytic Geometry)	3	0	3
Technical English 201 (Technical Writing and Reporting)	3	0	3
	<hr/>	<hr/>	<hr/>
	6	15 6	15
Physical Education 201 (Games and Sports)	(0.5)	(1.5)	(1)

SECOND YEAR

<u>FIRST SEMESTER</u>	<u>Hours/Week</u>		<u>Credit</u>
	<u>Lecture</u>	<u>Lab.</u>	
On-the-Job Training		1008	18
		<u>1008</u>	<u>18</u>
CMT 21 (Basic Military Science)	(0)	(3)	(1.5)
 <u>SECOND SEMESTER</u>			
Technology 212 (Entrepreneurial Try-out)		15	5
Work Ethics 202 (Employment Orientation)	2	0	2
Technical Drawing 202 (Details and Assembly Drawings)	0	3	1
Applied Science 202 (Selected Topics in Magnetism, Electricity, Light and Sound)	2	3	3
Applied Mathematics 202 (Advanced Industrial Mathematics)	3	0	3
Technical English 202 (Language of Technology)	3	0	3
Technology 222 (Terotechnology)	2	-	2
	<u>12</u>	<u>15</u>	<u>6</u>
Physical Education 202 (Methods and Leadership in P.E.)	(0.5)	(1.5)	(1)
CMT (Basic Military Science 22)		(3)	(1.5)

ANNEX D

DESCRIPTION OF COURSES

I. General Education

A. Work Ethics

1. Work Ethics 101 (Social Values)

Study on Social Values

1 hr./week - 1 unit

2. Work Ethics 201 (Industrial Values)

Includes orientation to on-the-job training

1 hr./week - 1 unit

3. Work Ethics 202 (Employment Orientation)

Covers evaluation of on-the-job training and orientation to employment

2 hrs./week - 2 units

B. Language

1. Technical English 101 (Grammar and Composition)

The study of conversational English and appropriate written composition.

3 hrs./week - 3 units

2. Technical English 102 (Effective Speech)

This course covers effective public speaking with emphasis on group work and group relations.

3 hrs./week - 3 units

3. Technical English 201 (Technical Writing and Reporting)

This course covers the understanding and application of technical writing and reporting including business correspondence.

3 hrs./week - 3 units

4. Technical English 202 (Language of Technology)

Study of English for general purposes relevant to the different areas of generalization.

3 hrs./week - 3 units

C. Social Science

1. Social Science 101 (Psychology)

The study of human behavior in general; this includes study of emotion, abilities, intelligence on capacity and individual differences.

3 hrs./week - 3 units

2. Social Science 102 (Philippine Social and Economic Life)

Study and understanding of general principles in socio-life as applied to Philippine setting to include Philippine History, Taxation, Land Reform, and the New Constitution.

3 hrs./week - 3 units

I. Specialization and Related Subjects

A. Technology Courses

1. Technology 101

Basic operations of hand and portable power tool, processes in the area of iron bechwork, sheet metal work, welding and woodworking and technology of these areas.

3 hrs. theory) 7 units
12 hrs. lab.)

2. Technology 112 (Basic Course)

Manipulation of hand tools for advanced processes and basic machine operations in specialized technology; related theory of these processes including materials used.

3 hrs. theory) 7 units
12 hrs. lab.)

3. Technology 122

Ohm's Law, power law, low-voltage wiring, transformers, fractional HP motors, controllers, low-voltage power supplies, basic electronic circuits, electronic components (passive/active).

1 hr. theory) 2 units
3 hrs. lab.)

4. Technology 201 (Advance Machine Processes)

Advanced machine processes and technology in specialized field; problem solving and trouble shooting in simulated and real job situations.

3 hrs. theory) 7 units
12 hrs. lab.)

5. Technology 212 (Entrepreneurship)

Entrepreneurial try-out in student-planned production or service jobs (in school income generating project); industrial orientation and on-the-job training in a business enterprise.

3 hrs. theory)
12 hrs. lab.) 7 units

B. Technical Drawing

1. Technical Drawing 101 (Fundamentals of Technical Sketching and Instrument Drawing).

This is a basic course in technical drawing. It is designed to give the students a working knowledge of, and skills in, technical sketching, use and care of drawing instruments as applied to orthographic projections, auxiliary projection, drawing and free hand lettering.

3 hrs./week lab. - 1 unit

2. Technical Drawing 102 (Technical Sketching and Instrument Drawing in Specialized Fields)

This course involved the preparation of technical sketches and orthographic drawing of more complicated projects and jobs in the specialized field.

3. Technical Drawing 201 (Basic Working Drawing)

This course deals with drawing of plans for the production of simple jobs or parts of machinery or structures with emphasis in the field of specialization.

3 hrs./week lab. 1 unit

4. Technical Drawing 202 (Details and Assembly Drawing)

To include sketching/interpreting of engineers;

concepts/ideas of jobs/detailing and final drafting.

3 hrs./week lab. 1 -unit

C. Applied Science

1. Applied Science 101 (General Chemistry)

This course consists mainly of general inorganic chemistry including concepts of matter and energy; molecular and atomic constitutions of matter; chemical reactions, chemical equations and calculations; oxygen and ozone; hydrogen and its compounds; solutions and chemical equilibrium, and halogen and hydro-carbon families.

2 hrs. lecture) 3 units
3 hrs. lab.)

2. Applied Science 102 (Properties and Characteristics of Materials)

This includes the different metallurgical processes and the different industrial materials including metals, wood, cement and rocks, plastics, fibers, and synthetics.

2 hrs. lecture) 3 units
3 hrs./lab.)

3. Applied Science 201 (Selected Topics in Mechanics and Heat)

This course includes the study of the states and properties of matter, molecular motion, balanced and unbalanced forces of motion and of simple machines, heat and thermometry and meteorology.

2 hrs. lecture) 3 units
3 hrs. lab.)

4. Applied Science 202 (Selected Topics in Magnetism)

Electricity, Sound and Light)

This course covers magnetism, electricity, sound and light with emphasis in their application in the home, community and industry.

2 hrs. lecture) 3 units
3 hrs. lab.)

D. Applied Mathematics

1. Applied Mathematics 101 (Algebra)

This course includes a review of the four fundamental operations with integers, fraction and decimals, and factors and products; transformation and simplification of radicals; powers and roots; solutions of linear and quadratic equations with emphasis on problem solving.

3 hrs./week - 3 units

2. Applied Mathematics 102 (Trigonometry)

This course deals with the study of trigonometric functions, inverse functions, and application to industrial processes.

3 hrs/week - 3 units

3. Applied Mathematics 201 (Analytic Geometry)

This course consists of the study of the equations of the straight line and curves including circle, parabola, ellipse, hyperbola, rotation of axis, higher plane curves, polar coordinates, empirical equations, and curve fitting.

It also includes parametric representation, curvative differentiation with respect to time, polar coordinates, and means value theorems.

3 hrs./week - 3 units

4. Applied Mathematics 202 (Advanced Industrial Mathematics)

This course deals with the application of mathematical principles in the solution of problems on fabrication, trouble-shooting, renovation and installation of machinery and equipment and other industrial activities.

III. On-the-Job Training

- A. On-the-Job Training to be coordinated by faculty members from each field of specialization.

ANNEX E

Supplementary Course Description for
Specialized Industrial Technician Courses

A. Basic and Common Courses

1. Technology 101

Basic operation of hand and portable power tools, process in the area of iron benchwork, sheet metal work, welding and woodworking, and technology of these areas.

3 hrs. theory) 7 units
12 hrs. lab.)

2. Technology 122 (Common)

Ohms Law, power law, low-voltage wiring, transformers, fractional HP motors, controllers, low voltage power supplies, basic electronics circuits, electronic components. This includes linear and non-linear devices.

1 hr. lecture and) 2 units
3 hrs. lab./week)

3. Technology 222 (Terotechnology)

Principles and practices of Industrial plant maintenance.

