

Northcentral Technical College (NTC) Letters of Support and Course Curriculum

The following documents are partnership letters of support from school districts, employers, and others, as well as some letters of commitment from NTC to these partners. Also included is documented curriculum for courses within the Gas Metal Arc Welding Technical Diploma.



CHEQUAMEGON SCHOOL DISTRICT

"Home of the Screaming Eagles"

April 21, 2014

Lori A. Weyers, Ph.D., President
Northcentral Technical College
1000 W. Campus Drive
Wausau, WI 54401

RE: Wisconsin Fast Forward Blueprint for Prosperity: High School Pupil Workforce Training Programs

Dear Dr. Weyers:

On behalf of Chequamegon School District, I am pleased to write this letter of support and commitment for Northcentral Technical College's proposal to the Wisconsin Department of Workforce Development focused on the Certified Nursing Assistant (CNA) and Welding career pathway. We believe that this will provide opportunities for our faculty and staff to support learners in making career and educational decisions that fit their aptitudes.

Chequamegon High School recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy. As part of Chequamegon High School's commitment to the success of this Project, it will partner with Northcentral Technical College in the following ways:

- Assist in recruitment efforts for participation in the Health and/or Welding Academies
- Send appropriate district staff and faculty to all required professional development and curriculum training workshops
- Assist in the continued development of career pathways that provide exit points to employment and opportunities for job growth
- Participate in continuous improvement program processes

This project will help students obtain industry recognized credentials leading to employment. We are eager to participate in this opportunity.

Sincerely,

Tim Kief, CHS Principal



SCHOOL DISTRICT OF PHILLIPS

"Preparing for Tomorrow"

P.O. Box 70, Phillips, Wisconsin 54555-0070

Phone 715-339-2419 FAX 715-339-2416 www.phillips.k12.wi.us

Rick Morgan, Superintendent

Leah Theder, Finance Manager

April 21, 2014

Lori A. Weyers, Ph.D., President
Northcentral Technical College
1000 W. Campus Drive
Wausau, WI 54401

RE: Wisconsin Fast Forward Blueprint for Prosperity: High School Pupil Workforce Training Programs

Dear Dr. Weyers:

On behalf of Phillips High School, I am pleased to write this letter of support and commitment for Northcentral Technical College's proposal to the Wisconsin Department of Workforce Development focused on the Certified Nursing Assistant (CAN) and Welding career pathway. We believe that this will provide opportunities for our faculty and staff to support learners in making career and educational decisions that fit their aptitudes.

Phillips High School recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy. As part of Phillips High School's commitment to the success of this Project, it will partner with Northcentral Technical College in the following ways:

- Assist in recruitment efforts for participation in the Health and/or Welding Academies
- Send appropriate district staff and faculty to all required professional development and curriculum training workshops
- Assist in the continued development of career pathways that provide exit points to employment and opportunities for job growth
- Participate in continuous improvement program processes

This project will help students obtain industry recognized credentials leading to employment. We are eager to participate in this opportunity.

Sincerely,

A handwritten signature in black ink that reads "Rick Morgan". The signature is written in a cursive, flowing style.

Rick Morgan
Superintendent



SCHOOL DISTRICT OF PHILLIPS

"Preparing for Tomorrow"

P.O. Box 70, Phillips, Wisconsin 54555-0070

Phone 715-339-2419 FAX 715-339-2416 www.phillips.k12.wi.us

Rick Morgan, Superintendent

Leah Theder, Finance Manager

January 4, 2016

Lori A. Weyers, Ph.D., President
Northcentral Technical College
1000 W. Campus Drive
Wausau, WI 54401

RE: Career Pathways Initiative

Dear Dr. Weyers:

On behalf of Phillips High School, I am pleased to write this letter of support and commitment for Northcentral Technical College's 2016-2017 career pathways proposal to the Wisconsin Technical College System. We believe that this will provide opportunities for our faculty and staff to support learners in making career and educational decisions that fit their aptitudes.

Phillips High School recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy. As part of Phillips High School's commitment to the success of this Project, it will partner with Northcentral Technical College in the following ways:

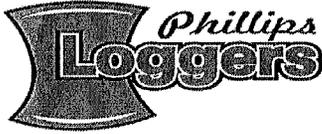
- Design, develop and participate in Academies via transcribed credit and/or contracted classes through NTC to begin Fall 2016
- Send appropriate district staff and faculty to all required professional development and curriculum training workshops
- Allow students to participate in business and college visits related to their chosen pathway
- Participate in sponsored trips, tours, forums, etc., understanding that this grant will support transportation and staff release stipends as appropriate
- Assist in the continued development of career pathways that provide exit points to employment and opportunities for job growth
- Provide insight and oversight to curriculum development and program design
- Participate in continuous improvement program processes

This career pathways project will help students make better career and educational decisions and support professional development opportunities of our staff and faculty. We support this opportunity and look forward to its continued expansion and enhancements.

Sincerely,

A handwritten signature in black ink that reads "Rick Morgan".

Rick Morgan, Superintendent
School District of Phillips



SCHOOL DISTRICT OF PHILLIPS

"Preparing for Tomorrow"

P.O. Box 70, Phillips, Wisconsin 54555-0070

Phone 715-339-2419 FAX 715-339-2416 www.phillips.k12.wi.us

Molly Lehman, Finance Manager

Rick Morgan, Superintendent

May 9, 2018

Wisconsin Office of Skills Development
Wisconsin Department of Workforce Development
201 East Washington Avenue
P.O. Box 7946
Madison, WI 53707-7946

Dear Evaluation Committee Members:

This letter is to confirm Phillips High School's planned participation in and contribution to the High School Student Certifications training program to be operated by Northcentral Technical College. We believe that this will provide opportunities for learners in making career and educational decisions that fit their aptitudes. Our district recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy.

Plans for Participant Contributions.

As part of our school's commitment to the success of this Project, it will partner with Northcentral Technical College in the following ways:

- Identify and enroll sophomores, juniors, or seniors in the workforce training programs leading to industry-recognized certifications in the following high demand fields: Nursing Assistant, Medical Assistant, and Welding
- Send appropriate district staff and faculty to professional development and curriculum training workshops
- Allow students to participate in business and college visits related to their chosen pathway
- Support dual credit and academy communication efforts to stakeholders, including parents and students
- Participate in sponsored trips, tours, forums, etc., understanding that this grant will support transportation and staff release stipends as appropriate
- Assist in the continued development of career pathways that provide exit points to employment and opportunities for job growth
- Provide insight to curriculum development and program design
- Participate in continuous improvement program processes

Plans for Match Contributions.

Phillips High School agrees to provide the following match to the project.

- Contract for educational services to be determined by # of student participants.
- Match will be documented with 38.14 contract.

The High School Student Certifications training program will help students make better career and educational decisions to fill the employment demands of District employers. We support this opportunity and look forward to our continued partnership.

Sincerely,

A handwritten signature in black ink that reads "Rick Morgan".

