Presented as an introduction to appliance repair, the course is intended as an orientation in the duties, responsibilities, and career opportunities of the major appliances service technician. It also introduces the learner to the various types of tools and equipment used in this trade, and provides him an opportunity for instruction and practice in their proper use. Ninety clock hours in length, the course consists of five instructional blocks: (1) orientation, (2) major appliance service tools, (3) appliance service equipment, (4) customer relations, and (5) service related duties, followed by a post-test. Manipulative instructional methods include demonstration and shop use of actual appliances, tools, equipment and appliance components, as well as mock-ups and demonstration pieces and kits. Basic references, manufacturer's manuals, and audiovisual aids are listed in the bibliography and the appendix provides sample post-tests. (MW)
AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

Course Outline
APPLIANCE REPAIR - BASIC - 9023
(Orientation, Shop Tools and Equipment)
Department 48 - quin 9023.01

DIVISION OF INSTRUCTION - 1973
Course Outline

APPLIANCE REPAIR - BASIC - 9023
(Orientation, Shop Tools and Equipment)

Department 48 - Quin 9023.01

county office of

VOCATIONAL AND ADULT EDUCATION
This course includes introduction to shop rules and safety regulations, the proper use of tools and equipment pertaining to the trade. Career opportunities in the major appliance field, customer relations, and writing out service orders and estimating job costs are all covered, as well as shop related jobs. This is a one or two quinmester credit course.

Clock Hours: 90
The following quinmester course outline is presented as an introduction to Appliance Repair. It is intended that this course will orientate the student in the duties, responsibilities, and career opportunities of the major appliance service technician. It also introduces the learner to the various types of tools and equipment used in this trade, and provides him an opportunity for instruction and practice in their use.

This course may be taught in a single quinmester session (1 hour class) for 45 clock hours or in a double quinmester session (2 hour block) for 90 clock hours. In each instance the course consists of six instructional blocks, however, the double session permits the student to cover each block in more detail and also provides added opportunity in which to practice and increase his skills.

Manipulative instructional methods include demonstration and shop use of actual appliances, tools, equipment and appliance components, as well as mock-ups and demonstration pieces and kits. Related instruction is taught through lecture, books, service and tool manuals, instructional sheets, and chalkboard presentations. Students are expected to keep notebooks and to complete daily related and manipulative assignments; opportunity is provided for practicing newly learned manipulative arts.

An adjunct to the listed instructional methods is provided through the instructors utilization of audiovisual equipment and materials.
This outline was developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee and the Vocational Curriculum Materials Service, and has been approved by the Dade County Vocational Curriculum Committee.
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with Suggested Hourly Breakdown

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<tr>
<td>BIBLIOGRAPHY</td>
<td>5</td>
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**BLOCK**

| I. ORIENTATION (8 Hours)                     | 1    |
| Introduction                                 |     |
| Student Responsibilities                     | 1    |
| Course Benefits                              | 1    |
| II. MAJOR APPLIANCE SERVICE TOOLS (30 Hours) | 2    |
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| III. APPLIANCE SERVICE EQUIPMENT (25 Hours)  | 2    |
| Appliance Moving Equipment                   |     |
| Appliance Servicing Equipment                | 3    |
| IV. CUSTOMER RELATIONS (15 Hours)            | 3    |
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| The Service Call                             | 3    |
| Post Service                                 | 3    |
| V. SERVICE RELATED DUTIES (12 Hours)         | 3    |
| Estimating Job Costs                         |     |
| The Service Order                            | 4    |
| VI. QUINMESTER POST-TEST                    |     |

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Upon completion of this course, the appliance repair student must be able to demonstrate:

1. Knowledge of tools and equipment basic to the job skills he will be expected to perform as a major appliance service technician.
2. Skills in the selection and handling of tools through organized practice sessions.
3. Knowledge and understanding of the duties and responsibilities of the major appliance service technician, as well as being aware of opportunities in this field.
4. The ability to practice good customer relations in his dealings with the public.
5. The proper techniques of filling out "Service Orders," writing reports, estimating job costs, and other service related duties.
SPECIFIC BLOCK OBJECTIVES

