



# Plumbing Technology

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## State Submission

**Mark Wilson, President**

**November 2012**



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# PLUMBING TECHNOLOGY PROGRAM

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## EXECUTIVE SUMMARY

Western Dakota Technical Institute is seeking approval to create a Diploma program in Plumbing Technology.

Labor market information for the state indicates that the demand for workers in the plumbing field is strong now and in the future. Through 2020, the number of plumbers, pipefitters, and steamfitters is expected to grow by 10 percent, according to the South Dakota Labor Market Information Center (LMIC). The LMIC also predicts a 19 percent increase in the number of jobs for helpers—pipelayers, plumbers, pipefitters, and steamfitters.

Graduates of this program will be able to seek employment in a variety of settings, including plumbing companies and public entities. Graduates also will—eventually—have the opportunity to start their own plumbing business.

Western Dakota Technical Institute will market this program as Plumbing Technology. The diploma is a nine-month or two-semester curriculum.

## IDENTIFICATION AND DESCRIPTION OF THE PROGRAM

The Plumbing Technology program prepares the student to begin a career in plumbing and pipe fitting. Coursework provides the student with technical understanding and skills development and integrates theory with practical experience. Through the program, the student develops skills in piping techniques and procedures, plumbing and piping systems, residential and commercial system installations, blueprint reading and isometric interpretation. The successful graduate is eligible for 800 hours on his or her apprenticeship card and employment at an advanced apprenticeship level in a variety of businesses found in rural and metropolitan areas.

There are a variety of career opportunities for graduates of the plumbing program. Graduates have the option of working for a commercial or residential plumbing contractor as they complete their apprenticeship training. The plumbing trade offers challenging and interesting work for those with the desire to work as designers, installers, and troubleshooters. The opportunity for advancement to master plumber status and business owner also exists.

## OBJECTIVES AND PURPOSE OF THE PROGRAM

The primary objective of the Plumbing Technology program is to prepare students with the necessary skills to be successful in the plumbing field. Students will take coursework in plumbing theory, plumbing practices, plan and print reading, and other technical skills. This program also will provide education and training in soft skills such as communication and math.

The aim of this program is to provide students a solid foundation in plumbing technology. According to the [Occupational Outlook Handbook](#) graduates of this program may do the following: *Plumbers install and repair water, drainage, and gas pipes in homes, businesses, and factories. They install and repair large water lines, such as those that supply water to buildings, and smaller ones, including ones that supply water to refrigerators. Plumbers also install plumbing fixtures—bathtubs, showers, sinks, and toilets—and appliances such as dishwashers, garbage disposals, and water heaters. They also fix plumbing problems. For example, when a pipe is clogged or leaking, plumbers remove the clog or replace the pipe. Some plumbers maintain septic systems, the large, underground holding tanks that collect waste from houses not connected to a city or county's sewer system.*

The program will articulate appropriate high school credits whenever possible, and there could be dual enrollment possibilities for high school students.

## PROGRAM OUTCOMES

The Plumbing Technology program graduate will be able to:

- Exhibit proper safety techniques and procedures
- Classify the use of common plumbing materials
- Analyze blueprints and isometric drawings
- Demonstrate proper techniques and procedures for installation of plumbing systems

- Perform skillfully the installation of plumbing fixtures, faucets, and water heaters
- Apply knowledge of model plumbing code rules and regulations
- Apply knowledge of mathematical foundation in plumbing

## **METHODS OF OBTAINING THE OBJECTIVES OF THE PROGRAM**

The program will include classroom and laboratory instruction, guest speakers, and apprenticeship opportunities.

The Plumbing Technology program will work closely with an industry advisory board composed of representatives who are from plumbing businesses, public entities, and others in the field. The Advisory Board will approve the curriculum, discuss and recommend equipment purchases, and assist in forming partnerships to help WDT with innovative curriculum, internships, and presentations.

## **POPULATION SERVED BY THE PROGRAM**

The Plumbing Technology program will be available to all interested individuals who successfully meet the WDT admissions criteria established for the program. The program will be open to full-time and part-time students. All applicants must be high school graduates and take an admissions test to establish reading, writing, and math abilities. No restriction will be made regarding race, creed, gender or age. The program will draw students primarily from South Dakota. The opportunities for employment in the field will be primarily in South Dakota.