2 hrs. theory - 2 units

B. Specialized Technical Courses

1. Electrical Technology

a. Electrical Technology 112 (Basic Electrical Technology)

Residential, commercial and industrial wirings

including lighting, signal, and power circuits in accordance with the Philippine Electrical Code, appliance installation repair and servicing; study, repair and maintenance of small D.C. machines.

3 hrs. lecture) 7 units
12 hrs./week lab.)

b. Electrical Technology 201 (Advanced Electrical Technology Processes)

Design, winding, construction and repair of transformers; trouble shooting and repair of single and poly-phase motors; wiring and operation of alternating current controls.

3 hrs. lecture) 7 units
12 hrs. lab./week)

c. Electrical Technology 212 (Entrepreneurship in Electrical Technology)

Principles and steps in organizing an electrical service shop/enterprise; service production in appliance servicing, wiring installation and motor rewinding; on-the-job training in business operation of an electrical service enterprise.

3 hrs. lecture) 7 units
12 hrs. lab./week)

2. Electronics Technology

a. Electronics Technology 112 (Electronic Receivers, Transmitters and T.V. Systems)

Principles and operations of the various types of electronic receivers and transmitters that are used for electromagnetic transmission or radio waves, study on radio laws and regulations, telegraphy and telephony. Measurements of electrical characteristics, disassembling and reassembling, alignment, mechanism adjustment and exercises on fault-finding.

Principles of transmission, reception and reproduction of television programs, antenna systems, function and/or description of the different stages of black and white and color television receivers, waveform observation and measurement of electrical characteristics, color and raster adjustments, antenna design and construction and exercises on fault-finding.

3 hrs. theory)
12 hrs. laboratory) 7 units

b. Electronics Technology 201 (Industrial Electronics)

Principles and operation of industrial process control and instrumentation, calibration, installation, maintenance of electronic receivers/devices, electro-pneumatics, nucleonics, radiation, medical electronics, and basic computer with emphasis on computer hardwares (analog and digital)

3 hrs. theory)
12 hrs. lab.) 7 units

o. Electronics Technology 212 (Entrepreneurship)

Principles and steps in organizing and electronic service shop/enterprise; service production in appliance servicing, installation, mass-production of electronic gadgets/receivers, on-the-job training/visits in business operation of an electronic enterprise.

3 hrs. theory)
12 hrs. lab.) 7 units

3. Automotive Technology

a. Automotive Technology 112 (Basic Course for Automotive Technology)

Deals with the understanding of construction, operation, fundamental theories of automotive vehicles. Emphasis will be concentrated on familiarization of vehicle components and its function. The types, model, kind of automotive fundamentals as introduction to the following: engines, automotive systems, body, uses, safety, basic handtools, basic shop equipment operations

3 hrs. theory)
12 hrs. practice) 7 units

b. Automotive Technology 201 (Advanced Machine Processes in Automotive Technology)

Deals with the advanced study of gasoline and diesel engine principles, automotive systems and components repair, trouble shooting, engine tune-up and servicing.

Operations and processes of automotive repair equipment, uses of test instruments, operation of advanced diagnostic and testing equipment in the automotive technology. The courses aims to prepare students to meet the need of industry in the field of reliable servicing job in correlation to the energy crisis and energy conservation.

3 hrs. theory)
12 hrs. practice) 7 units

c. Automotive Technology 212 (Entrepreneurial and Servicing Jobs)

An introduction in the field of small business enterprising activity and preparation of the student on career entrepreneurship emphasizing on planning, introduction on how to make project study, automotive trade servicing jobs, and managing a small business; the student will be scheduled on the job training to give them actual exposure and the industrial orientation.

3 hrs. theory)
12 hrs. practice) 7 units

d. Automotive Technology 222 (Principles and Practices of Industrial Plant Maintenance in Automotive Technology)

Study of principles and practices in the application of industrial maintenance in the field of automotive industry and servicing shop machines, equipment, installations and automotive vehicles. It aims in providing the student improved skills in the training practices and knowledge of

techniques by re-enforcing them with plant visits to well-established enterprises in automotive trade.

The course will provide fundamental theories and practical work in the following:

1. Automotive Service Shop Plan, layout and equipment
2. Proper and Safe Use of Testing Instrument and Modern Automotive Diagnostic and Tune-up equipment.
3. Maintaining Automotive Equipment and Facilities
4. Industrial Safety and Practices
5. Preventive Maintenance

2 hrs. theory - 2 units

4. Carpentry and Construction Technology 112 (Fundamentals of House Framing Construction)

Advanced machine processes and technology in specialized field which includes principles of house planning, stakeout and layout of buildings, foundation and framework, exterior and interior framing such as roof, ceiling, floor and wall. This also includes fenestration like trims, windows, doors, stair construction and cabinet work.

3 hrs. theory)
12 hrs. practice) 7 units

b. Construction Technology 201 (Construction Technology)

Blue printing and blue print reading, quantity surveying (estimating labor and materials), building code, specifications and simple stress computations, timber structure analysis and layout, plain and reinforced concrete structures including steel construction, housing, subdivisions, and other infra-structures. It also includes sanitary works for sewage and sewerage disposal.

3 hrs. theory)
12 hrs. lab./shop) 7 units

c. Construction Technology 212 (Entrepreneurship)

Entrepreneurial try-out in student planned production or service jobs (on school income generating project); industrial orientation and on-the-job training (in a business enterprise).

a. School Component - 9 weeks

Principles of feasibility study and feasibility studies related to the civil trade, mass production production processes, basic construction planning which includes "PERT CPM" and supervision of works.

b. Industrial Component - 9 weeks

Industrial orientation and on-the-job training (either single proprietorship/private business or in industrial firms).

3 hrs. theory)
12 hrs. lab.) 7 units

5. Refrigeration and Airconditioning Technology

a. Refrigeration and Airconditioning Technology 112 (Basic Machine Tool Processes in Refrigeration and Airconditioning)

Deals with the theory and practice in Refrigeration and airconditioning solders and welds. Includes definition and functions of RAC parts and components, use of handtools and equipment in RAC parts and components, use of handtools and equipment in RAC assembly, testing, and servicing of domestic units.

3 hrs. theory)
12 hrs. practice) 7 units

b. Refrigeration and Airconditioning Technology 201 (Advanced Machine Tool Processes in Refrigeration and Airconditioning)

Includes the study on the theory of refrigeration and their applications to industrial and commercial systems. Evaporators, condensers, compressors, refrigerant controls, psychometrics, instrumentation, electrical components and parts, installation and servicing are the main subjects in this block.

3 hrs. theory)
12 hrs. lab./week) 7 units

c. Refrigeration and Airconditioning Technology 212
(Entrepreneurial Practices in Refrigeration and Airconditioning)

Deals with the servicing and contracting practices such as estimating of costs of refrigeration and aircondi-

tioning jobs, customer relations and related topics
(more on domestic servicing and installation jobs.)

3 hrs. theory)
12 hrs. lab./week) 7 units

6. Machine Shop Technology

a. Machine Shop Technology 112 (Basic Machine Tool Processes)

Operating on the lathe involving plain turning and facing, toolbit, grinding, tapework, threading, boring, and face plate work; basic shaperwork operation; related theory and principles underlying these operations; fundamentals of steel heat treatment.

3 hrs. lecture)
12 hrs. lab./week) 7 units

b. Machine Shop Technology 201 (Advanced Machine Shop Processes)

Theory and practice in milling plain surface, slots, angles, flutes, spur, bevel and helical gears; surface, cylindrical and tool and cutter grinding; fundamentals of tool and die making and presswork operation.

3 hrs. lecture)
12 hrs. lab./week) 7 units

c. Machine Shop Technology 212 (Fundamentals of Machine Shop Production)

Basics of project study; design, development and limited production of typical products; product or job costing; design and fabrication of simple machine, jigs, fixtures, and cutters for mass production; advanced heat

treatment of metals; fundamentals of quality control.

