



# NONRESIDENT TRAINING COURSE

June 1998



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# Utilitiesman Basic Volume 1

NAVEDTRA 14265

Although the words “he,” “him,” and “his” are used sparingly in this course to enhance communication, they are not intended to be gender driven or to affront or discriminate against anyone.

# PREFACE

By enrolling in this self-study course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program.

**COURSE OVERVIEW:** In completing this nonresident training course, you will demonstrate a knowledge of the subject matter by correctly answering questions on the following subjects:

- Plans, Specifications, and Color Coding
- Advanced Base Functional Components (ABFC)
- Plumbing
- Plumbing Valves and Accessories
- Plumbing Fixtures and Plumbing Repairs
- Prime Movers, Pumps, and Compressors
- Water Treatment
- Maintenance of Water Treatment Equipment

**THE COURSE:** This self-study course is organized into subject matter areas, each containing learning objectives to help you determine what you should learn along with text and illustrations to help you understand the information. The subject matter reflects day-to-day requirements and experiences of personnel in the rating or skill area. It also reflects guidance provided by Enlisted Community Managers (ECMs) and other senior personnel, technical references, instructions, etc., and either the occupational or naval standards, which are listed in the *Manual of Navy Enlisted Manpower Personnel Classifications and Occupational Standards*, NAVPERS 18068.

**THE QUESTIONS:** The questions that appear in this course are designed to help you understand the material in the text.

**VALUE:** In completing this course, you will improve your military and professional knowledge. Importantly, it can also help you study for the Navy-wide advancement in rate examination. If you are studying and discover a reference in the text to another publication for further information, look it up.

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## **Sailor's Creed**

"I am a United States Sailor.

I will support and defend the  
Constitution of the United States of  
America and I will obey the orders  
of those appointed over me.

I represent the fighting spirit of the  
Navy and those who have gone  
before me to defend freedom and  
democracy around the world.

I proudly serve my country's Navy  
combat team with honor, courage  
and commitment.

I am committed to excellence and  
the fair treatment of all."

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# **SUMMARY OF UTILITIESMAN BASIC**

## **VOLUME 1**

*Utilitiesman Basic*, Volume 1, NAVEDTRA 14265, consists of chapters on Plans, Specifications, and Color Coding; Advanced Base Functional Components (ABFC); Plumbing; Plumbing Valves and Accessories; Plumbing Fixtures and Plumbing Repairs; Prime Movers, Pumps, and Compressors; Water Treatment; and Equipment Maintenance.

## **VOLUME 2**

*Utilitiesman Basic*, Volume 2, NAVEDTRA 14279, consists of chapters on Boilers; Boiler Maintenance; Steam Distribution Systems; Heating Systems; Galley Equipment; Laundry Equipment; Air Conditioning; and Refrigeration.

# INSTRUCTIONS FOR TAKING THE COURSE

## ASSIGNMENTS

The text pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions. Pay close attention to tables and illustrations and read the learning objectives. The learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

## SELECTING YOUR ANSWERS

Read each question carefully, then select the BEST answer. You may refer freely to the text. The answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the course.

## SUBMITTING YOUR ASSIGNMENTS

To have your assignments graded, you must be enrolled in the course with the Nonresident Training Course Administration Branch at the Naval Education and Training Professional Development and Technology Center (NETPDTC). Following enrollment, there are two ways of having your assignments graded: (1) use the Internet to submit your assignments as you complete them, or (2) send all the assignments at one time by mail to NETPDTC.

**Grading on the Internet:** Advantages to Internet grading are:

- you may submit your answers as soon as you complete an assignment, and
- you get your results faster; usually by the next working day (approximately 24 hours).

In addition to receiving grade results for each assignment, you will receive course completion confirmation once you have completed all the

assignments. To submit your assignment answers via the Internet, go to:

**<http://courses.cnet.navy.mil>**

**Grading by Mail:** When you submit answer sheets by mail, send all of your assignments at one time. Do NOT submit individual answer sheets for grading. Mail all of your assignments in an envelope, which you either provide yourself or obtain from your nearest Educational Services Officer (ESO). Submit answer sheets to:

COMMANDING OFFICER  
NETPDTC N331  
6490 SAUFLEY FIELD ROAD  
PENSACOLA FL 32559-5000

**Answer Sheets:** All courses include one “scannable” answer sheet for each assignment. These answer sheets are preprinted with your SSN, name, assignment number, and course number. Explanations for completing the answer sheets are on the answer sheet.

**Do not use answer sheet reproductions:** Use only the original answer sheets that we provide—reproductions will not work with our scanning equipment and cannot be processed.

Follow the instructions for marking your answers on the answer sheet. Be sure that blocks 1, 2, and 3 are filled in correctly. This information is necessary for your course to be properly processed and for you to receive credit for your work.