## **PROJECTED THREE-YEAR BUDGET**

This program will be staffed by a ¾-time instructor. Therefore, one ¾-time instructor and supplies will be the only budgetary needs required for this program. The projected budget is as follows:

<b>Expenses</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>
Instructors	\$66,152.00	\$68,136.00	\$70,180.00
Equipment	\$25,000.00	\$25,000.00	\$10,000.00
Supplies	\$10,000.00	\$10,000.00	\$10,000.00

## **PROGRAM COMPETENCIES AND ENTRY AND EXIT POINTS**

Entry point: Fall Semester

Exit point: Graduation with a diploma in Plumbing Technology.

## **STATEMENT OF NONDUPLICATION**

Western Dakota Tech is proposing this program to meet industry needs for plumbers. There are no other Plumbing Technology programs in South Dakota.

## **CURRICULUM DESIGN**

See Appendix A for Curriculum Sequence.

## WAGE FACTOR

The median annual wage of plumbers, pipefitters, and steamfitters was \$46,660 in May 2010, according to the Bureau of Labor Statistics. The median wage is the wage at which half the workers in an occupation earned more than that amount and half earned less. The lowest 10 percent earned less than \$27,580, and the top 10 percent earned more than \$79,920.

The starting pay for apprentices usually is between 30 percent and 50 percent of the rate paid to fully trained plumbers, pipefitters, and steamfitters. They receive pay increases as they become more skilled.

South Dakota Wage Estimates for SD, Rapid City, and West					Percentile				
AREA	SOC CODE	Occupation	Workers	Avg. Wage	10 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	90 <sup>th</sup>
Statewide	47-2152	Plumbers, Pipefitters, and Steamfitters	1,040	18.66	12.76	14.42	17.86	21.93	26.61
Rapid City MSA	47-2152	Plumbers, Pipefitters, and Steamfitters	210	20.28	13.33	16.31	20.08	23.59	28.28
West	47-2152	Plumbers, Pipefitters, and Steamfitters	100	15.88	12.33	13.27	15.05	18.13	21.23

Data derived from SD Department of Labor [http://dlr.sd.gov/lmic/menu\\_occupational\\_wages.aspx](http://dlr.sd.gov/lmic/menu_occupational_wages.aspx)

## EMPLOYMENT OUTLOOK

### South Dakota Occupational Projections 2010-2020

SOC	SOC Title	2010	2020	Growth	% Growth	Average Annual Demand
47-2152	Plumbers, Pipefitters, and Steamfitters	1,195	1,315	120	10.0	36

Data derived from SD Department of Labor [http://dlr.sd.gov/lmic/occupation\\_projections.aspx](http://dlr.sd.gov/lmic/occupation_projections.aspx)

On a national level (retrieved from the Occupational Outlook Handbook):

Employment of plumbers, pipefitters, and steamfitters is projected to grow 26 percent from 2010 to 2020, faster than the average for all occupations. Demand for plumbers is expected to come from new building construction and stricter water efficiency standards for plumbing systems, such as low-flow toilets and showerheads.

Job opportunities are expected to be good as some employers continue to report difficulty finding qualified professionals. In addition, many workers are expected to retire over the next 10 years, which will result in more job openings.

Like that of many other types of construction work, employment of plumbers, pipefitters, and steamfitters is sensitive to fluctuations of the economy. On the one hand, workers may experience periods of unemployment when the overall level of construction falls. On the other hand, shortages of workers may occur in some areas during peak periods of building activity.

However, maintenance and repair of plumbing and pipe systems must continue even during economic downturns, so plumbers and fitters outside of construction tend to have more stable employment.