BLOCK I - ORIENTATION

The student must be able to:

1. Identify and list the types of major appliances he will learn about in the Major Appliance Service course.
2. Describe some of the appliances used in the past; discuss their operating principles, relate and compare these to appliances of today and of the future.
3. List and explain the primary duties of a major appliance serviceman and the career opportunities open to him.
4. Work, study and act in a safe and proper manner, thereby demonstrating his understanding of school and shop rules and regulations.

BLOCK II - MAJOR APPLIANCE SERVICE TOOLS

The student must be able to:

1. Name and describe the function of all hand tools used by the major appliance serviceman.
2. Use hand tools in a safe and correct manner while assembling and disassembling various major appliance components.
3. Remove all hand tools considered unsafe for use from his tool box or tool inventory.
4. Dress or sharpen his tools keeping them clean, rust free and in excellent working condition.
5. Name and describe the function of all bench and power tools used by the major appliance serviceman.
6. Use all bench and power tools in a safe and correct manner while performing various manipulative assignments requiring the use of these tools.
7. Connect or insert the proper attachment, accessory or drill bit for the job at hand.
8. Select and use the appropriate safety device and observe the proper safety precautions when working with a bench or power tool.
9. Name and describe the functions and reasons for using special purpose tools.

BLOCK III - APPLIANCE SERVICE EQUIPMENT

The student must be able to:

1. Select and use the appropriate appliance moving device when moving from one location to another: a washer, a refrigerator, an air conditioner and a range.
2. Point out, name and describe the function of the service equipment at the refrigeration charging station.
3. Differentiate between "testing" and "measuring" equipment and explain under what circumstances one or the other is used.

BLOCK IV - CUSTOMER RELATIONS

The student must be able to:

1. Take a customer's call, handle the complaint and set up a service appointment, demonstrating and practicing this procedure under simulated conditions.
2. Display correct and accepted procedures in dealing with the customer when inquiring about the complaint, explaining the repairs needed and the estimated charges when making a service call.

BLOCK V - SERVICE RELATED DUTIES

The student must be able to:

1. Estimate and compute job costs of various repairs involving: time, labor and parts; installed exchange items; and items covered under different service policy forms.
2. Write out a "serviceman's Report" containing all required information, in a concise industry acceptable form.
3. Itemize by part and stock number all parts used on a job, and compute with accuracy all charges including labor and credits.
4. Write out customer information on a "Service Order" including all required data in a clear and legible hand.

BLOCK VI - QUINMESTER POST-TEST

The student must be able to:

1. Satisfactorily complete the quinmester post-test.
I. ORIENTATION

A. Introduction
1. Types of Appliances
   a. Automatic washers
   b. Automatic dryers
   c. Gas and electric ranges
   d. Dishwashers
   e. Water heaters
   f. Domestic refrigerators
   g. Room air conditioners
2. The past, present, and future of major appliances
3. Duties of the major appliance serviceman
   a. Installation of appliances
   b. Diagnosing and analyzing appliance malfunctions
   c. Rebuilding, replacing and repairing appliance components

B. Student Responsibilities
1. Safety regulations
   a. Identifying existing and potential safety hazards
   b. Working with others
      (1) Taking nothing for granted
      (2) Knowing what your partner is doing at all times
      (3) Understanding each others instructions
   c. Shop and school safety rules
2. Shop regulations:
   a. Care of tools and equipment
   b. Reporting lost or damaged articles
   c. Clean-up assignments
   d. Shop and school rules

C. Course Benefits
1. Career opportunities
   a. Installer
   b. Shop man
   c. Outside service technician
   d. Field supervisor
   e. Service manager
2. Learning and improving basic skills
   a. Identifying tools
   b. Using tools properly
II. MAJOR APPLIANCE SERVICE TOOLS