## COMPLETION TIME

Courses must be completed within 12 months from the date of enrollment. This includes time required to resubmit failed assignments.

## **PASS/FAIL ASSIGNMENT PROCEDURES**

If your overall course score is 3.2 or higher, you will pass the course and will not be required to resubmit assignments. Once your assignments have been graded you will receive course completion confirmation.

If you receive less than a 3.2 on any assignment and your overall course score is below 3.2, you will be given the opportunity to resubmit failed assignments. **You may resubmit failed assignments only once.** Internet students will receive notification when they have failed an assignment--they may then resubmit failed assignments on the web site. Internet students may view and print results for failed assignments from the web site. Students who submit by mail will receive a failing result letter and a new answer sheet for resubmission of each failed assignment.

## **COMPLETION CONFIRMATION**

After successfully completing this course, you will receive a letter of completion.

## **ERRATA**

Errata are used to correct minor errors or delete obsolete information in a course. Errata may also be used to provide instructions to the student. If a course has an errata, it will be included as the first page(s) after the front cover. Errata for all courses can be accessed and viewed/downloaded at:

**<http://www.advancement.cnet.navy.mil>**

## **STUDENT FEEDBACK QUESTIONS**

We value your suggestions, questions, and criticisms on our courses. If you would like to communicate with us regarding this course, we encourage you, if possible, to use e-mail. If you write or fax, please use a copy of the Student Comment form that follows this page.

## **For subject matter questions:**

E-mail: n314.products@cnet.navy.mil  
Phone: Comm: (850) 452-1001, Ext. 1826  
DSN: 922-1001, Ext. 1826  
FAX: (850) 452-1370  
(Do not fax answer sheets.)  
Address: COMMANDING OFFICER  
NETPDTC N314  
6490 SAUFLEY FIELD ROAD  
PENSACOLA FL 32509-5237

## **For enrollment, shipping, grading, or completion letter questions**

E-mail: fleetservices@cnet.navy.mil  
Phone: Toll Free: 877-264-8583  
Comm: (850) 452-1511/1181/1859  
DSN: 922-1511/1181/1859  
FAX: (850) 452-1370  
(Do not fax answer sheets.)  
Address: COMMANDING OFFICER  
NETPDTC N331  
6490 SAUFLEY FIELD ROAD  
PENSACOLA FL 32559-5000

## **NAVAL RESERVE RETIREMENT CREDIT**

If you are a member of the Naval Reserve, you may earn retirement points for successfully completing this course, if authorized under current directives governing retirement of Naval Reserve personnel. For Naval Reserve retirement, this course is divided into two units evaluated at 14 points: 12 points upon satisfactory completion of unit 1, assignments 1 through 8; and 2 points upon satisfactory completion of unit 2, assignment 9. (Refer to *Administrative Procedures for Naval Reservists on Inactive Duty*, BUPERSINST 1001.39, for more information about retirement points.)



## **Student Comments**

**Course Title:** Utilitiesman Basic, Volume 1

**NAVEDTRA:** 14265 **Date:** \_\_\_\_\_

**We need some information about you:**

Rate/Rank and Name: \_\_\_\_\_ SSN: \_\_\_\_\_ Command/Unit \_\_\_\_\_

Street Address: \_\_\_\_\_ City: \_\_\_\_\_ State/FPO: \_\_\_\_\_ Zip \_\_\_\_\_

**Your comments, suggestions, etc.:**

<p><b>Privacy Act Statement:</b> Under authority of Title 5, USC 301, information regarding your military status is requested in processing your comments and in preparing a reply. This information will not be divulged without written authorization to anyone other than those within DOD for official use in determining performance.</p>
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NETPDTC 1550/41 (Rev 4-00)

## CHAPTER 1

# PLANS, SPECIFICATIONS, AND COLOR CODING

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**LEARNING OBJECTIVE:** *Interpret basic plans, drawings, and specifications in construction operations. Recognize crew leader responsibilities and safety color-coding standards.*

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In the day-to-day work as a Utilitiesman, you will be installing, assembling, inspecting, and troubleshooting many types of utility systems. To do these jobs properly, you must read and interpret plans and drawings. You may also have to read specifications that contain additional information on the details of construction and installation. Plans and specifications help you in doing the job correctly and safely.

After studying this topic, you should be able to read and interpret simple drawings and sketches as well as using the specifications to help you with more complex plans. Additionally, you should be able to draw simple shop drawings and specify the hazards associated with each color code for piping and compressed gas containers.