Plumbing Technology/Plumber CIP Code: 46.0503

## APPENDIX A – Plumbing Technology PROGRAM CURRICULUM

### Diploma Course Sequence

First Semester		Credits
<b>MATH104</b>	<p><b>Technical Math</b></p> <p>This course includes real numbers and variable expressions, first-degree equations, polynomials, factoring, rational expressions, rational exponents and radicals, geometry, quadratic equations and trigonometry. This course is designed for students who are preparing for technical careers. It stresses a working knowledge of applied mathematical concepts. The practice problems are applications from various technical fields but do not require prior knowledge of the technical applications. Problems are selected to help develop an understanding of where and how mathematics is used in the various fields of employment. <b>PREREQUISITES:</b> High School Math and a COMPASS Score in Pre-Algebra Domain of 40 or higher.</p>	3
<b>PLU120</b>	<p><b>Plumbing Theory I</b></p> <p>Provides instruction on the basic principles of plumbing system installations. At the conclusion of the course, the student will be able to complete a variety of plumbing-related tasks such as identify and describe safe work practices; identify and explain the materials, fittings and supports used in a plumbing installation; identify the Uniform Plumbing Code; identify the content covered in each chapter of the UPC and perform basic pipe sizing; create plan and elevation plumbing drawings and sketches; and identify and describe potable water systems, water wells and basic water treatment.</p>	6
<b>PLU125</b>	<p><b>Plumbing Practices I</b></p> <p>Provides instruction on common pipe joining techniques and common pipe fitting procedures for pressure and drainage weight pipe and fittings. At the completion of the course, the student will be able to identify the common materials used in plumbing and gas piping systems, identify and perform common joining methods used on piping materials, and maintain a job log of time spent and materials used for each of the piping assignments.</p>	4
<b>PLU130</b>	<p><b>Plumbing Plan and Print Reading</b></p> <p>Provides instruction on reading, interpreting and understanding standard construction drawings. From a given construction drawing, students develop piping sketches including plan, elevation and isometric views, size drain waste and vent piping by use of the Uniform Plumbing Code and the City of Rapid City amendments, prepare a materials list from a given piping sketch and download and print a variety of manufacturers' product information sheets for fixtures, faucets, fittings and other related items.</p>	2
<b>CIS105</b>	<p><b>Microcomputer Software Applications</b></p> <p>This course is an introductory course in software applications, which</p>	3

	includes basic technical concepts, as well as, hands-on experience. The utility of the computer is demonstrated by introducing Windows, word processing, spreadsheet, database, and presentation software to the student. (A computer course is required of all students at WDTI; students may take CIS 105 or CIS 106).	
	<b>TOTAL CREDITS</b>	<b>18</b>
<b>Second Semester</b>		<b>Credits</b>
<b>PSYC103</b>	<b>Human Relations in the Workplace</b> Success in the world of work requires not only the ability to perform according to the requirements of the position, but also the ability to adjust and get along with others. The purpose of this course is to help students grasp the importance of human relations skills in both their personal and career lives. It will introduce students to the skills necessary to create and maintain positive relationships and interactions in the workplace.	3
<b>ENGL102</b>	<b>Career Communications</b> This course covers the communication skills required for success during the job hunt and on the job.	2
<b>PLU135</b>	<b>Plumbing Theory II</b> Provides instruction in all aspects of plumbing installations in a residential setting. Students learn to plan, design and install a plumbing drain, a waste and vent system, plumbing fixtures, water distribution systems, natural gas supply piping, venting, and chimney systems in accordance with the Uniform Plumbing Code, state and local amendments.	7
<b>PLU140</b>	<b>Plumbing Practices II</b> Provides instruction for installation of plumbing systems. At the completion of the course, the student will be able to plan, design and install a plumbing drain, a waste and vent system, plumbing fixtures, water distribution systems, natural gas supply piping, venting, and chimney systems in accordance with the Uniform Plumbing Code, state and local amendments.	4
<b>PLU145</b>	<b>Advanced Plumbing Plan and Print Reading</b> Provides additional and advanced instruction on reading, interpreting and understanding standard construction drawings. From a given construction drawing, students develop piping sketches including plan, elevation and isometric views, size drain waste and vent piping by use of the Uniform Plumbing Code and the City of Rapid City amendments, prepare a materials list from a given piping sketch and download and print a variety of manufacturers' product information sheets for fixtures, faucets, fittings and other related items.	2
	<b>TOTAL CREDITS</b>	<b>18</b>

**APPENDIX B – LETTERS OF SUPPORT**

# *Action Mechanical, Inc.*

PLUMBING • HEATING • SHEET METAL • AIR CONDITIONING

1856 Lombardy Drive • P.O. Box 880  
Rapid City, SD 57709-0880

Phone: (605) 348-5212  
Fax: (605) 348-6984

October 24, 2012

Mr. Mark Wilson, President  
Western Dakota Tech  
800 Mickelson Drive  
Rapid City, SD 57703

Mr. Wilson,

As a Black Hills area business and employer, we would be interested in a Plumbing Technology program offered by Western Dakota Tech.