Rick Morgan
Superintendent

Together
for
Children



SCHOOL DISTRICT OF RIB LAKE

1236 Kennedy St. P.O. Box 278 Rib Lake, WI 54470
www.riblake.k12.wi.us #RLSDPride

Board of Education

President: Jerry Blomberg
Vice President: Scott Everson
Clerk: Joan Magnuson
Treasurer: Steve Martin

Lori Manion

District Administrator
715.427.3222
715.427.3221 fax

Rick Cardey

Principal
High School/ Middle School
715.427.3220 • 715.427.5446
715.427.5022 fax

Jonathon Dallmann

Principal
Elementary School
Special Ed. Director
715.427.5818

January 4, 2016

Lori A. Weyers, Ph.D., President
Northcentral Technical College
1000 W. Campus Drive
Wausau, WI 54401

RE: Career Pathways Initiative

Dear Dr. Weyers:

On behalf of Rib Lake High School, I am pleased to write this letter of support and commitment for Northcentral Technical College's 2016-2017 career pathways proposal to the Wisconsin Technical College System. We believe that this will provide opportunities for our faculty and staff to support learners in making career and educational decisions that fit their aptitudes.

Rib Lake High School recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy. As part of Rib Lake High School's commitment to the success of this Project, it will partner with Northcentral Technical College in the following ways:

- Design, develop and participate in Academies via transcribed credit and/or contracted classes through NTC to begin Fall 2016
- Send appropriate district staff and faculty to all required professional development and curriculum training workshops
- Allow students to participate in business and college visits related to their chosen pathway
- Participate in sponsored trips, tours, forums, etc., understanding that this grant will support transportation and staff release stipends as appropriate
- Assist in the continued development of career pathways that provide exit points to employment and opportunities for job growth
- Provide insight and oversight to curriculum development and program design
- Participate in continuous improvement program processes

This career pathways project will help students make better career and educational decisions and support professional development opportunities of our staff and faculty. We support this opportunity and look forward to its continued expansion and enhancements.

Sincerely,

Rick Cardey
Rib Lake High School Principal

Board Members: Amber Fallos MaryAnne Roiger Stacy Tlusty

The School District of Rib Lake is an equal opportunity provider.

April 21, 2014

Lori A. Weyers, President
Northcentral Technical College
1000 W. Campus Drive
Wausau, WI 54401

RE: Wisconsin Fast Forward Blueprint for Prosperity: High School Pupil Workforce Training Programs

Dear Dr. Weyers:

On behalf of AGRA Industries, Inc., I am pleased to write this letter of support and commitment for Northcentral Technical College's proposal to the Wisconsin Department of Workforce Development focused on the welding career pathway. This application provides opportunities to support local economies, strengthens large and small manufacturing businesses, and allows individuals to gain skills needed for high demand jobs that lead to advanced skill positions.

AGRA recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy. By June 2015 and in collaboration with the Academy-to-Work: Welding Pathway project, our company anticipates hiring 50 new employees to fill openings in skilled labor positions, including welding, based on the following hiring criteria:

- Successful completion and attainment of NTC Production Welding Technical Diploma
- Ability to use most current guidelines and safety precautions in all welding laboratory activities
- Ability to set up, operate and maintain common welding machines and equipment to industrial standards
- Ability to apply accepted principles in using welding-related tools and fabrication equipment
- Ability to interpret welding prints, material specifications and procedures
- Ability to execute principles of welding inspection and testing
- Ability to demonstrate good work ethics and teamwork

Project participants who meet the above criteria will be given additional consideration in filling these openings.

As part of our commitment to the success of this project, we will partner with Northcentral Technical College in the following ways:

- Continue to identify necessary workforce skills/competencies so curriculum accurately reflects industry trends
- Assist in the continued development of career pathways that provide exit points to employment and entry points into education to provide opportunities for growth
- Provide work-based learning opportunities as appropriate to the welding credential
- Give preference to employing and/or promoting candidates who receive an industry recognized credential
- Participate in mock interviews, job fairs, class guest lectures, and industry tours to discuss and showcase career opportunities, skill needs, and local area opportunities

AGRA believes this grant application will help meet immediate needs of local manufacturers as they hire employees and grow their businesses. We support this initiative.

Sincerely,



David Marcott
Vice President Administration



April 21, 2014

Lori A. Weyers, President
Northcentral Technical College
1000 W. Campus Drive
Wausau, WI 54401

RE: Wisconsin Fast Forward Blueprint for Prosperity: High School Pupil Workforce Training Programs

Dear Dr. Weyers:

On behalf of G3 Industries, I am pleased to write this letter of support and commitment for Northcentral Technical College's proposal to the Wisconsin Department of Workforce Development focused on the welding career pathway. This application provides opportunities to support local economies, strengthens large and small manufacturing businesses, and allows individuals to gain skills needed for high demand jobs that lead to advanced skill positions.

G3 Industries recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy. By June 2015 and in collaboration with the Academy-to-Work: Welding Pathway project, our company anticipates hiring up to 4 new employees to fill openings in Welding based on the following hiring criteria:

- Successful completion and attainment of NTC Production Welding Technical Diploma
- Ability to use most current guidelines and safety precautions in all welding laboratory activities
- Ability to set up, operate and maintain common welding machines and equipment to industrial standards
- Ability to apply accepted principles in using welding-related tools and fabrication equipment
- Ability to interpret welding prints, material specifications and procedures
- Ability to execute principles of welding inspection and testing
- Ability to demonstrate good work ethics and teamwork

Project participants who meet the above criteria will be given additional consideration in filling up to 8 openings.

As part of our commitment to the success of this project, we will partner with Northcentral Technical College in the following ways:

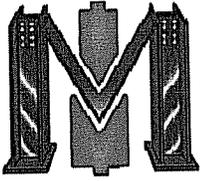
- Continue to identify necessary workforce skills/competencies so curriculum accurately reflects industry trends
- Assist in the continued development of career pathways that provide exit points to employment and entry points into education to provide opportunities for growth
- Provide work-based learning opportunities as appropriate to the welding credential
- Give preference to employing and/or promoting candidates who receive an industry recognized credential
- Participate in mock interviews, job fairs, class guest lectures, and industry tours to discuss and showcase career opportunities, skill needs, and local area opportunities

G3 Industries believes this grant application will help meet immediate needs of local manufacturers as they hire employees and grow their businesses. We support this initiative.

Sincerely,

A handwritten signature in black ink that reads 'Randy Stroik'.

Randy Stroik
Plant Manager – Mosinee Facility



MERRILL IRON & STEEL, INC.

900 Alderson Street
PO Box 110
Schofield WI 54476-0110

Telephone (715) 355-8924 Fax (715) 355-8444



AISC CERTIFIED

COMPLEX STEEL BUILDING STRUCTURES
CONVENTIONAL STEEL STRUCTURES
SIMPLE STEEL BRIDGES
SOPHISTICATED PAINT ENDORSEMENT

info@merrilliron.com www.merrilliron.com

April 21, 2014

Lori A. Weyers, President
Northcentral Technical College
1000 W. Campus Drive
Wausau, WI 54401

RE: Wisconsin Fast Forward Blueprint for Prosperity: High School Pupil Workforce Training Programs

Dear Dr. Weyers:

On behalf of Merrill Iron and Steel Inc I am pleased to write this letter of support and commitment for Northcentral Technical College's proposal to the Wisconsin Department of Workforce Development focused on the welding career pathway. This application provides opportunities to support local economies, strengthens large and small manufacturing businesses, and allows individuals to gain skills needed for high demand jobs that lead to advanced skill positions.