3 hrs. lecture)
12 hrs. lab./week) 7 units

6-A. Welding and Fabrication Technology

a. Welding Technology 112 (Basic Course in Welding and Fabrication)

Deals with the familiarization of basic related theories and practices in the welding technology. Right approaches, basic trade handtools, basic power machines, will be given emphasis. Welding techniques will be concentrated on mild steel structures, designs and fabrication. The course aims to prepare the students by equipping them with the adequate knowledge and practical skill.

3 hrs. theory)
12 hrs. practice) 7 units

b. Welding Technology 201 (Advanced Machine Process and Operation in Welding and Fabrication)

An introduction in the field of specialization. The study will be concentrated on advanced machine processes and its operation in the field of welding and steel fabrication. Actual problem solving, trouble shooting and job simulations will be adopted to strengthen and re-enforce the technology concept of specialization.

3 hrs. theory)
12 hrs. practice) 7 units

c. Welding Technology 212 (Entrepreneurship in Welding and Fabrication)

An introduction to the field of small business enterprising activity and the preparation of the students on a career entrepreneurship emphasizing on planning, introduction on how to make project study production and welding fabrication, servicing jobs, and managing small business. To have a more relevant system of training, the student will be scheduled for on-the-job training to give them the actual exposure and industrial orientation.

3 hrs. theory)
12 hrs. practice) 7 units

d. Welding Technology 222 (Principles and Practices of Industrial Plant Maintenance in Welding and Fabrication)

The course deals with the study of the principles and practices in the application of industrial plant maintenance in the field of welding and steel fabrication. The course provides fundamental theories and practical work in:

1. Welding shop plan and equipment layout
2. Proper and safe use of handtools and measuring instrument
3. Maintaining welding and fabrication equipment and facilities
4. Industrial safety practices

2 hrs. theory - 2 units

(Inclosure No. 3 to MEC Order No. 38, S. 1982)

ANNEX E

B. Diploma in Engineering Technician

Course Description for Engineering Technician

I. General Education

A. Social Science

1. Social Science 301 (Engineering Economics)

This is a study of the use of resources in the most efficient manner, employing all methods of production and resources as effectively as present technology allows. It includes also the study of weighted average or variety of economics indicators and barometers that measure and affect the level of general business activity, the factor of production such as property resources, including land, capital and human resources, and the systematic gathering, recording, computing and analyzing of data about problems relating to the sales and distribution of goods and services for certain time periods.

It includes furthermore, the study of the life span of capital assets such as plant, machine, equipment affected by technological changes as invention, improvement in process, and change in economic conditions. The study of the principles of budgeting, bookkeeping and accounting and auditing.

2. Social Science 302 (Industrial Relations)

This is a course consisting of a study of workers, work groups, and work relations; analysis of the role of

the worker in such group and analysis and description of the social organization of work society with special emphasis on Philippine institutions of work. It includes a study of management - labor relations, special problems of Philippine Industrial Life, and evaluation of relationship between industry, community and society.

3 hrs. lecture - 3 units

B. Management

1. Management 302 (Personnel Management)

This study deals with new foundations of management, management systems, productivity and labor relations under different management systems, the inter-dependent, interacting character of effective organizations improving General Management by better Fiscal Management. It also includes the need for a systems approach, measurement, human asset accounting and achieving effective coordination in a highly functionalized company.

3 hrs. lecture - 3 units

C. Research

1. Technical Research 301 (Technical Research)

This course covers a study of the basic principles and methods applicable to the specialized technology. It includes time and motion study, material process flow analysis, individual case studies, and technical feasibility studies.

2 hrs.)
3 hrs. lab.) 3 units

II. Specialization and Related Courses

A. Technology Courses

1. Technology 301 (Advanced Technological Processes 1)

Includes integrated and intensified training in technical skills of the first two years in their respective areas of specialization.

15 hrs./week - Integrated
lecture/laboratory activities - 5 units

2. Technology 312 (Advanced Technological Processes 2)

Deals with advanced skills training in area of specialization with topics on leadership and foremanship, job programming and production planning.

2 hrs. theory) 5 units
9 hrs. lab.)

3. Technology 322 (Plant Layout, Organization and Management)

This involves the selection, installation, inspection and maintenance of machines and equipment; principles and theories, safety demands, maximization of space utility and energy conservation.

3 hrs. theory - 3 units

B. Mathematics

1. Mathematics 301 (Calculus)

This deals with selected topics on differential and integral calculus adopted to specialized course offered in the program.

3 hrs./week theory - 3 units

C. Physics

1. Physics 301 (Mechanics)

Includes selected topics in Mechanics with emphasis on resultant and equilibrium of forces, friction, centroid of areas, moments of inertia, dynamics of rigid body in rotation, work and energy and mechanical vibration.

5 hrs./week - Integrated lecture/lab. - 3 units

2. Physics 302 (Strength of Materials)

Covers basic concepts such as simple stresses, shears and moments in beams, tensions of shafts, bending, combined stresses and solution of problems involving beams and columns. Other selected topics such as theories of failures and design, riveted and welded joints, members subjected to fatigue and impact loads, Philippine timber as construction materials, strength of concrete and bearing strength of soils. Testing of materials should be integrated with the course.

3 hrs./week - 3 units (lecture and lab.)

D. Drawing

1. Engineering Drawing 301 (Industrial Designing)

Includes sketching/interpreting the engineers' concepts/ideas of jobs or objects, detailing and final planning.

3 hrs./week laboratory - 1 unit

Upon completion of the Third Year

1. Install and commission major units of machinery and equipment.
2. Analyze defects and faults in equipment or system operation and make proper adjustments and remedies.
3. make sketches and plans for details of design and development concepts of the engineer.
4. Relieve engineers from performing less complex mathematical computations.
5. Undertake small scale entrepreneurial project.

List of Prescribed Courses

Engineering Technician

<u>Courses</u>	<u>Units</u>
I. General Education	
A. Social Science	
1. Social Science 301 (Engineering Economics)	3
2. Social Science 302 (Industrial Relations)	3
SUB-TOTAL	<u>6</u>
B. Management	
1. Management 302 (Personnel Management)	3
C. Research	
1. Technical Research 301 (Technical REsearch)	3
II. Specialization and Related Courses	
A. Technology Courses	
1. Technology 301 (Advanced Technology)	5
2. Technology 312 (Advanced Technology)	5
3. Technology 322 (Plant Layout, Organization and Management)	5
SUB-TOTAL	<u>15</u>

(Diploma in Engineering Technician)

<u>FIRST SEMESTER</u>	Hours/Week		<u>Credit</u>
	<u>Lecture</u>	<u>Lab.</u>	
Technology 301 (Advanced Technology)	15		5
Engineering Drawing 301 (Industrial Design)	-	3	1
Mathematics 301 (Calculus)	3	0	3
Physics 301 (Mechanics)	2	3	3
Social Science 301 (Engineering Economics)	3	0	3
Technical Research 301 (Technical Research)	2	3	3
	<hr/>	<hr/>	<hr/>
	10	15 9	18
 <u>SECOND SEMESTER</u>			
Technology 312 (Advanced Technology)		15	5
Technology 322 (Plant Layout Org. and Management)	3	3 -	3
Physics 302 (Strength of Materials)	2	3	3
Social Science 302 (Industrial Relations)	3	-	3
Management 302 (Personnel Management)	3	-	3
	<hr/>	<hr/>	<hr/>
	11	15 3	17

(Inclosure No. 4 to MEC Order No. 38, S. 1982)

ANNEX G

C. GUIDELINES AND MINIMUM STANDARDS FOR THE BACHELOR OF INDUSTRIAL TECHNOLOGY

A. Curriculum Goal and Objectives

1. Goal

The B.I.T. curriculum aims to prepare individuals for entrance to, and advancement in the upper level technical positions in industry. These technicians will provide liaison, linkage and coordination between the industrial technician and emergency technician and the engineer engaged in planning, designing, and researching.