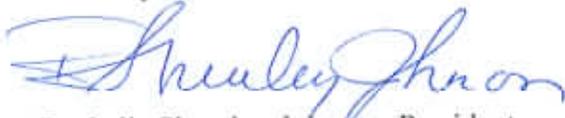
As a mechanical contractor, we employ many plumbing professionals who work on large commercial projects or who provide services to individual residential customers. The plumbing industry is an ever-growing business with constant technical changes and can flourish with well-trained employees educated in the last technologies.

We are always seeking qualified employees, who have received formal training and education. We support efforts to increase structured training in our area, there are currently no local certificate programs to formally train those students who want to become plumbing professionals. These skills are in high demand. Job security, plus pay and benefits await these professionals.

We hope this plumbing program can be developed and our company would support your efforts to inform policy makers and the public of the great career opportunities available to graduates of your program.

Thank you.

Sincerely,



Rochelle Sheesley-Johnson, President





SOUTH DAKOTA ASSOCIATION

OFFICE OF THE  
EXECUTIVE VICE PRESIDENT  
ken.phcc@midconetwork.com

OF PLUMBING • HEATING • COOLING CONTRACTORS, INC.

(605) 271-7255 • 1-800-640-7422 • 1000 N. WEST AVE. #200 • SIOUX FALLS, SD 57104

October 24 , 2012

Mr. Mark Wilson, President  
Western Dakota Tech  
800 Mickelson Drive  
Rapid City, SD 57703

Dear Mr. Wilson,

The South Dakota Association of Plumbing, Heating, Cooling Contractors is interested in a possible Plumbing Certificate program at Western Dakota Tech.

The South Dakota PHCC represents about 70 contractor members in South Dakota and Sioux City, Iowa. Our members range in size from 150 employees to two or three employees.

Our members constantly seek qualified applicants and cannot find sufficient candidates to meet the demand. Some of our members have to actively recruit employees from out-of-state technical schools. Contractors in the Black Hills region would certainly welcome an appropriate training program in western South Dakota. Our industry is also facing a chronic, growing shortage of qualified professionals who have obtained appropriate training.

We offer this letter of support, and we offer an extensive apprenticeship program for students who want to advance their career once they've completed a formal Plumbing Certificate curriculum. We would further help with guest speakers and supplemental information for the program and its students.

Thank you for your efforts to advance the p-h-c industry. We look forward to the development of this program.

Sincerely,

Ken Melius  
Executive Vice President

# WOLFF'S PLUMBING & HEATING, INC.

614 South 32nd Street - PO Box 97 - Spearfish, SD 57783

Ph - (605) 642-5755 - Fax - (605) 642-5757

October 23, 2012

Mr. Mark Wilson, President  
Western Dakota Tech  
800 Mickelson Drive  
Rapid City, SD 57703

Dear Mr. Wilson,

As a Black Hills area business and employer, we are interested in a possible Plumbing Certificate program offered by Western Dakota Tech.

As a mechanical contractor, we employ many plumbing professionals who work on large commercial projects or who provide services to individual residential customers. The plumbing industry is a fast-changing industry with constant technical changes requiring educated and well-trained employees who can master these disciplines.

We are always seeking qualified employees, and employees who have received formal training and education are an asset to our business. The P-H-C industry faces a critical shortage of trained employees entering our industry—both locally and nationally. We support efforts to increase structured training in our geographic area, there are currently no local programs to formally train those students who want to become plumbing professionals. These skills are in high demand. Job security, plus pay and benefits, are above average for these professionals.

I hope this plumbing program can be developed and our company would support your efforts to inform policy makers and the public of the great career opportunities available to graduates of your program.

Thank you.

Sincerely,



\_\_\_\_\_  
Greg Hartman  
President