### PLANS

**LEARNING OBJECTIVE:** *Identify the arrangement of a set of project blueprints and types of plans and drawings.*

You will be working with several types of plans and drawings. These may range from simple shop drawings and sketches, made perhaps by your immediate supervisor, to construction blueprints created by engineers. For the most part you will be working with plans created by architects and engineers. In Seabee construction, a complete set of plans for a project consists of civil, architectural, structural, electrical and mechanical plans, or drawings. You will be spending the majority of your time with mechanical drawings, but you will need all of these plans together to obtain a full picture of your part of that project and how to accomplish it.

### CIVIL PLANS

Civil plans, or site plans, encompass a variety of drawings and information. They furnish essential data, such as land contours, roads, utilities, trees, structures, site preparation and development, and significant physical features, on or near the construction site (fig. 1-1)

### ARCHITECTURAL PLANS

Architectural plans show the architectural design and composition of a building. They include floor plans, exterior elevation plans, and door and window schedules (fig. 1-2).

### STRUCTURAL PLANS

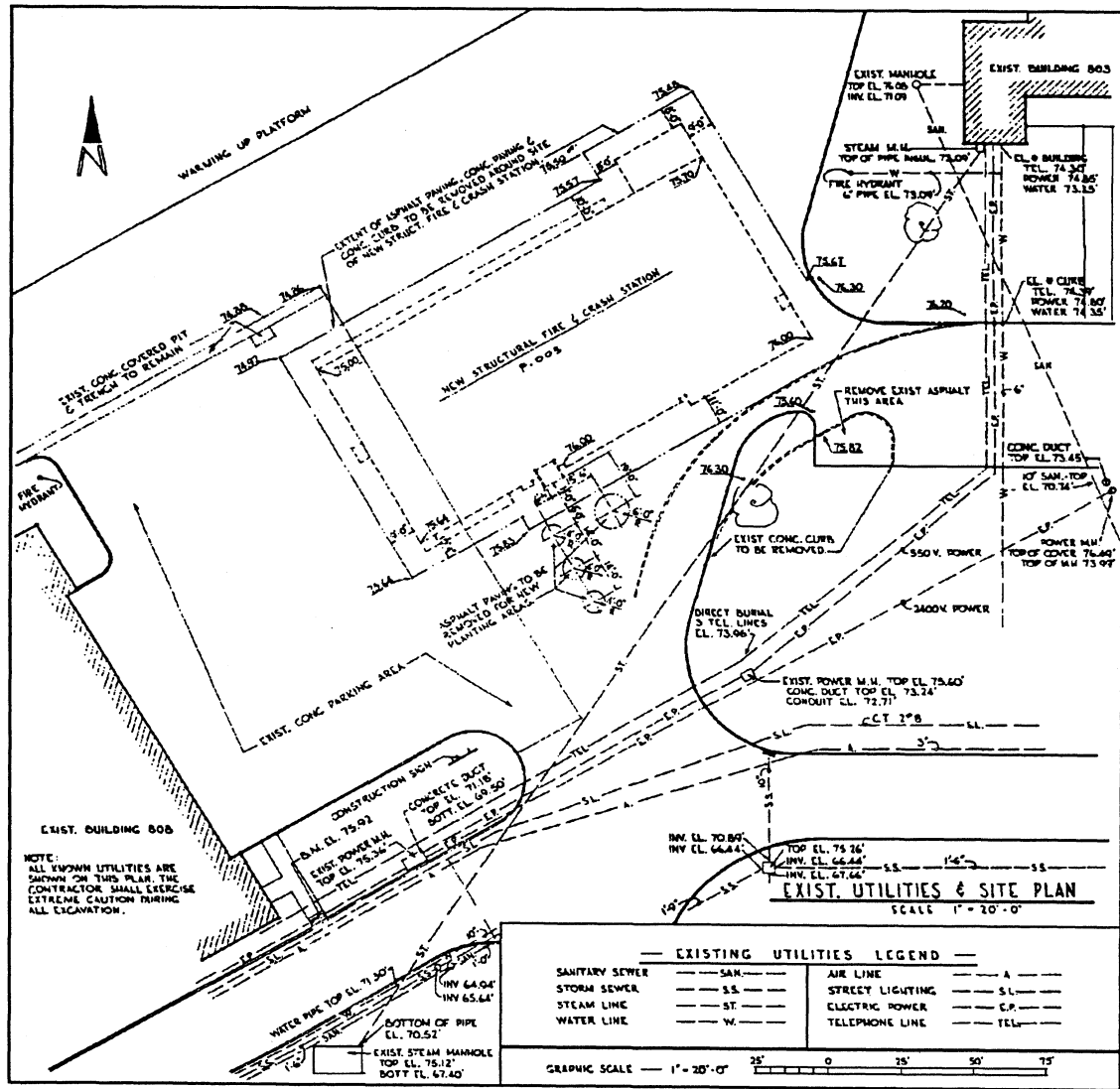
Structural plans show the support of the building or structure, including walls, columns, beams, foundation, roof, and deck slab. They also show their relationship to each other (figs. 1-3 and 1-4).