Merrill Iron and Steel Inc recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy. By June 2015 and in collaboration with the Academy-to-Work: Welding Pathway project, our company anticipates hiring 15 new employees to fill openings in Welding based on the following hiring criteria:

- Successful completion and attainment of NTC Production Welding Technical Diploma
- Ability to use most current guidelines and safety precautions in all welding laboratory activities
- Ability to set up, operate and maintain common welding machines and equipment to industrial standards
- Ability to apply accepted principles in using welding-related tools and fabrication equipment
- Ability to interpret welding prints, material specifications and procedures
- Ability to execute principles of welding inspection and testing
- Ability to demonstrate good work ethics and teamwork

Project participants who meet the above criteria will be given additional consideration in filling 5-10 openings.

As part of our commitment to the success of this project, we will partner with Northcentral Technical College in the following ways:

- Continue to identify necessary workforce skills/competencies so curriculum accurately reflects industry trends
- Assist in the continued development of career pathways that provide exit points to employment and entry points into education to provide opportunities for growth
- Give preference to employing and/or promoting candidates who receive an industry recognized credential
- Participate in mock interviews, job fairs, class guest lectures, and industry tours to discuss and showcase career opportunities, skill needs, and local area opportunities

Merrill Iron and Steel Inc believes this grant application will help meet immediate needs of local manufacturers as they hire employees and grow their businesses. We support this initiative.

Sincerely,

A handwritten signature in cursive script that reads "Becky Weiland". The signature is written in black ink and is positioned above the printed name and title.

Becky Weiland
Corporate Human Resources Manager

OEM FABRICATORS, INC.

April 21, 2014

Lori A. Weyers, President
Northcentral Technical College
1000 W. Campus Drive
Wausau, WI 54401

RE: Wisconsin Fast Forward Blueprint for Prosperity: High School Pupil Workforce Training Programs

Dear Dr. Weyers:

On behalf of OEM Fabricators, Inc, I am pleased to write this letter of support and commitment for Northcentral Technical College's proposal to the Wisconsin Department of Workforce Development focused on the welding career pathway. This application provides opportunities to support local economies, strengthens large and small manufacturing businesses, and allows individuals to gain skills needed for high demand jobs that lead to advanced skill positions.

OEM recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy. By June 2015 and in collaboration with the Academy-to-Work: Welding Pathway project, our company anticipates hiring 25 new employees to fill openings in weld based on the following hiring criteria:

- Successful completion and attainment of NTC Production Welding Technical Diploma
- Ability to use most current guidelines and safety precautions in all welding laboratory activities
- Ability to set up, operate and maintain common welding machines and equipment to industrial standards
- Ability to apply accepted principles in using welding-related tools and fabrication equipment
- Ability to interpret welding prints, material specifications and procedures
- Ability to execute principles of welding inspection and testing
- Ability to demonstrate good work ethics and teamwork

Project participants who meet the above criteria will be given additional consideration in filling 25 openings.

As part of our commitment to the success of this project, we will partner with Northcentral Technical College in the following ways:

- Continue to identify necessary workforce skills/competencies so curriculum accurately reflects industry trends
- Assist in the continued development of career pathways that provide exit points to employment and entry points into education to provide opportunities for growth
- Provide work-based learning opportunities as appropriate to the welding credential
- Give preference to employing and/or promoting candidates who receive an industry recognized credential
- Participate in mock interviews, job fairs, class guest lectures, and industry tours to discuss and showcase career opportunities, skill needs, and local area opportunities

OEM Fabricators, Inc believes this grant application will help meet immediate needs of local manufacturers as they hire employees and grow their businesses. We support this initiative.

Sincerely,

Andy Hennes
Manager, Staffing and Workforce Development
OEM

Department of Workforce Development
Youth and At Risk Populations Section
201 E. Washington Ave., E100
P.O. Box 7972
Madison, WI 53707-7972



Scott Walker, Governor
Reginald J. Newson, Secretary
Scott Jansen, Division Administrator

March 17, 2015

Sarah Dillon
Northcentral Technical College
1000 West Campus Drive
Wausau, WI 54401

Re: Blueprint for Prosperity Letter of Intent to Award (BP151HSP-26)

Dear Sarah Dillon:

On behalf of Governor Walker, I am pleased to announce the approval of a Wisconsin Fast Forward Blueprint for Prosperity High School Pupil Workforce Training grant to Northcentral Technical College for up to \$149,806 to train 83 pupils. These funds are available through the Youth and At-Risk Populations Section at the Wisconsin Department of Workforce Development. This grant supports your Academy-to-Work: Welding, Health and IT Career Pathways high school pupil workforce training project.

This award is based on your High School Pupil Workforce Training Program grant application. If we have made any modifications to your proposed project budget they are attached. To accept this award, please reply to this email within two weeks. If you have questions concerning this award, please contact the Blueprint for Prosperity High School Pupil Program team at WFFHSPupil@dwd.wisconsin.gov.

After receiving your acceptance, Youth and At-Risk Populations staff will send you an award contract and related documents. As signor on the award, you will be responsible for all reporting requirements, ensuring that funds are administered according to the project scope, and all other terms and conditions detailed in the contract.

You are authorized to begin program operations, and you may begin incurring costs effective today. Please note, however, that costs cannot be billed until after the grant contract agreement documents have been signed and returned to our department.

We respectfully request that you do not publicize this award until DWD has issued a public announcement of all awards. This is a courtesy notification.

I extend my best wishes for your success in this Wisconsin Fast Forward High School Pupil Workforce Training Program collaboration.

Sincerely,

Reginald J. Newson
Secretary

June 18, 2018

Micki Dirks-Luebbe, Director of Grants
Northcentral Technical College
1000 W Campus Dr.
Wausau, WI 54401

Re: Expanded Wisconsin Fast Forward Letter of Intent to Award
(Correspondence ID# EF181HS10004)

Dear Micki,

On behalf of the Wisconsin Department of Workforce Development (DWD), I am pleased to announce the approval of an Expanded Wisconsin Fast Forward Training Grant to Northcentral Technical College for up to \$96,545 to train a minimum of 44 students for High School Student Certifications. These funds are available through the Office of Skills Development (OSD). This grant supports your NTC District HS Certifications: Welding, CNA/Medical Assistant Pathways Project.

The award is based on your Wisconsin Fast Forward application. If we made any modifications to your project or if the award is contingent upon Special Conditions, details are available in Attachment A: Terms and Conditions and Attachment B: Award Budget Summary. To accept this award, please:

- Review Attachment A and B
- Sign and date Attachment A
- Include Attachment A in your Intent to Award reply e-mail to the OSD by Friday, June 22, 2018.