A. Basic Hand Tools
1. Types of hand tools
   a. Wrenches
   b. Pliers
   c. Screwdrivers
   d. Sockets and nutdrivers
   e. Ratches
   f. Saws
   g. Files
   h. Chisels and punches
   i. Hammers and mallets
2. Using hand tools
   a. Selecting the proper tool for the job
   b. Correct and proper handling of tools in use
3. Safety factors
   a. Identifying tools unsafe for use
   b. Identifying unsafe tool handling practices
4. Care and maintenance of hand tools
   a. Dressing, sharpening and shaping
   b. Cleaning and protecting from rust

B. Bench and Power Tools
1. Types of bench and power tools
   a. Arbor press
   b. Bench grinder
   c. Electric hand drill
   d. Drill press
   e. Power hand saws
2. Using bench and power tools
   a. Correct and proper handling of bench and power tools
   b. Use of attachments and power tool accessories
3. Safety factors
   a. Wearing and use of protective devices
   b. Guarding against electric shock
   c. Identifying unsafe tools
   d. Horseplay and distractions

C. Special Purpose Tools
1. Refrigeration tools
   a. Flaring and swaging tools
   b. Tube cutting and reaming tools
   c. Refrigeration charging tools
2. Washer and dryer tools
   a. Bearing removal and installation tools
   b. Pump service tools

III. APPLIANCE SERVICE EQUIPMENT

A. Appliance Moving Equipment
1. The hand truck
2. The dollie
3. The flipper
III. APPLIANCE SERVICE EQUIPMENT (Contd.)

B. Appliance Servicing Equipment
   1. Brazing equipment
      a. The torch
      b. Brazing rods, solders and fluxes
   2. Refrigeration servicing
      a. The evacuation pump
      b. The charging cylinder
      c. Manifold and gauges
      d. Refrigerant tanks and fittings
   3. Testing and measuring equipment
      a. Electrical test meters
      b. Appliance analyzers
      c. Test lamps and test cords
      d. Heat measuring devices

IV. CUSTOMER RELATIONS

A. Telephone Communications
   1. Calling for service
      a. Taking the complaints
      b. Checking her file
      c. Explaining the service charge
   2. Making an appointment
      a. Filling in the call sheet
      b. Checking your route
      c. Radio dispatching

B. The Service Call
   1. Understanding the customers complaint
      a. Customers observations
      b. Checking the appliance
   2. Diagnosing the trouble
      a. Explaining the malfunction and the repairs needed
      b. Explaining the charges to the customer
      c. Explaining the guarantee or warranty

C. Post Service
   1. Cleaning up servicing area
   2. Post checking the appliance

V. SERVICE RELATED DUTIES

A. Estimating Job Costs
   1. Labor, time plus parts
   2. Installed exchange basis
   3. Service policy
      a. Contract
      b. Guarantee
      c. Warranty
B. The Service Order

1. Writing a "Serviceman's Report"
   a. What you found to exist
   b. What you did about it
   c. What you told customer; what customer told you

2. Writing the charges
   a. Itemize all parts used in repair
   b. List labor and service charges
   c. Deduct previous paid and customer credits
   d. Include tax
   e. Establish method of payment
      (1) C.O.D.
      (2) Charge
      (3) Send bill
      (4) Accept deposit balance C.O.D.

3. Completing the service order
   a. Model and serial numbers of appliance
   b. Part numbers of parts used or ordered
   c. Customer information
      (1) Name, address phone number
      (2) Date of appliance purchase and installation
      (3) Date of last service call
   d. Serviceman's and customer's signatures

VI. QUIZMASTER POST-TEST
BIBLIOGRAPHY
(Orientation, Shop Tools and Equipment)

Basic References:


Manufacturer's Manuals:


Filmstrips and Cassette Tapes:

5. Use and Care of Test Instruments. Filmstrip G-5 #28440. La Forte, Indiana: Whirlpool Corp.
6. Use and Care of Test Instruments. Cassette Tape G-5 #28459. La Forte, Indiana: Whirlpool Corp.
Quinmester Post-Test

Name ______________________ Date ___________ Score ___

Block I - Related Test

Each statement needs a word, a figure, or a phrase to make it correct. Only one of the choices listed is correct. Place the letter of the choice you make in the space provided at the right edge of the sheet.