### ELECTRICAL PLANS

Electrical plans contain the electrical distribution system plans, interior wiring drawings, and electrical component schedules for a building, or structure. They show wiring circuits, light switches, receptacles, light fixtures, and equipment (fig. 1-5).

### MECHANICAL PLANS

Mechanical plans include layouts and details for systems of plumbing, heating, ventilating, air conditioning, and refrigeration (fig. 1-6). These systems vary, depending on whether they are for a permanent installation with the most modern fixtures and equipment or for a temporary installation where less complex equipment is used. Whatever the job, you



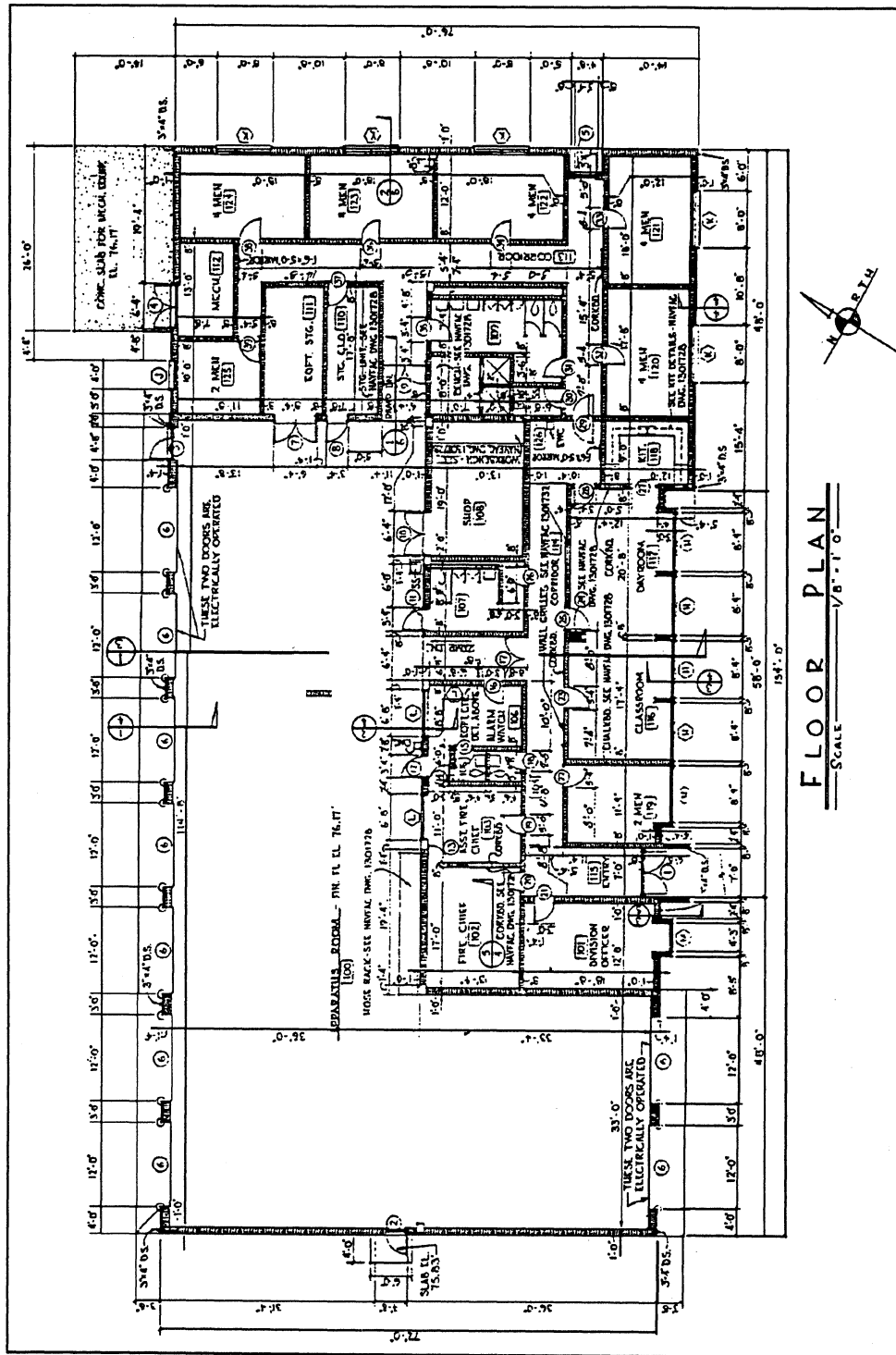


Figure 1-2.—Architectural or floor plan of concrete-masonry construction.