2. Objectives

- a. To inculcate desirable values and work ethics as a crucial factor in national development.
- b. To develop tradesmen and broad technical skills in a particular field of technology.
- c. To provide technical/technological knowledge and information which will enable the individual to analyze job problem, to determine appropriate solutions and to perform problem-solving tasks.

- d. To gain adequate professional education to enable one to cope with problem dealing with the nature of the workers as a means of enhancing the impact of the foremanship process.
- e. To acquire professional morale, self-reliance, personal discipline, and other personality traits desired of an industrial technologist.

B. Program

1. Guiding Principles

The four-year Technician Education curriculum is designed and structured under the following principles:

- a. Supporting of national-regional development goals.
The thrust in an accelerated agriculture-based regional industrialization has continuously imposed increasing requirements for more technical types of skills such that a major concern was matching the quality and quantity of technicians to the demands and requirements of national-regional development needs.
- b. Management and production-oriented. Provisions include strengthening the technician curriculum in order to produce graduates with increased

capabilities in managing and engaging in entrepreneurial endeavors.

- c. Flexibility, economy, and viability. The curriculum provides for more flexibility to meet current and emerging needs. It includes requirements for minimal additional inputs in terms of available operational outlay and training staff. Viability is assured in that this curricular revision fits into the existing structure of the institutions that will implement it.
- d. Immediacy of needs - the four-year technician curriculum is envisioned to fill the immediate needs of industries for adequately trained engineering technicians to fill the void resulting from the exodus of trained and experienced manpower to foreign countries.
- e. Balance between theory and practice. To meet current and future standards and requirements, this curriculum provides for a balance between theory and practice as is required by new concepts and practices resulting from increasing demands for more skilled and professionally-oriented technicians.

2. Course Offerings

The level of industrial development of the country indicates the need for trained technicians and technician trainers along the following fields of specialization:

- a. Electrical Technology
- b. Electronics Technology
- c. Automotive Technology

- d. Carpentry and Construction Technology
- e. Refrigeration and Airconditioning Technology
- f. Mechanical Technology
- g. Welding and Fabrication

3. Production, and On-the-Job Training

Production projects and on-the-job training should be undertaken to strengthen the instructional program.

Funds for facilities must be provided by the institution of effectively carry out its production and on-the-job training activities.

Funding for these instruction-related activities may come from internal and/or external sources.

The program and resources of the institution for the Bachelor of Industrial Technology Curriculum should be organized in such a way that the instructional, production, and on-the-job activities could be carried out in an integrated manner.

C. Academic Rules

1. Entrance Requirements

The requirements for entrance to the Bachelor of Industrial Technology Curriculum are:

- a. The applicant must have completed the Diploma in Engineering Technician.
- b. The applicant must qualify in the National College Entrance Examination (NCEE).
- c. A certificate of physical examination by a government physician must be submitted by the applicant.

- d. The applicant must be of good moral character as certified by the school principal and must have a pleasing and facility of oral expression.

2. Attendance

Students' attendance shall be governed by the sets of rules and regulations prescribed by the school administration.

A student shall be dropped from the class/roll when the hours lost through absence, and/or late enrollment is ten percent of the total prescribed number of hours of recitation, lecture, laboratory technology in one semester.

A student who is absent from the final examination in any course shall be given a grade of Inc. A special examination may, however, be given upon request of the student, if his absence is properly justified, provided however, that his class standing within the semester is passing. If the absence is unjustifiable and the class standing is also below 3, a grade of 5.0 or failure is given.

3. Study Load

A student shall carry only a load equivalent to the maximum number of units prescribed for the semester in which he is enrolled.

Strict adherence to the sequence of subjects as prescribed should be satisfactorily completed first, before taking the other subjects.

Candidates for graduation may be allowed by the administration to take more units than the prescribed number during the last two semesters of the curriculum, if in his opinion the student could carry additional load. The extra load, however, shall not be more than six (6) units.

4. Grading System

The following grading system shall be used for rating the mark of the students:

- 1.0 to 1.5 - Superior
- 1.6 to 2.0 - Very Good
- 2.1 to 2.5 - Good
- 2.6 to 3.0 - Fair or Passing
- 3.1 to 4.0 - Conditional Failure
- 4.1 to 5.0 - Failure
- Inc. - Incomplete

A Conditional Failure in any course maybe removed by passing a re-examination, and a grade of 3.0 may be given. Only one re-examination is allowed.

A re-examination is never given for the purpose of improving a passing grade. Failure in the re-examination means a grade of 5.0. A conditional failure must be cleared within one year from the date of receipt of the grade. Conditional failure not removed within the prescribed length of time automatically becomes a failure.

Incomplete (Inc.) is the grade given to a student who fails to complete the work in any course due to illness and other reasons beyond his control. A student who received a grade of incomplete is allowed to make up for his deficiency within one year from the time he received such grade. Any student who drops after midterm shall be given a grade of 5.0 or failure.

Any student who fails in two (2) general or technical education subjects or one (1) technology course within a semester shall be dropped from the rolls.

5. Requirements for Graduation

To be eligible for graduation from the Bachelor of Industrial Technology curriculum, the candidate must fulfill the following requirements:

- (1) He has fulfilled all the curricular requirements (technological, and general education).
- (2) He has established at least one (1) year residence in the training institute immediately prior to graduation.

II. Minimum Standards

A. Program

1. Instruction/Curriculum

- a. The diploma for the Bachelor of Industrial Technology shall receive a minimum credit of 186 units, 58 of which are general education, 81 specialization and allied courses, 37 professional education, and 10 for credits in on-the-job training.
- b. For effective instruction, the class size per shop/laboratory courses should not exceed 15 students (teacher-student ratio of 1:15). For classes other than shopwork/laboratory, a ratio of 1:30 shall be the maximum limit.

B. Resources

1. Faculty

Inclusive of the general education faculty, the following are required:

- a. A minimum of sixteen (16) fulltime faculty members with practical experience and training to teach in the technology courses (electrical, electronics, automotive, carpentry and construction, refrigeration and airconditioning, and mechanical)
- b. There should be at least ten (10) faculty members for general and professional education subjects (MTE)

- c. In addition, four (4) fulltime faculty members with practical experience and advanced training shall be required. Two of them should have competence in educational technology and two with experience in vocational guidance and industrial relations.

2. Physical Facilities and Equipment

a. Building Requirements

- (1) School buildings should comply with appropriate zoning and building code/regulations.
- (2) The laboratory floor space should be 4.5 sq. meters per student *
- (3) The shop floor space should be 10.5 sq. meters (average) per student*
- (4) The classroom floor space should be 2.5 sq. meters per student*
- (5) The residential floor space should be 6.5 sq. meters per student plus 25% for sanitary accommodation and storage*
- (6) Circulation area should be approximately 30% of the sum of the areas of all teaching accommodation (including storage), library, communal, administrative, and other facilities.

- b. Laboratory and workshop equipment and facilities for instruction and production in the following course shall at least conform with the minimum standards prescribed by the MEC:

* British Council Final Report - Philippine TECHVOC Project Proposal for the ADB, December 1980

- (1) Electrical Technology
- (2) Electronics
- (3) Automotive Technology
- (4) Carpentry and Construction Technology
- (5) Refrigeration and Airconditioning
- (6) Mechanical (Machine Shop) Technology
- (7) Physical/Chemistry Laboratory
- (8) Vocational Guidance Center

c. Library

- (1) The library seating capacity should be 10% of the combined total of students and academic staff.
- (2) A minimum of three (3) book titles per subject (not more than 5 years old) for the general education and technical courses.
- (3) A minimum of three (3) professional and technical journals (current) for each of the technical and professional courses should be available.

d. Support Services

- (1) Health Services

There should be an adequate functional medical and dental clinics for students, staff and their dependents.