1. A type of major appliance most likely to be located in a laundry room is:
   a. A dishwasher
   b. An electric range
   c. An automatic dryer
   d. A refrigerator
   e. A toaster

2. A food preserving appliance found in a kitchen is:
   a. A toaster
   b. An electric range
   c. An air conditioner
   d. A dishwasher
   e. A refrigerator

3. An appliance which, in addition to its main purpose, also filters dust and pollen from the air while lowering humidity is called:
   a. A water heater
   b. An air conditioner
   c. An automatic washer
   d. A fan
   e. A refrigerator

4. An attachment on early washing machines used to extract water from the wash load is called:
   a. A wringer
   b. A roller
   c. A spinner
   d. A scrubber
   e. A dryer

5. Stoves of the future will likely cook foods through a heatless process called:
   a. Boiling
   b. Microwave radiation
   c. Char-broiling
   d. Dehydration
   e. Defrosting

8/07
6. A complete installation consists of installing the appliance, demonstrating the appliance and:

a. Hooking up the appliance  
b. Levelling the appliance  
c. Cleaning the appliance  
d. Oiling the appliance  
e. Checking the appliance

7. In the event of an internal short, a ground on the appliance should:

a. Cause the fuse to blow  
b. Prevent the fuse from blowing  
c. Cause shocks  
d. Burn out the appliance's motor  
e. Permit the appliance to operate normally

8. We have shop rules which must be followed in order that:

a. All students may be treated fairly  
b. The shop environment maintains a good atmosphere for learning and working  
c. Conditions in the shop are as safe as possible  
d. We may develop the habits and disciplines which will help us to succeed in our society  
e. All of the above are correct

9. The man with the overall responsibility of operating the service department is the:

a. Outside service technician  
b. Field supervisor  
c. Shop man  
d. Service manager  
e. Installer

10. One sure mark of the good mechanic is:

a. He never makes mistakes  
b. He knows how to use his tools  
c. He knows more than his superiors  
d. He never argues with the customers  
e. He sets the other mechanics "straight"
Quinmester Post-Test

Name ______________________ Date ___________ Score _____

Block II - Manipulative Test

Each student will be assigned a work station. Each station will contain the following:

1. A tool box of assorted tools including some defective tools, at least one tool which requires sharpening or cleaning, and other tools needed to properly complete his assigned tasks
2. A water pump, new pump gasket and bearings
3. An inlet valve
4. A pencil and a sheet of paper

The student will perform Operations A and B in any order he desires.

Operation A

1. Disassemble the water pump
2. Remove old bearings and press in new bearings
3. Remove all traces of old gasket and replace
4. Reassemble water pump
5. On the sheet of paper, list all tools used in this operation

Operation B

1. Disassemble the inlet valve
2. Use the wire wheel to remove traces of corrosion on the solenoid coils and brackets
3. Reassemble the valve
4. On the sheet of paper, list all tools used in this operation

Replace tools in tool box.

Time allowed for test: 40 minutes
Quinmester Post Test

Name ___________________ Date ________________ Score __

Block II - Related Test

In the left hand column you will find a list of "special purpose tools." In the right hand column is listed the "special purpose" each tool is used for. You are to match the tool to its purpose or use by placing the letter on the left of the "special Purpose" in the space provided on the left of its tool.