After receiving your award acceptance, the OSD staff will send you a contract and related documents. As signatory on the contract, you are responsible for ensuring that funds are administered according to the project scope in your application and in the attached Intent to Award document; and for adhering to the terms and conditions detailed in the contract, including reporting requirements.

The date of the executed contract will be the Project Start Date, and you are not authorized to begin program operations and incurring costs until the Project Start Date. Furthermore, if a grant contract agreement is not signed and returned, any costs incurred will not be reimbursed.

We respectfully request that you do not publicize this award until DWD has issued a public announcement of all awards. This is a courtesy notification. If you have any questions please contact Wisconsin Fast Forward at WisconsinFastForward@dwd.wisconsin.gov.

I extend my best wishes for your success in this Wisconsin Fast Forward training collaboration.

Sincerely,



Raymond Allen, Secretary
Department of Workforce Development

**WISCONSIN FAST FORWARD INTENT TO AWARD
ATTACHMENT A: TERMS AND CONDITIONS**

CORRESPONDENCE ID: EF181HS10004

GRANTEE: Northcentral Technical College

PROJECT TITLE: NTC District HS Certifications: Welding, CNA/Medical Assistant Pathways

GRANT AMOUNT: \$96,545

USE: As detailed on Attachment B: Award Budget Summary.

DELIVERABLES: In return for Wisconsin Fast Forward Funds, the Grantee agrees to:

- Complete training of no fewer than 44 students. Total reimbursement of up to \$96,545 will be pro-rated based on the number of successfully trained program participants.
- Students will receive full certifications or progress towards certification as specified on the approved CTE Incentive Grants Certifications List. WTCS Certifications must be "State-Approved" Career Pathways Certificates (CPCs) or "State-Approved" Embedded Technical Diplomas (ETDs).

REPORTING: Quarterly reports will be provided as detailed in the contract and will include, at a minimum, the following items:

- Student certification project updates
- The number of trainees starting and completing training in the previous quarter and in the project-to-date
- Collect and submit via DWD's Youth Online Data Application (YODA) registration/enrollment and post-program completion information on all student trainees, which may include data related to grade level, academic status, student risk factors, demographics, name of high school, high school graduation, type of training program(s), program completion date(s), certification(s) earned, enrollment in post-secondary education or training, and other indicators, as needed.
- Match funds expended
- Reimbursement request

SPECIAL CONDITIONS: 38.14 Contracts with participating schools must be submitted by NTC prior to execution of the binding contract with DWD. NTC proposed \$32,412 as leveraged match/cost sharing with 38.14 contracts to meet state statute requirements for contracting for educational services.

OTHER CONDITIONS:

- a) The execution and delivery of all standard documents, including the contract between the Grantee and the Wisconsin Department of Workforce Development (DWD).
- b) There being no material adverse change in the Project between now and the funding of the

award.

- c) This letter of intent represents the extent of DWD's participation in the project. Any future requests to DWD regarding assistance for this project will take into account the participation identified above.
- d) In signing this document, you acknowledge that neither the Grantee nor Grant Partners will issue news releases or publicize the award or project without prior consultation with and the authorization of DWD's Communications Office. Please contact the DWD Communications Office at 608-266-2722 or CommunicationsOffice@dwd.wisconsin.gov.
- e) This letter of intent is not a binding contract and it does not detail the specific, final terms of an agreement between DWD and the Grantee. This letter of intent is a contingent proposal and a commitment to work with the Grantee toward execution of a final contract based on the framework outlined here. Reimbursements of costs incurred after the project start date will only be made if a contract is executed. All reimbursement requests must include paid invoices to be considered.
- f) The grantee is current on all federal and state tax obligations. (Per DWD 801.04 Project eligibility. (1) ELIGIBLE APPLICANTS. Any private organization or public agency that is current on all federal and state tax obligations.)

EXPIRATION DATE: This proposal will expire automatically unless it is accepted by signing below and emailing it to WisconsinFastForward@dwd.wisconsin.gov by Friday, June 22, 2018

ACCEPTANCE OF INTENT TO AWARD TERMS AND CONDITIONS AND BUDGET SUMMARY:
I have read and agree to the terms and conditions and budget summary:

Northcentral Technical College
Company/Organization

Vicki S. Jeppesen VP of College Advancement 6.21.18
Signature and Title Date

Vicki S. Jeppesen, VP of College Advancement
Type or Print Name and Title Signed Above



NORTH CENTRAL WISCONSIN WORKFORCE DEVELOPMENT BOARD

1/11/2016

Lori A. Weyers, Ph.D., President
Northcentral Technical College
1000 W. Campus Drive
Wausau, WI 54401

RE: Career Pathways Initiative

Dear Dr. Weyers:

On behalf of North Central Wisconsin Workforce Development Board (NCWWDB), I am pleased to write this letter of support and commitment for Northcentral Technical College's career pathways proposal to the Wisconsin Technical College System. We believe this initiative will provide effective training and educational opportunities which are uniquely suited to the needs and demands of participants in our Workforce Innovation and Opportunity Act (WIOA) and other programs.

NCWWDB recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy. This project will expand, enhance, and support current grant partnerships between NCWWDB and NTC: 1) 2015-16 WTCS (Consortium) Career Pathways for Educational Attainment—IT, Manufacturing & Health and 2) the INTERFACE Project focused on information technology pathways. As part of NCWWDB's commitment to the success of this Project, it will partner with NTC in the following ways:

- Continue to identify necessary workforce skills/competencies so curriculum accurately reflects industry trends
- Assist in the continued development of career pathways that provide exit points to employment and entry points into education to provide opportunities for growth
- Channeling the knowledge of NCWWDB-facilitated, business-led sector groups (Central Wisconsin Metal Manufacturers Alliance, North Central Health Care Alliance, and an emerging IT group) in continued development of targeted career pathways
- Provide insight to curriculum development and program design
- Participate in continuous improvement program processes

This career pathways project will help high school and adult learners make better career and educational decisions. I support this opportunity and look forward to its continued expansion and enhancements.

Sincerely,

Rene Daniels

Executive Director, North Central Wisconsin Workforce Development Board



422 WEST 3RD STREET, SUITE 200 • PO BOX 616 • ASHLAND, WI 54806
888-780-4237 • V/TTY 715-682-9141 • NWWIB.COM

January 7, 2016

Lori A. Weyers, Ph.D., President
Northcentral Technical College
1000 W. Campus Drive
Wausau, WI 54401

RE: Career Pathways Initiative

Dear Dr. Weyers:

On behalf of Northwest Wisconsin Workforce Investment Board (NWWIB), I am pleased to write this letter of support and commitment for Northcentral Technical College's career pathways proposal to the Wisconsin Technical College System. We believe this initiative will provide effective training and educational opportunities which are uniquely suited to the needs and demands of participants in our Workforce Innovation & Opportunity Act (WIOA) and other programs.