- (2) Placement and Auxiliary Services

There should be adequate student accommodation, food services, recreational facilities, and counselling and graduate placement services.

3. Budget

The budget should be apportioned in such a way that out of the allotment for instruction, at most 70% is allotted for salaries and other personnel services and at least 30% is allocated for maintenance and operating expenses and equipment.

C. Output Competencies

This curriculum is expected to develop an engineering technician with the following competencies:

1. General:

- a. Ability to relate with peers, subordinate, and superiors
- b. Ability to communicate effectively
- c. Ability to compute
- d. Ability to apply the scientific method in problem solving.

2. Technical Competencies

- a. Mastery of skills to be performed
- b. Mastery of technical information
- c. Professional Competencies

3. Professional Competencies

- a. Ability to manage effectively
- b. Ability to understand the workers

ANNEX H

List of Prescribed Courses for Bachelor of Industrial Technology

<u>Courses</u>	<u>Credit</u>
A. Technology	
1. Technology 401 (In-Plant Training)	18
2. Technology 412 (Entrepreneurial Project)	10
3. Technology 422 (Manufacturing Process)	3
Total	<u>31</u>
B. Social Science	
1. Social Science 401 (Rizal)	3
2. Social Science 402 (New Philippine Constitution)	3
Total	<u>6</u>
Grand Total	----- 37

ANNEX I

Proposed Curriculum for Bachelor of Industrial Technology

FOURTH YEAR

<u>FIRST SEMESTER</u>	Hours/Week Lecture	<u>Lab.</u>	<u>Credit</u>
Technology 401	18 weeks		
(In-plant Training	@ 56 Hrs./wk.	1008	18
Social Science 401 *	3	0	3
Rizal			
	<u>3</u>	<u>1008</u>	<u>21</u>
 <u>SECOND SEMESTER</u>			
Technology 412	-	30	10
(Entrepreneurial Project)			
Technology 422	2	3	3
(Manufacturing Processes)			
Social Science 402	3	0	3
(New Philippine Constitution)			
	<u>5</u>	<u>33</u>	<u>16</u>

*To be taken in the evening

ANNEX J

Course Description for the Bachelor of Industrial Technology

A. Technology

Technology

1. Technology 401 (In-Plant Training)

This part of the program exposes the student to a programmed industrial experience with emphasis on foremanship, and personnel management, supply management and related areas along his field of specialization.

18 weeks at 56 hours/week (1008 hrs.) with one (1) credit unit per 56 hours _____ 18 units

2. Technology 412 (Entrepreneurial Project)

Deals with project designing for actual production under direction of a shop teacher. Involves determining of costs, workflow, quality control, marketing, and cost accounting and financing resource procurement.

30 hrs/wk lab. _____ 10 units

3. Technology 422 (Manufacturing Processes)

This is a related course to Technology 412 with a perspective view of the production involves methods study such as methods analysis, motion study, work simplification and cost reduction techniques including industrial visits

2 hrs theory, 3 hrs/wk _____ 3 units

ANNEX J (Cont.)

B. Social Science

1. Social Science 401 (Rizal)

A comprehensive study on the life and works of Dr. Jose Rizal and its relevance to the present society.

3 hrs. lecture/week _____ 3 units

2. Social Science 402 (New Philippine Constitution)

Introduces the student to the parliamentary system of government under the New Constitution, its principal features, organs of government, functions of the Prime Minister and the Members of the Cabinet.

3 hrs. lecture/wk. _____ 3 units

(Inclosure No. 5 MEC Order No. 38, S. 1982)

ANNEX A

D. Master in Technician Education

Guidelines and Standards for the Master of Technician Education
(MTE Program)

These guidelines and standards shall govern the operation of the Master of Technician Education (MTE) program under the TECHVOC PROJECT, MEC

A. AUTHORIZATION

1. This graduate program shall be implemented only after the proper authority granted by the Minister of Education and Culture.
2. A report on the following requirements shall be submitted for appropriate action by the MEC;
 - 2.1 Rationale and mission statement of the program
 - 2.2 Goals and objectives
 - 2.3 Resources pertaining to:
 - a. School site and buildings;
 - b. Floor plans showing allocation of classrooms and other quarters for instructional purposes;
 - c. Facilities available, including program for acquisition of additional resources;
 - d. Proposed faculty line-up, administrative and supervisory staff with their respective bio-data; and
 - e. Budget estimates

B. ADMINISTRATION

- *1. The MTE program shall be managed by the Executive Director of the National Center for Teacher Education and Staff Development through the Office of the Deputy Director and the Dean of the Graduate School and concurrently the Vocational College Dean.
2. The dean shall:
 - 2.1 be a holder of an appropriate doctoral degree;
 - 2.2 have at least five years of successful administrative, supervisory, and/or teaching and industrial experience; and
 - 2.3 have distinguished himself in his discipline.
3. The graduate school shall encourage its faculty members to undertake research through financial assistance and/or other incentive grants made available for this purpose.
4. The graduate school is encouraged to enter into consortia with other technological institutions and/or other agencies.

C. FACULTY

1. As a general rule, a majority of the faculty members in the master's degree program shall be holders of an appropriate doctorate's degree.
2. In specific fields of study which require special and technical training, a faculty member without the appropriate degree may be allowed to teach provided he has demonstrated a high degree

* Refer to organizational chart

of competence and has gained recognition for scholarship in his field of specialization.

3. At least sixty percent of the total members of the faculty members of the graduate school shall be on full-time service; however, part-time faculty members may be hired, and shall be required to undertake related work, such as thesis advisement and consultation in addition to teaching.
4. Faculty members in the graduate school shall teach mainly their respective majors of fields of concentration.
5. Faculty member shall undertake research and other related developmental activities for purposes of enriching instructional and professional growth.

D. LIBRARY

1. The graduate school shall have a library with adequate books, and audio-visual equipment and other instructional materials and facilities.
2. The graduate school library shall contain a minimum of reading and reference materials, in proportion to its enrolment, the minimum requirements of which are as follows:

<u>Enrolment</u>	<u>Number of Professionally Prepared Libraries</u>	<u>Number of Professional/ Technical Books & Magazines</u>	<u>Number of Cultural Books</u>
50 or less	1 full-time	940	1,000
51 to 100	- do -	1,410	1,500
101 to 200	- do -	1,875	2,000
201 to 300	- do -	2,500	2,500
301 to 400	- do -	3,125	3,000
401 to 500	- do -	3,750	3,500
501 to 1000	2 full-time	5,625	5,000
1001 to 3000	- do -	8,125	7,000
over 3,000	3 full-time	10,625	9,000

3. At least ten percent (10%) of the professional, technical, cultural books and periodicals in the library shall be Filipiniana, Orientalia, and Asiana, and shall include a substantial number of appropriate professional and technical publications, such as journals, bibliographies, annuals, monographs, serials, and book-bound issues of foreign and local publication. There shall be at least six professional and technical journals per one hundred students for every discipline.

4. The graduate school library shall have:

- 4.1 an adequate research system, such as updated catalogues, vertical files reader's guides, and other appurtenances;
- 4.2 carrels for independent study and research of students and faculty members; and in addition, adequate reading space commensurate with the population of the graduate school.

E. RESEARCH

- 1. The graduate school shall have a research unit.
- 2. It shall publish at least annually a journal containing primarily

the results of studies and researches of its faculty and outstanding and scholarly research papers or projects in each discipline undertaken by students.

- 3. Exchange of copies of research journals with other institutions and with foreign schools is encouraged.

F. ADMISSION REQUIREMENTS

- 1. The administration of the graduate school shall implement the requirements for the admission of students to graduate work, subject to the following conditions:
 - 1.1 Only students who, in the judgment of the faculty admissions committee chaired by the dean, can profit from graduate work shall be admitted:
 - 1.2 The admission committee shall set up criteria for admission to the MTE program.