1. Corbin pliers    a. Used for cutting pipe
2. Yoke and block   b. Used for swaging
3. Hack saw         c. Used for removing clamps
4. Reamer           d. Used for cutting tubing
5. Tube cutter      e. Used for flaring
                    f. Used for cleaning out burrs

Use a metal ruler to determine the diameter of the circles below. In the space next to each circle write down the size (in 32nds) of the twist drill which fits most accurately.

Use a metal ruler to determine the diameter of the circles below. In the space next to each circle write down the size (in 32nds) of the twist drill which fits most accurately.

If you required a slightly larger twist drill, which of the above is closest to:

1. 1 inch       ____
2. 3/4 inch     ____
3. 1/2 inch     ____
4. 3/8 inch     ____
5. 3/16 inch    ____

12/13
THE INSTRUCTOR SHOULD RATE THE STUDENT ON THE FOLLOWING:

1. Selected proper tools.
2. Selected only safe tools.
3. Cleaned or sharpened tools used, if needed.
4. Used hand tools in a safe manner. (If not, list faults.)
5. Used hand tools properly. (If not, list faults.)
6. Used proper safety equipment and safe guards.
7. Used power/bench tools in a safe manner. (If not, list faults.)
8. Used power/bench tools properly. (If not, list faults.)
9. Cleans tools before putting away.
10. Cleans work stations.

Check student's sheet to see that he has identified and listed all tools used.

Check time
Quinmester Post Test

Name __________________________ Date _____________ Score ___

Block III - Related Test

Each statement needs a word, a figure, or a phrase to make it correct. Only one of the choices listed is correct. Place the number of the choice you make in the space provided at the right edge of the sheet.

1. When it is necessary to move a refrigerator only a few feet, and to tilt it on its side or back, it is best to use a:
   
   a. Hand truck
   b. Rug or pad
   c. Dollie
   d. Flipper
   e. Any of the above will do

2. A joining or sealing technique most often used in "refrigeration work" is:
   
   a. Silver soldering
   b. Epoxeeing
   c. Bronze brazing
   d. Soft soldering
   e. Welding

3. "Flux" is used before soldering to:
   
   a. Remove oxide deposits and clean the solder
   b. Remove oxide deposits and clean the metal being soldered
   c. Prevent the metal being soldered from melting
   d. Make the solder melt faster
   e. All of the above

4. Silver solder will "flow" at approximately:
   
   a. 700°
   b. 600°
   c. 1200°
   d. 1900°
   e. 2400°

5. A refrigeration gauge which can measure a vacuum as well as pressure is called a:
   
   a. Pressure gauge
   b. Manifold
   c. Vacuum gauge
   d. Atmospheric gauge
   e. Compound gauge
6. A device used to measure liquid refrigerant is called:
   a. Refrigerant tank
   b. Charging cylinder
   c. Manifold gauge set
   d. Graduated beaker
   e. Gallon jug

7. The evacuation pump is used to create a vacuum in a refrigeration system in order to:
   a. Permit moisture in the system to vaporize and boil away
   b. Remove all traces of the old refrigerant
   c. Remove oil from the system
   d. Clean the tubing in the system
   e. None of the above are correct

8. Electrical valves, such as volts, ohms and amps may be measured by using various:
   a. Gauges
   b. Analyzers
   c. Test lamps
   d. Line test cords
   e. Detectors

9. A live circuit can most easily be traced using:
   a. An ammeter
   b. A test cord
   c. A test lamp
   d. A watt meter
   e. An ohmmeter

10. In order to use a temperature gauge accurately, the pointer must first be set (calibrated) to:
    a. 32°
    b. Zero
    c. 212°
    d. Room temperature (ambient)
    e. The outside temperature
Block IV - Related Test

Place a "T" in the space provided next to each statement if you believe the statement is True, and place an "F" if you believe it to be False.

1. Before "setting up" a service call the person taking the call should advise the customer of the "Service Charge."  

2. The person taking the call should advise the customer of the exact time and date that the serviceman will call.  

3. When on the phone, you should try to figure out the appliances trouble and give the customer an estimated cost.  

4. If a customer claims a call is "the same trouble as before" and is under the service policy, you should give her the benefit of any doubt and tell her there will not be a charge.  