NWWIB recognizes that a trained and educated workforce is vital to Wisconsin's economic future and ability to compete in the global economy. As part of NWWIB's commitment to the success of this Project, it will partner with NTC in the following ways:

- Continue to identify necessary workforce skills/competencies so curriculum accurately reflects industry trends
- Promote the continued development of career pathways that provide exit points to employment and entry points into education to provide opportunities for growth
- Channeling the knowledge of NWWIB-facilitated, business-led regional and industry sector groups (Agriculture & Food Systems Regional Partnership; HealthCARE Project; Manufacturing Industry Partnership; HealthWorks Northwest; Transportation Industry Partnership) in continued development of targeted career pathways
- Provide insight to curriculum development and program design
- Participate in continuous improvement program processes

This career pathways project will help high school and adult learners make better career and educational decisions. I support this opportunity and look forward to its continued expansion and enhancements.

Sincerely,

Mari Kay-Nabozny
Chief Executive Officer

April 21, 2014

Shelly Harkins
Office of Skills Development
Wisconsin Department of Workforce Development
201 E. Washington Ave
Madison, WI 53707-7946

RE: Wisconsin Fast Forward Blueprint for Prosperity: High School Pupil Workforce Training Programs

Dear Ms. Harkins:

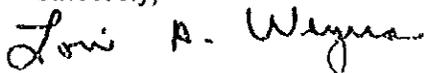
On behalf of Northcentral Technical College we are pleased to write this letter of commitment to the Wisconsin Department of Workforce Development focused on the Certified Nursing Assistant (CNA) and Welding career pathways. We believe our application provides opportunities to support local economies, strengthens our local healthcare organizations and manufacturing companies, and allows individuals to gain skills needed for high demand jobs that lead to advanced skill positions.

As part of our commitment to the success of this project, Northcentral Technical College commits to the project in the following ways:

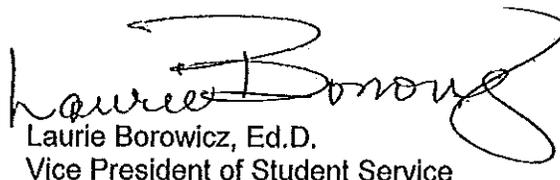
- Work with employers to identify necessary workforce skills/competencies so curriculum accurately reflects industry trends
- Lead the continued development of career pathways that provide exit points to employment and entry points into education to provide opportunities for growth
- Coordinate work-based learning opportunities as appropriate to the CNA and welding credentials
- Coordinate mock interviews, job fairs, class guest lectures, and industry tours to discuss and showcase career opportunities, skill needs, and local area opportunities
- Provide placement services to students as they complete their credentials
- Coordinate required professional development and curriculum training workshops
- Provide communication for high schools and employers about grant outcomes and activities
- Develop funding opportunities to sustain the project beyond the grant period

Northcentral Technical College believes this grant application will help meet immediate needs of local healthcare and manufacturing employers as they hire employees and meet community needs. We are fully committed to this initiative.

Sincerely,



Lori A. Weyers, Ph.D.
President



Laurie Borowicz, Ed.D.
Vice President of Student Service

Department of Workforce Development
Office of Skills Development
Wisconsin, Fast Forward
P.O. Box 7946
Madison, WI 53707-7946
Fax: (608) 266-1784



Scott Walker, Governor
Raymond Allen, Secretary
Scott Jansen, Division Administrator

October 18, 2016

Dr. Vicki Jeppesen, Ed.D.
Vice President of College Advancement
Northcentral Technical College
1000 West Campus Drive
Wausau, WI 54401

Re: Wisconsin Fast Forward High School Pupil Application Correspondence ID:
BP142HSP-24

Dear Dr. Jeppesen:

Thank you for your participation in the Wisconsin Fast Forward High School Pupil Training Grant Program. Congratulations on the completion of your project.

OSD Staff has reviewed your request to close-out your grant. Based upon their review you have satisfactorily completed the grant's contractual requirements. This is notification of the completion of your contract ending 9/30/2015, and referencing the above mentioned grant.

Please note, per your contract, that you must retain all grant related documentation for at least three years from the date of the end of this contract or any approved extensions.

We appreciate your partnership in building a strong Wisconsin workforce.

Should you have any further questions, feel free to contact OSD staff at:
WFFHSPupil@dwd.wisconsin.gov

Respectfully,

David Karst
OSD Director
Department of Workforce Development

January 15, 2016

Mark Johnson & Ann Westrich
Wisconsin Technical College System
4622 University Avenue
Madison, WI 53705

RE: 15-820-124-127, Consortium: Career Pathways for Educational Attainment

Dear Mr. Johnson and Ms. Westrich:

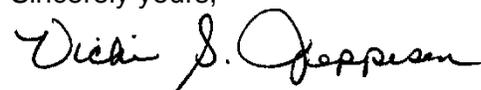
As defined by the 2016-17 State Career Pathways Grant Guidelines, enclosed is the following grant package submitted for your review: application with budget narrative, SFR, and twenty-five letters of commitment from local industry partners and local K-12 school district partners.

The project has three goals: 1) formalize and disseminate four comprehensive Career Pathways within Finance; Hospitality and Tourism; Agriculture, Food and Natural Resources career clusters and expand options within the Health Career Pathway, supporting secondary students and adult learners in identifying seamless entry and exit points in noted pathways, 2) reduce time spent in college prep coursework and easing transitions through pathways, and 3) create academies for secondary students that support seamlessly moving from secondary to post-secondary education.

This project will strengthen the academy approach launched in 2015-16, by implementing multi-level and individualized case management support to ensure pathway progress and student success. NTC will coordinate Finance; Agriculture, Food and Natural Resources; Manufacturing; IT; and Health Academies in district high schools with 525 participants completing requirements towards a credential. Dual Credit and Work-Based Learning secondary students will participate in career pathway exploration activities providing connections to employers and NTC campuses/programs. 150 secondary faculty teaching general college/General Education and Academy-related coursework will participate in dual credit workshops during the year based on successful practices from 2015-16. Navigation of career pathways for adult learners with work-based learning opportunities will enhance the Career Pathway framework.

Please contact me at 715-803-1776 or jeppesen@ntc.edu if you have any questions regarding the submitted application or need additional information. Thank you for your consideration.

Sincerely yours,



Vicki S. Jeppesen, Ed.D.
Vice President of College Advancement

May 11, 2018

Maria Maize
Office of Skills Development
Wisconsin Department of Workforce Development
201 E. Washington Ave
Madison, WI 53707-7946

RE: Wisconsin Fast Forward High School Student Certifications grant

Dear Ms. Maize:

On behalf of Northcentral Technical College we are pleased to write this letter of commitment to the Wisconsin Fast Forward High School Student Certifications grant focused on the Health and Welding Career Pathways. We believe our application provides opportunities to support local economies, strengthens our local healthcare and manufacturing organizations, and allows individuals to gain skills needed for high demand jobs that lead to advanced skill positions.

As part of our commitment to the success of this project, Northcentral Technical College commits to the project in the following ways:

- Lead the continued development of career pathways that provide exit points to employment and entry points into education to provide opportunities for growth.
- Coordinate work-based learning opportunities as appropriate to the Nursing Assistant, Medical Assistant, and Welding credentials.
- Coordinate mock interviews, job fairs, class guest lectures, and industry tours to discuss and showcase career opportunities, skill needs, and local area opportunities.
- Provide placement services to students as they complete their credentials.
- Provide communication for high schools and employers about grant outcomes and activities.
- Develop funding opportunities to sustain the project beyond the grant period.
- NTC will provide Program Coordination to the project as match at a value of \$16,348.