G. CURRICULUM - MTE

- 1. The curriculum for the MTE degree shall contain a minimum total of 32 units distributed as follows:
 - A. CORE SUBJECTS 9 units
 - A.1 Philo-Socio-Psychological Foundations of Technical-Vocational Education - - - - - 3 units
 - A.2 Research and Statistics - - - - - 3 units
 - A.3 Curriculum Development and Evaluation - - - - 3 units
 - B. PROFESSIONAL SUBJECTS 9 units
 - B.1 Methodology of Teaching - - - - - 3 units
 - B.2 Classroom Laboratory Management - - - - - 3 units
 - B.3 Educational Technology - - - - - 3 units

- C. SPECIALIZED SUBJECTS 6 units
 - C.1 Technology 1 - - - - - 3 units
 - C.2 Technology 2 - - - - - 3 units
- D INDUSTRIAL COMPONENT 4 units
- E. RESEARCH OR SEMINAR PAPER 4 units

H. INSTRUCTIONAL AND PROMOTIONAL STANDARDS

- 1. The instructional and promotional standards of the graduate school shall be aimed at the attainment and maintenance of excellence.
- 2. All graduate students shall take an integrated written comprehensive examination immediately after completing the academic requirements of the program.
 - 2.1 The scope of the comprehensive examination shall include the core, professional and specialized subjects.
 - 2.2 A complete list of students who have been formally admitted to graduate status and passed the comprehensive examination shall be maintained in the Office of the Dean.

I. THESIS OR SEMINAR PAPER

- 1. A thesis/seminar paper for the MTE degree shall be required as a pre-requisite for graduation.
- 2. The thesis/seminar paper shall contribute substantially and purposefully to the existing body of knowledge preferably in conformity with institutional goals, thrusts and objectives of technical-vocational education and shall manifest the student's competence in research.

3. A thesis/seminar paper guidance committee, chaired by the dean, shall be responsible for approving the research design and maintaining the high quality of thesis/seminar papers.
4. The graduate school shall adopt an acceptable format for thesis/seminar paper writing.
5. Each graduate student shall be assigned an adviser chosen on the basis of his expertise in his own discipline and a working knowledge of research methodology.
6. One bound copy of the thesis/seminar paper shall be furnished to each of the following: Management Unit of the TECHVOC Project, Bureau of Technical Vocational Education, Graduate Library, National Library, MEC Regional Office, and the Bureau of Higher Education.

J. ORAL EXAMINATION

1. The oral examination for the defense of thesis/seminar paper shall be scheduled by the dean only after the student shall have:
 - 1.1 successfully passed the written comprehensive examination; and
 - 1.2 been certified by the adviser as to his readiness for oral defense and recommended by the thesis/seminar paper guidance committee.
2. The oral examination shall be conducted by a panel of experts at least three members who shall be holders of appropriate master's degree.

- 2.1 The chairman and members of the panel shall be chosen on the basis of their expertise and areas of specialization, upon recommendation of the thesis guidance committee and approval of the Dean.
- 2.2 The graduate school is encouraged to invite deans and faculty members of other graduate schools, qualified officials of the Ministry of Education and Culture, and experts from industry to sit as members of the panel in the oral examination.
3. The final rating for the oral examination of a candidate shall be the average of the ratings given by the panel members.

K. GRADING SYSTEM

The grading system for the MTE program shall be in accordance with the following scale:

- 1.0 - Excellent
- 1.25 - Superior
- 1.5 - Very Good
- 1.75 - Good
- 2.0 - Fair or Passing
- Inc. - Incomplete
- 5.0 - Failure

A grade lower than 2.0 shall not be credited towards graduation. A grade of Incomplete is given only in the case of a student who is unable to complete the course work due to reasons

beyond his control. An Incomplete grade must be made up within one year from the time such grade is received. Failure to make up the deficiency within one year upon official notification by the Office of the Dean shall result in a final grade of 5.0 or failure.

L. RESIDENCE/UNIT REQUIREMENTS

1. The residence requirement for graduation for MTE degree, excluding the units for thesis/seminar paper, shall be at least two consecutive semesters or the equivalent of 12 units.
2. After completion of all the academic requirements, a candidate for graduation in the MTE program shall be given a maximum period of 12 months within which to finish the thesis/seminar paper.

M. ACCREDITATION

A total of nine (9) units of credits earned in other graduate programs may be credited to MTE, subject to validating examination and/or evaluation by the admission committee.

Tentative Schedule of Subjects

Second Semester

	<u>Hours Per Week</u>		<u>Credit</u>
	<u>Lecture</u>	<u>Lab.</u>	
1. Psychological, Philosophical, Sociological Foundations of Technical-Vocational Education	3	-	3
2. Research and Statistics	3	-	3
3. Curriculum Development and Evaluation	3	-	3
4. Technology/Major Subject I	-	9	3
	<hr/>	<hr/>	<hr/>
	9	9	12

Summer Term

1. Research/Seminar Paper	-	-	4
2. Industrial Component	2	6	4
	<hr/>	<hr/>	<hr/>
	2	6	8

First Semester

1. Methodology of Teaching	3	-	3
2. Classroom or Laboratory Management	3	-	3
3. Educational Technology	3	-	3
4. Technology/Major Sub. II	-	9	3
5. Research/Seminar Paper (Continuation, if necessary)	<hr/>	<hr/>	<hr/>
	9	9	12

A.1. PHILO-SOCIO-PSYCHOLOGICAL FOUNDATION
OF TECHNICAL-VOCATIONAL EDUCATION

Subject Description

This subject is designed to provide an overview of education its philosophical bases, its nature and aim, its rule and function in contemporary society, its interrelation with other disciplines, its future in the modern world and how these various elements affect learning, instruction, and the curriculum.

It also deals with the contemporary social and psychological issues, trends and problems as they affect and are related to education, including concepts, principles, techniques, strategies and approaches as applied to the problems affecting technical-vocational school-industry relationship in the Philippine setting.

credit	-- 3 units
No. of hours	-- 3 hours/week

General Objective

Develop a clearer perspective and understanding of the philosophical, sociological, and psychological foundation of education with particular emphasis on technical-vocational education.

Specific Objectives

1. Identify and discuss the basic foundation of education.
2. Identify and explain the socio-political, ethical, and psychological foundation of education.

3. Respect, practice, and foster the philo-socio-political and psychological foundation of education.

Subject Outline

I. Topics

1. Introduction : Foundation of Education I
Foundation of Education II
2. Basic Concepts of Education
3. Philosophical Foundation of Education
4. Psychological Foundation of Education
5. Sociological and Cultural Foundation of Education
6. Education and Technology
7. The Future of Technical-Vocational Education in the Philippines
8. Conclusion: Synthesis and Examination

A.2. RESEARCH AND STATISTICS

Subject Description

This subject is designed to develop specific knowledge and skills in the preparation of research proposals/seminar papers/feasibility studies. It covers an overview of research strategies (experimental and descriptive), identification/definition and conceptualization research problems, sampling techniques, analysis and interpretation of findings, and writing summary, conclusions, and recommendations. It also includes descriptive and inferential statistics, emphasizing both parametric and non-parametric techniques.

The output of the course is a research proposal/seminar paper/feasibility study in a field of competence.

credit -- 3 units

No. of hours -- 3 hours/week

General Objective

Develop knowledge and skills in the preparation of research proposals/seminar paper/feasibility studies.

Specific Objectives

1. Identify the characteristics of various research strategies.
2. Identify and define research problems.
3. Conceptualize research problems.
4. Prepare research designs and select appropriate statistical tools.
5. Acquire skills in gathering, analyzing and interpreting data.
6. Acquire skills in summarizing, concluding, and formulating recommendations.