5. On a "recall" you should inform the customer that our servicemen are experts and that there is probably something else wrong.  

6. When routing your service calls it is good policy to treat all customers alike and not put the "cash" calls before the "S.P." calls.  

7. On making a service call you should never enter a home unless an adult is present.  

8. It is best to complete the job before telling a customer of the charges so that she has no opportunity to refuse the work.  

9. It is a good practice to listen well to the customer's complaint about her appliances, and to ask questions of her before you start trouble-shooting.  

10. If a customer has small children or pets, it is best to see that they are not in the room you are working in.
Block V - Related Test

Fill in the missing word or phrase with the correct response. Use scrap paper for figuring.

1. A sales tax is added to all bills, this money is eventually paid to the government. 
   (County, City, State, Federal)

2. A service charge is $12.95; additional labor is computed at $3.50 per 15 minutes; the service charge covers the first 1/2 hour. How much should you charge for total labor if you spent 1 hour and 25 minutes on a repair?

3. Service charge is $12.95, this covers the first 1/2 hour labor. You replaced a part which cost $17.50; the entire job requires 27 minutes. How much, including tax, will you charge the customer?

4. You replace a pump for an installed/exchange price of $37.50. Labor is normally $3.50 per 15 minutes and you spent 30 minutes on the job. How much, not counting tax, will you charge the customer?

5. You have replaced a timer in a full service contract customer's appliance. The timer lists at $22.50 and normally your company charges $3.50 per 15 minutes labor charge. You spent 45 minutes on the job. How much, not counting tax, will you charge the customer?

6. You have replaced a gear case in a 3 year old appliance which has a 5 year warranty on that part. The gear case lists for $45.50 and normally your company charges $3.50 per 15 minutes for labor. You spent 1-1/2 hour on the job. How much, not counting tax, will you charge the customer?
Quinmester Post Test

Block V - Short Essay

The student will be assigned a shop appliance and will assume that he has just replaced two separate components. Using the name of a relative or friend as the imagined owner, the student will then fill out the SERVICE ORDER below.

<table>
<thead>
<tr>
<th>NAME</th>
<th>ADDRESS</th>
<th>TYPE APPLIANCE</th>
<th>MAKE</th>
<th>MODEL</th>
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<th>COMPLAINT</th>
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<table>
<thead>
<tr>
<th>SERVICEMAN'S REPORT</th>
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<thead>
<tr>
<th>STOCK NO.</th>
<th>PART</th>
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</table>

The appliance was left in good working order.

<table>
<thead>
<tr>
<th>Customer's Signature</th>
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</table>

<table>
<thead>
<tr>
<th>TOTAL PARTS</th>
<th>LABOR</th>
<th>TAX</th>
<th>TOTAL</th>
</tr>
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<tr>
<td></td>
<td></td>
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</tbody>
</table>

All parts and labor guaranteed 90 days from this date

Serviceman's Signature

-23-04
ANSWER KEY TO QUINMESTER POST-TEST

Block I - Related Test
1. c
2. e
3. b
4. a
5. b
6. e
7. a
8. e
9. d
10. b

Block II - Manipulative Test
Use Rating Sheet

Block II - Related Test
1. c
   a. 29/32nds
   1. b
2. e
   b. 31/30nds
   2. a
3. a
   c. 15/30nds
   3. c
4. f
   d. 11/30nds
   4. d
5. d
   e. 5/30nds
   5. e
Block III - Related Test
1. d
2. a
3. b
4. c
5. e
6. b
7. a
8. e
9. c
10. d

Block IV - Related Test
1. T
2. F
3. F
4. F
5. F
6. T
7. T
8. F
9. T
10. T

Block V - Related Test
1. State
2. $26.95
3. $31.67
4. $37.50
5. 0
6. $21.00

Block V - Essay
Check for completeness