Northcentral Technical College believes this grant application will help meet immediate needs of local healthcare and manufacturing employers as they hire employees and meet community needs. We are fully committed to this initiative.

Sincerely,

Lori A. Weyers, Ph.D.
President



Northcentral Technical College

10-442-101 Introduction to Welding

Course Outcome Summary

Course Information

Description	Compares equipment and techniques used in the major arc welding and thermal cutting processes. Learners perform introductory level welds in the SMAW, GMAW, FCAW and GTAW processes. Learners also perform material preparation skills including shearing, grinding and thermal cutting.
Instructional Level	10 Associate Degree
Total Credits	2
Total Hours	63

Types of Instruction

Instruction Type	Credits/Hours
Classroom Presentation/Lecture	.5/9
On-Campus Lab	1.5/54

Course History

Revised By	Kristin Kruzan (Kruzank)
Last Approval Date	7/21/2017

Target Population

This course is the starter for both the Production Welding program (certificate) and the Welding program (diploma). This course is also required for the Machine Tooling Technics program, and the Automotive Technology program.

Learner Supplies

Leather shoes. Required.
Welding Gloves. Required.
Safety Glasses. Required.

Course Competencies

1.	Compare and contrast the major arc welding processes					
	<i>Domain</i>	<i>Cognitive</i>	<i>Level</i>	<i>Analyzing</i>	<i>Status</i>	<i>Active</i>

Assessment Strategies

- 1.1. by taking a written quiz

Criteria

Your performance will be successful when:

- 1.1. you score at least 70% on the quiz

Learning Objectives

- 1.a. Differentiate the five basic joints
- 1.b. Define fillet weld, groove weld, and surface weld
- 1.c. Differentiate common groove weld types
- 1.d. Decode the AWS weld type and position designations
- 1.e. Interpret fillet weld symbols
- 1.f. Interpret groove weld symbols

2. Make surface and fillet welds with the SMAW process

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 2.1. by making surface and fillet welds with the SMAW process

Criteria

Your performance will be successful when:

- 2.1. your welds meet visual inspection criteria of AWS D1.1 - Structural Steel Code

Learning Objectives

- 2.a. Select appropriate current type for electrode
- 2.b. Determine appropriate amperage setting
- 2.c. Demonstrate proper arc length, electrode angles, and travel speed
- 2.d. Identify and resolve weld discontinuities

3. Make fillet and groove welds with the GMAW short circuit process

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 3.1. by making fillet and groove welds with the GMAW short circuit process

Criteria

Your performance will be successful when:

- 3.1. your welds meet the visual inspection acceptance criteria of AWS D1.1 - Structural Steel Code

Learning Objectives

- 3.a. Differentiate between short circuit and spray transfer
- 3.b. Determine appropriate wire feed speed (WFS)
- 3.c. Determine appropriate voltage
- 3.d. Select appropriate shielding gas for metal transfer
- 3.e. Demonstrate proper electrode extension, gun angles, and travel speed
- 3.f. Identify and resolve weld discontinuities

4. Make fillet welds with the GMAW spray process

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 4.1. by making fillet welds with the GMAW spray process

Criteria

Your performance will be successful when:

- 4.1. your welds meet the visual inspection acceptance criteria of AWS D1.1 - Structural Steel Code

Learning Objectives

- 4.a. Differentiate between short circuit and spray transfer
- 4.b. Determine appropriate wire feed speed (WFS)
- 4.c. Determine appropriate voltage
- 4.d. Select appropriate shielding gas for metal transfer
- 4.e. Demonstrate proper electrode extension, gun angles, and travel speed
- 4.f. Identify and resolve weld discontinuities

5. Make fillet welds with the FCAW process

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 5.1. by making fillet welds with the FCAW process

Criteria

Your performance will be successful when:

- 5.1. your welds meet the visual inspection acceptance criteria of AWS D1.1 - Structural Steel Code

Learning Objectives

- 5.a. Explain the differences between solid and cored electrode wires
- 5.b. Determine appropriate wire feed speed (WFS)
- 5.c. Determine appropriate voltage
- 5.d. Select appropriate shielding gas
- 5.e. Demonstrate proper electrode extension, gun angles, and travel speed
- 5.f. Identify and resolve weld discontinuities

6. Make fillet welds with the GTAW process

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 6.1. by making fillet welds with the GTAW process

Criteria

Your performance will be successful when:

- 6.1. your welds meet the visual inspection acceptance criteria of AWS D1.3 - Structural Welding Code - Sheet Steel

Learning Objectives

- 6.a. Select appropriate current type for base metal
- 6.b. Determine appropriate amperage setting
- 6.c. Prep tungsten electrode properly for current type
- 6.d. Demonstrate proper arc length, electrode angles, and travel speed
- 6.e. Identify and resolve weld discontinuities



Northcentral Technical College

10-442-112 Weld Print Reading (NTC, NATC, MSTC)

Course Outcome Summary

Course Information

Description	Develops print interpretation skills needed in metal fabrication. Learners study orthographic projection, dimensioning, welding symbols and bill of materials. Learners apply concepts in hands-on activities, practicing basic layout skills and safe operation of saws, shears and drills.
Career Cluster	Manufacturing
Instructional Level	A.A.S. - Associate in Applied Science
Total Credits	2
Total Hours	63

Types of Instruction

Instruction Type	Credits/Hours
Lecture	.5
Lab	1.5

Course History

Revised By	Jessica Towle (TOWLE)
Last Approval Date	1/10/2018

Pre/Corequisites

Condition: Accepted into the Welding Fabrication & Robotics Associate Degree program, Manufacturing Technician or Welding Technical Diploma, or Industrial Laser Operator - Welding Certificate.

Textbooks

Blueprint Reading for Welders, A.E. Bennet, Louis Siy, Delmar Cengage Learning, ISBN:978-1-4283-3528-8, 413 pages, spiral bound

Hobart Institute of Welding Technology - Symbols for Welding Self-Study Write-In Packet (Item #342)

Course Competencies

1. Visualize 3D object from three view orthographic projections

Domain Cognitive Level Analyzing Status Active

Assessment Strategies

1.1. Sketch, fabrication or written assessment

Criteria

Performance will meet expectations when:

- 1.1. your fabrication or sketch includes all parts and features of the whole
- 1.2. the parts or features in your fabrication or sketch are located correctly
- 1.3. the parts or features in your fabrication or sketch are the correct shape
- 1.4. the parts or features in your fabrication or sketch are in correct proportion
- 1.5. your parts are dimensionally correct per print tolerances

Learning Objectives

- 1.a. Defend the need for graphical communication in welding fabrication
- 1.b. Illustrate the arrangement of plane views in orthographic projection
- 1.c. Describe the appearance and function of the line types used in orthographic projection
- 1.d. Locate a given part or feature in multiple views
- 1.e. Draw plane views of a given part