7. Defend before a class a research proposal/seminar paper/
feasibility study proposal.

Subject Outline

- I. Overview of Research Strategies
 - A. Strategy of Descriptive Research
 1. Overview of Descriptive Studies
 - a. Steps in Investigation
 - b. Collection of Data
 - c. Expression (Analysis, Interpretation, and Discussion) of Data.
 2. Types of Descriptive Research
 - a. Survey Studies
 - b. Intercorrelation Studies
 - c. Developmental Studies
 - B. Strategy of Experimental Research
 1. Nature of Experimental Research
 2. Control of the Experiment
 3. Design with Minimal Controls
 4. Designs with Rigorous Controls
- II. Preparing Research proposals/Seminar Papers/Feasibility Studies
 - A. problem Identification/Definition
 - B. Conceptualization of the Problem
 - C. Design and Methodology
 - D. Statistical Treatments
 1. Parametric Methods
 2. Non-Parametric Methods
 - E. Analysis and Interpretation of Data
 - F. Writing Summary of Findings, Conclusion, and Recommendations
- III. Oral Defense of Proposed Thesis/Seminar Paper/Feasibility Study

A.3 CURRICULUM DEVELOPMENT AND EVALUATION

Subject Description

The subject covers the study of the underlying theories and principles of curriculum development and evaluation in the technical and vocational education. It covers the philosophical and socio-political bases for curriculum construction, revision, curricular implications of culture and technology, specification of educational outputs, formulation of strategies, quality control, and evaluation.

Credit -- 3 units

No. of hours -- 3 hours/week

General Objective

Develop a working knowledge and critical analysis of curriculum development, implementation, evaluation, and revision/improvement.

Specific Objectives

1. State and discuss the concept of curriculum.
2. Interpret and explain curriculum construction.
3. Identify and discuss the guideposts in curriculum implementation and evaluation.
4. Be aware of the needs and demands of the community in formulating a curriculum.

Subject Outline

1. Concepts of Curriculum
 - a. Broad Concept of Curriculum
 - b. Narrow Concept of Curriculum
 - c. Essential Elements of a Curriculum
 - d. Implication to Technical and Vocational Education
2. Bases of Curriculum Structure and Development
 - a. Philosophical Principles

- b. Socio-Political Aspirations
 - c. Cultural Development
 - d. Technological Development
 - e. Implications to Technical-Vocational Education
3. Guideposts in Curriculum Implementation
- a. Objectives or Specification of Educational Outputs
 - b. Strategies for Curricular Experiences
 - c. Institutions of Quality Control
4. Action Planning for Curriculum Improvement
- a. Quality of Student Inputs
 - b. Socio-cultural, Economic and Technological Demands
 - c. Physical Facilities Development
 - d. Staff Development

B.1. METHODOLOGY OF TEACHING

Subject Description

This subject is designed to develop competencies in evolving and utilizing the teaching methods applicable to a technician course. It covers an overview analysis of contents of the different subjects in the technician curriculum; methods, approaches and strategies in teaching technical and professional/related subjects giving due emphasis to subject integration.

credit -- 3 units

No. of hours -- 3 hours/week

General Objective

Gain further knowledge and skills in modern pedagogy.

Specific Objectives

1. Enumerate and discuss the current trends and approaches in teaching technician courses.
2. Select and explain the appropriate teaching approaches for particular subject matters in technician education and training.
3. Identify and discuss the strengths and weaknesses of the various types of teaching methods and techniques.
4. Discuss and demonstrate approaches/strategies on transfer of skills.
5. Show and discuss how ergonomics and environmental factors can affect the development of habits and skills.

Subject Outline

- I. An Overview of the Technician Curriculum
 - Technical Subject Contents
 - professional/Related Subjects Contents

II. Approaches to Teaching

- Essentials of Subject Integration
- Scientific Approach to Knowledge Transfer
- Induction and Transfer of Skills
- Stimulus and Effects on Transfer of Skills

III. Strategies in Teaching a Technician Course

- Setting Progressive Practical Learning
- Demonstrative Competencies in Practical Teaching
- Ergonomics and Environmental Factors
- Developing Appropriate Working Attitudes and Habits
- Specialized Systems of Skill Development

B.2. WORKSHOP/LABORATORY MANAGEMENT

Subject Description

This subject deals with organizational and management approach of physical facilities, equipment, tools, and materials. Environmental principles, safety and security of assets as basis for optimization of resources and development of good working habits are covered.

Equipment/tools specification, documentation, and inventory systems are the foundation for establishing preventive maintenance schedule.

Credit	--	3 units
No. of hours	--	3 hours/week

General Objective

Develop functional knowledge, habits, and desirable attitudes on pedagogical principles and educational supervision in the setting up of a healthy and conducive teaching-learning environment.

Specific Objectives

1. Identify and discuss the socio-human factors influencing effective transfer of knowledge.
2. Identify and explain the environmental and safety principles in shop/classroom/laboratory management.
3. Observe and apply environmental and safety principles in shop/classroom/laboratory management.
4. Establish a systematic approach in specification, documentation, and storing of tools, materials, and equipment.
5. Provide opportunities for the development of managerial leadership, responsibilities, and shop/classroom/laboratory safety.

Subject Outline

- I. Environmental and Safety Principles
 - Workshop and Lab Layout Maximizing Flow Area Utilization
 - Flow of Students and Facilities
 - Ergonomic Approach to Furniture/Dimension and Orientation
 - Location and Control of Equipment and Tools
- II. Specification, Documentation, and Storing of Equipment
 - Historical Data/Preventive Maintenance Cards
 - Inventory System and Coding Standards
 - Organization of Preventive and Routinary Maintenance System
 - Instrument/Equipment Calibration Procedures
- III. Students Management
 - Establishing Standards Operating Procedure for Requisition of Tools and Materials
 - Student Liabilities in the Utilization of Facilities
 - Tool Keeper and Instructor Responsibility
 - Leadership from Class Officers
 - Safety and Fire Drill Exercises

B.3. EDUCATIONAL TECHNOLOGY

Subject Description

This subject focuses on the philosophy of technician education, basic principles of teaching and learning, recent trends on methods and strategies of teaching and classroom management, and evaluating results of instruction and lesson planning.

It also deals with the preparation of teaching tools such as lesson guides, hand-outs, modules, overhead projector, transparencies, slides, models and demonstration apparatuses and how to effectively present and impart technical knowledge and skills using various teaching tools.

Credit -- 3 units

No. of hours -- 3 hours/week

General Objectives

1. Acquire advanced knowledge and sophisticated skills in teaching-learning strategies and in the preparation of formative and summative evaluation for technical education.
2. provide challenging opportunities for the development of acceptable skills in planning, preparing, and utilizing different teaching tools.

Specific Objectives

1. Design and prepare lesson guides, hand-outs, and modules in respective technology areas.
2. Operate overhead projector, overhead opaque, and film projects.
3. Prepare transparencies, slides, and models.
4. Demonstrate apparatuses and discuss their effectiveness, advantages, and disadvantages in presenting technical knowledge and skills.

Subject Outline

- I. Principles, Theories, and Practices of Educational Technology
 - Proper Operation and Maintenance of Audio-Visual Equipment and Machines
 - Principles Underlying Audio-Visual Equipment Operation, Maintenance, and Repair
- II. Production of Hardware and Software
- III. Evaluation of the Effectiveness of Audio-Visual Techniques

C.1 TECHNOLOGY/SPECIALIZATION I

Subject Description

This subject aims to provide an appreciation and understanding of the principles, function, and parts of equipment/instruments and tools as appropriate to each technology. The study, analysis, identification, and experimentation of the parameter involved should generate specific documentation and training materials organized on modular training units.

Credit - 4 units
No. of hours - 2 hours lecture
6 hours lab./week

General Objective

Develop a working knowledge of the underlying principles of the equipment, instruments, and tools appropriate to the particular technology/specialization.

Specific Objectives

1. Identify and classify tools and equipment
2. Demonstrate the principles of and operate the different machines/instruments.
3. Apply and utilize the different accessories to the systems.
4. Observe and apply preventive maintenance, inventory and control system for different tools, machines and equipment.
5. Inspect, install and align equipment.