2. Visualize 3D object from orthographic projections with special views

Domain Cognitive Level Analyzing Status Active

Assessment Strategies

2.1. Sketch, fabrication or written assessment

Criteria

Your performance will be successful when:

- 2.1. your fabrication or sketch includes all parts and features of the whole
- 2.2. the features in your fabrication or sketch are shaped correctly
- 2.3. the features in your fabrication or sketch are located correctly
- 2.4. the features in your fabrication or sketch are in correct proportion
- 2.5. you identify section views in prints and state their purpose
- 2.6. you correctly identify line types associated with special views
- 2.7. you can spatially resolve special views
- 2.8. you identify auxiliary and detail views in prints and state their purpose

Learning Objectives

- 2.a. Explain the need for section and auxiliary views in welding fabrication
- 2.b. Differentiate between full sections, half sections, revolved sections and offset sections
- 2.c. Identify section views on prints
- 2.d. Locate cutting plane and section lines on prints
- 2.e. Identify the purpose of specific section views
- 2.f. Locate auxiliary views on prints
- 2.g. Identify the purpose of specific auxiliary views
- 2.h. Locate detail views on prints
- 2.i. Identify the purpose of specific detail views
- 2.j. Draw auxiliary, section, and detail views of a given part

3. Create parts list from assembly print

Domain Cognitive Level Analyzing Status Active

Assessment Strategies

3.1. written assessment

Criteria

Performance will meet expectations when:

- 3.1. you include and quantify all parts
- 3.2. you specify structural shapes in a standard format
- 3.3. You correctly specify the dimensions of each part
- 3.4. your part descriptions relate to their form or function
- 3.5. you number your parts

Learning Objectives

- 3.a. Locate dimensions for a given part of an assembly
- 3.b. Calculate missing dimensions
- 3.c. Identify common structural shapes
- 3.d. Specify common structural shapes using standard callouts
- 3.e. Study common bill of materials formats

4. Create individual parts of an assembly

Domain Cognitive Level Analyzing Status Active

Assessment Strategies

- 4.1. Performance

Criteria

Performance will meet expectations when:

- 4.1. You saw parts to correct dimensions
- 4.2. You shear parts to correct dimensions
- 4.3. You punch parts to correct dimensions
- 4.4. You drill holes to correct dimensions

Learning Objectives

- 4.a. Investigate pre-welding processes employed by area industries
- 4.b. Summarize safe and accurate shearing practices
- 4.c. Demonstrate squaring with the combination square
- 4.d. Explore methods of laying out angular shapes
- 4.e. Summarize safe and accurate sawing methods
- 4.f. Summarize safe and accurate punching practices
- 4.g. Demonstrate change out of punches and dies on the Scottsman

5. Locate parts within linear and angular tolerances of print

Domain Cognitive Level Analyzing Status Active

Assessment Strategies

- 5.1. Fabrication

Criteria

Performance will meet expectations when:

- 5.1. you locate parts within linear tolerances on prints
- 5.2. you locate parts within angular tolerances on prints

Learning Objectives

- 5.a. Explain repercussions of mislocated parts
- 5.b. Differentiate chain dimensioning and datum dimensioning
- 5.c. Calculate missing dimensions
- 5.d. Inspect completed assemblies to determine conformance with prints
- 5.e. Determine order of work steps for assembling various weldments with multiple parts

6. Interpret fillet symbols on fabrication prints

Domain Cognitive Level Applying Status Active

Assessment Strategies

- 6.1. Fabrication and written assessment

Criteria

Performance will meet expectations when:

- 6.1. Your fillet welds meet the length specification of the symbol
- 6.2. Your fillet weld meets the size specification of the symbol
- 6.3. Your fillet welds meet the pitch specifications of the welding symbol
- 6.4. Your fillet welds meet the contour specification of the welding symbol
- 6.5. The convexity of your welds does not exceed 1/16"
- 6.6. The concavity of your welds does not exceed 1/16"
- 6.7. Your fillet weld leg lengths do not differ by more than 1/16"
- 6.8. Your weld craters meet the size specification of the welding symbol
- 6.9. Your welds have no undercut exceeding 1/32" (depth)
- 6.10. Your welds have no overlap
- 6.11. Your welds have no cracks
- 6.12. You correctly judge conformance of your welds with symbol specifications
- 6.13. You correctly interpret fillet weld symbols

Learning Objectives

- 6.a. Illustrate the layout of information on welding symbols
- 6.b. Explain how fillet weld size is specified
- 6.c. Investigate common tolerances for fillet weld size
- 6.d. Demonstrate measurement of concave and convex fillet welds with gauges
- 6.e. Demonstrate the layout of intermittent fillet welds
- 6.f. Inspect finished fillet welds for symbol compliance

7. Interpret groove weld symbols on fabrication prints

Domain Cognitive Level Applying Status Active

Assessment Strategies

- 7.1. Fabrication or written assessment

Criteria

Performance will meet expectations when:

- 7.1. You prep groove weld members in conformance with weld symbols
- 7.2. You fit up your groove welds in conformance with symbols
- 7.3. your weld length conforms to the spec of weld symbol
- 7.4. You correctly interpret groove weld symbols

Learning Objectives

- 7.a. Illustrate the groove weld types
- 7.b. Explain how each of the groove weld geometries is formed
- 7.c. Differentiate between joint size and groove size
- 7.d. Investigate common tolerances for root and face reinforcement
- 7.e. Measure face and root reinforcement with gauges
- 7.f. Illustrate the location of joint geometry information on groove weld symbols
- 7.g. Evaluate completed groove welds to determine conformance with weld symbols

8. Measure linear distances, angles, and feature sizes accurately

Domain Cognitive Level Analyzing Status Active

Assessment Strategies

- 8.1. Written Objective Test
- 8.2. Performance

Criteria

Your performance will be successful when:

- 8.1. You measure linear distances accurately within 1/64" with a fractional inch scale
- 8.2. You measure linear distances accurately within 1/16" with a fractional inch tape measure
- 8.3. You measure thicknesses and external features within .002" with a micrometer
- 8.4. You measure lengths and internal features within .003" with a caliper
- 8.5. You measure angles within 1 degree with a protractor or combination square
- 8.6. You measure linear distances within .025" with a decimal inch scale

Learning Objectives

- 8.a. Measure lengths and distances with a fractional inch scale
- 8.b. Measure lengths and distances with a decimal inch scale
- 8.c. Measure lengths and interior features with a caliper
- 8.d. Measure thicknesses and exterior features with a micrometer
- 8.e. Convert customary units to metric units
- 8.f. Measure angles with a protractor and combination square

Grading Information

Grading Scale

The total point value from all assessments will be tallied and figured as a percentage of the possible points. Letter grades are derived from those percentages.