Subject Outline

- I. Classification and Identification of Equipment/Tools
 - Hand tools
 - Lay-out Tools

- Measuring Instruments
- Power Tools
- Machine Tools and Accessories

II. Operating Principles and Systems (machine/instruments)

- Power system (including gearing, clutches, broaches and electrical controls)
- Lubrication System
- Coolant Supply and Recycling
- Accessories Application and Utilization

III. Utilization and Maintenance

- Equipment Installation and Levelling
- Inspection and Alignments
- Lubrication Schedule
- Preventive Maintenance Program
- Inventory and Control System

Extensive use of " OPERATING AND INSTRUCTION MANUALS" is recommended.

C.2. TECHNOLOGY/SPECIALIZATION II

Subject Description

The skills upgrading subject aims to develop manual dexterity in the set-up, sequencing, and operation of equipment in selected activities. Blueprint reading and interpretation, lay-out measurement are also included. Outputs of this subject should generate and experiment practical work and training exercises for the effective implementation of two years course.

Credit	- 4 units
No. of hours	- 2 hours lecture 6 hours lab/week

General Objective

To upgrade and apply skills to develop and improve manual dexterity in the set-up, sequencing, and operation of equipment in selected technology areas for the effective implementation of tech-voc education.

Specific Objectives

1. Design and develop functional training objectives.
2. Sequence operations according to training objectives.
3. Prepare equipment/tools for practical demonstration
4. Prepare formative and summative evaluation to assess performances.
5. Demonstrate use of lay-out and measuring instruments.

Subject Outline

- I. Design and development of Practical Exercises, Projects
 - Setting Training Objectives Module System
 - Techniques in Skills Transfer
 - Development of Sequence of Operation
 - Preparation of Equipment Tools
 - Practical Demonstration for Students

- Evaluation and Rating Performances
- Team Work and Individual Approach to Projects

II. Benchfitting Operations

- Selection of Practical Exercises Projects
- Use of Lay-out and Measurement Instruments
- Execution of Scheduled Exercises and Fits Using Files, Drills, Reamers, and Hand Threading
- Evaluation/Validation of Projects/Exercises

III. machine Tools Operation

- Setting of Equipment and Tools for various Operations
- Execution of Exercises Including Turning, Milling, Shaping and Grinding Operation
- Measurement and Evaluation/Validation of Exercises

D. INDUSTRIAL COMPONENT

Subject Description

The subject aims to produce teachers who are able to take their place in the Technical-Vocational teaching job as well as the Technical-Vocational Manpower System so that they may have wider and more enriched experiences and therefore effectively impart knowledge and skills. Through a cooperative endeavor of the institution with the industry, the subject will place the teachers in practical training situations, giving him more concrete exposures to industrial shop processes by gaining access to the expertise, facilities and services available in the industry.

Credit	- 4 units
No. of hours	- 2 hours lecture 6 hours laboratory/week

General Objective

To develop acceptable industrial competencies in their respective technology areas.

Specific Objectives

1. Update knowledge and skills through selected cooperative training institutions/industries.
2. Become familiar with modern industrial processes, expertise, facilities, etc.
3. Evaluate and assess training effectiveness.
4. Manipulate, operate various modern industrial/shop facilities available in selected cooperating agencies/institutions.

Subject Content

In-plant training or actual job performance.

E. RESEARCH OR SEMINAR PAPER

Subject Description

The study of a problem on the development of a new or modified technique, process, product, formula or theory within the writer's field of competence and writing a corresponding paper which shall be defended before a panel of experts.

Credit - 4 units

No. of hours - Combined group lectures and
individual conferences

MEMORANDUM OF AGREEMENT

KNOW ALL MEN BY THESE PRESENTS:

This Memorandum of Agreement entered into this _____ day
of _____, 1982 by and among:

The Ministry of Education and Culture - Technical Vocational
Education Project with office and postal address at Marvin Plaza,
Pasong Tamo, Makati, Metro Manila, represented by the Project Manager,
hereinafter referred to as MEC-TVEP;

The Marikina Institute of Science and Technology with office
and postal address at Marikina, Metro Manila, represented by the
Vocational College Superintendent, hereinafter referred to as the MIST;

The Technological University of the Philippines with office
and postal address at Ayala Boulevard, Cor. San Marcelino St., Ermita,
Manila, represented by the President, hereinafter referred to as TUP;

The Manila Technician Institute with office and postal address
at Taguig, Metro Manila, represented by the Executive Director, herein-
after referred to as MTI; and

The National Manpower and Youth Council - Office of Manpower
Skills Development, with office and postal address at Taguig, Metro Manila,
represented by the Executive Director, hereinafter referred to as NMYC-QMSD;

WITNESSETH:

WHEREAS, the Ministry of Education and Culture in undertaking
the Technical Vocational Education Project funded by an Asian Develop-
ment Bank loan for the purpose of upgrading technician education program;

WHEREAS, the training of technician trainers is recognized as a basic requirement to carry out a successful and effective technician education program;

WHEREAS, the Marikina Institute of Science and Technology has been designated as the National Center for Technician Education and Staff Development under the Technical Vocational Education Projects; and

WHEREAS, the Manila Technician Institute, the Technological University of the Philippines and the NMYC-OMSD have the capabilities and expertise to provide advanced training in certain technician courses;

NOW, THEREFORE, for and in consideration of the foregoing premises, the MEC-TVEP, MIST, MTI, TUP and NMYC-OMSD mutually agree that:

The MEC-TVEP shall:

1. exercise over-all administrative and supervisory functions in the implementation of the Master of Technician Education curriculum (Annex A);
2. provide funds for the operating expenses specifically for honoraria of personnel involved in the program for the training of technician instructors and maintenance and other operating expenses;
3. set the general guidelines in carrying out the objectives of the technician instructor training program; and
4. provide such other logistical support as maybe deemed necessary to effectively and efficiently implement the Master of Technician Education curriculum.

The MIST shall:

1. directly administer, coordinate and supervise the implementation of the Master of Technician Education curriculum;
2. be responsible in the final selection and admission of participants in the MTE program;
3. be responsible for accrediting the courses offered by the cooperating institutions and granting of the MTE degree by authority of the Minister of Education and Culture; and
4. provide the instructional staff/services and training materials, equipment and facilities for the core and professional courses in the Master of Technician Education curriculum.

The Cooperating Agencies (MTI, TUP AND NMYC-OMSD) shall:

1. make available their facilities and equipment for the following courses
MTI - Automotive Technology, Civil Technology, Machine Technology,
Applied Electronics, Electrical Technology and Educational Technology
TUP - Automotive Technology, Civil Technology, Machine Technology, Applied
Electronics, Electrical Technology, and Educational Technology;
NMYC-OMSD - Electronics, Electricity, Machine Shop, Plumbing, Sheet
Metal Work, Welding, Automotive Mechanics, Refrigeration and
Airconditioning;
2. provide the instructional staff for the courses enumerated above;
3. develop syllabi and instructional materials in said courses;
4. submit the ratings and other pertinent records of instructor-trainees to the MIST;
5. help implement the guidelines of the MTE (Annex B) when applicable; and

6. Provide such other assistance or services as maybe necessary to effectively carry out the objectives of MTE.

This Memorandum of Agreement takes effect upon signing of all parties concerned and shall remain in force until sooner terminated.

IN WITNESS WHEREOF, the parties to this agreement have on the day and year given above hereunto signed this agreement.

MINISTRY OF EDUC. & CULTURE
TECHNICAL VOC. EDUC. PROJECT

TECHNOLOGICAL UNIVERSITY OF THE
PHILIPPINES

MARIKINA INSTITUTE OF SCIENCE
AND TECHNOLOGY

MANILA TECHNICIAN INSTITUTE

NATIONAL MANPOWER AND YOUTH COUNCIL
OFFICE OF MANPOWER AND SKILLS DEVELOPMENT

WITNESSES