A	93 - 100% of possible points earned, and meets all course competencies
A-	90 - 92% of possible points earned, and meets all course competencies
B+	88 - 89% of possible points earned, and meets all course competencies
B	82 - 87% of possible points earned, and meets all course competencies
B-	80 - 81% of possible points earned, and meets all course competencies
C+	78 - 79% of possible points earned, and meets all course competencies
C	70 - 77% of possible points earned, and meets all course competencies
D	60 - 69% of possible points earned, and does not meet all course competencies
F	0 - 59% of possible points earned, and does not meet all course competencies

Course Learning Plans and Performance Assessment Tasks

Type	Title	Source	Status
LP	Sketching Assignment	Course	Active
LP	Reel Cover Bracket Print Interpretation	Course	Active
LP	Engine Base Print Interpretation	Course	Active
LP	Structural Shapes Ortho Drawing	Course	Active
LP	Engine Mount Print Interpretation	Course	Active
LP	Motor Support Frame Print Interpretation	Course	Active
LP	Die Stand Frame Print Interpretation	Course	Active
LP	Intermittent Fillet Welds Lab	Course	Active
LP	Fillet Welds Lab	Course	Active
LP	Hot Water Tank print interpretation	Course	Active
LP	Utility Trailer Chassis print interpretation	Course	Active
LP	Hobart Fillet Weld Symbols Test	Course	Active
LP	Sheave Wheel Bracket Construction	Course	Active
LP	Mold Positioner Print Interpretation	Course	Active
LP	Groove Welds Lab	Course	Active
LP	Hobart Groove Weld Symbols Test	Course	Active
LP	Linear Measurement Quiz	Course	Active
LP	Hands-on Measuring Test	Course	Active
LP	Project Calculations Activity	Course	Active

LP	Learning Plan 1 - Understanding Orthographic Projection	Course	Active
LP	Learning Plan 6 - Interpreting Special Views	Course	Active
LP	Learning Plan 4 - Fillet Weld Symbols	Course	Active
LP	Learning Plan 5 - Groove Weld Symbols	Course	Active
LP	Learning Plan 2 - Bill of Materials	Course	Active
LP	Learning Plan 3 - Measurement & Calculations	Course	Active



Northcentral Technical College

10-442-159 Gas Metal Arc Welding (NTC, NATC, MSTC)

Course Outcome Summary

Course Information

Description	Develops skill in gas metal arc welding. Learners use the “mig” process in all positions on steel, stainless steel and aluminum. Required welds include fillet and groove welds with short circuit, spray and pulsed spray transfer. Weld quality is assessed per AWS D1.1 Structural Steel Code.
Career Cluster	Manufacturing
Instructional Level	A.A.S. - Associate in Applied Science
Total Credits	3
Total Hours	99

Types of Instruction

Instruction Type	Credits/Hours
2.5/Lecture	.5/9
Lab	90

Course History

Revised By	Jessica Towle (TOWLE)
Last Approval Date	1/9/2017

Pre/Corequisites

Pre/Corequisite: 10-442-101 INTRODUCTION TO WELDING. Condition: Accepted into the Welding Fabrication & Robotics Associate Degree program or Manufacturing Technician, GMAW or Welding Technical Diploma.

Textbooks

Althouse Andrew; Turnquist Carl; Bowditch William; Bowditch Kevin; Bowditch Mark. Modern Welding. The Goodheart-Willcox Company, Inc. (publisher), 2013. Eleventh edition. ISBN: 978-1-60525-795-2. This book may be purchased at NTC's bookstore.

Learner Supplies

Welding Helmet

Safety Glasses
Protective Clothing
Weld Pliers
Right Angle Magnet
Tape Measure

Course Competencies

1. Setup the GMAW station for carbon and stainless steels

Domain Cognitive Level Analyzing Status Active

Assessment Strategies

- 1.1. Written Objective Test
- 1.2. Demonstration in lab

Criteria

Performance will be satisfactory when:

- 1.1. Complete written exam with 75% or higher
- 1.2. Identifies correct electrode to match base metal
- 1.3. Demonstrates correct flowrates and gas mixture set-up for GMAW-S
- 1.4. Demonstrates GMAW-S weld station set-up correctly
- 1.5. Participates in shop management teams

Learning Objectives

- 1.a. Explain the advantages, disadvantages, and applications of short circuit transfer
- 1.b. Explain the advantages, disadvantages, and applications of spray transfer
- 1.c. Explain the advantages, disadvantages, and applications of pulsed spray transfer
- 1.d. Differentiate GMAW wire types and diameters
- 1.e. List wire feed speed and voltage ranges for short circuit transfer on steel and stainless steel
- 1.f. List wire feed speed and voltage ranges for spray transfer on steel and stainless steel
- 1.g. List wire feed speed and arc length ranges for pulsed spray transfer on steel and stainless steel
- 1.h. Differentiate common gas mixes for short circuit and spray transfer on steels
- 1.i. Differentiate common gas mixes for short circuit and spray transfer on stainless steel
- 1.j. Select and install electrode wire, drive rolls, gun liner, diffuser, contact tip, and nozzle

2. Perform GMAW-S weldments in the 1F and 2F positions on carbon steel

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 2.1. Skill Demonstration
- 2.2. Oral Test

Criteria

Performance will be satisfactory when:

- 2.1. Complete written exam with 75% or higher
- 2.2. Completed weldment meets specification of print
- 2.3. Completed weldment meets AWS D1.1 standards
- 2.4. Participate in shop management teams

Learning Objectives

- 2.a. Select and set up gas mix for short circuit transfer
- 2.b. Select electrode wire for short circuit transfer on steel
- 2.c. Adjust wire feed speed per welding position and material thickness
- 2.d. Adjust voltage per welding position and material thickness
- 2.e. Adapt technique for specified weld size and contour
- 2.f. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 2.g. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make corrective

adjustments if needed

3. Perform GMAW-S weldments in the 1G and 2G positions on carbon steel

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 3.1. Written Objective Test
- 3.2. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 3.1. Complete written exam with 75% or higher
- 3.2. Identifies correct electrode to match base metal
- 3.3. Demonstrates correct flowrates and gas mixture set-up for GMAW
- 3.4. Demonstrates GMAW weld station set-up correctly
- 3.5. Participates in shop management teams

Learning Objectives

- 3.a. Select and set up gas mix for short circuit transfer
- 3.b. Select electrode wire for short circuit transfer on steel
- 3.c. Adjust wire feed speed per welding position, material thickness, and groove geometry
- 3.d. Adjust voltage per welding position and material thickness
- 3.e. Experiment with varied root openings, root face dimensions, and groove angles
- 3.f. Compare weave and stringer techniques in groove layers
- 3.g. Adapt technique for specified weld size and contour
- 3.h. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 3.i. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make corrective adjustments if needed

4. Perform GMAW spray weldments in the 1F and 2F positions

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 4.1. Written Objective Test
- 4.2. Skill Demonstration in lab

Criteria

Performance will be satisfactory when:

- 4.1. Completed weldment meets specification of print
- 4.2. Completed weldment meets AWS D1.1 standards
- 4.3. Demonstrates correct welding procedure for flat position
- 4.4. Participates in shop management teams

Learning Objectives

- 4.a. Select and set up gas mix for spray transfer
- 4.b. Select electrode wire for spray transfer on steel
- 4.c. Adjust wire feed speed per wire diameter and welding position
- 4.d. Adjust voltage per wire diameter
- 4.e. Adapt technique for specified weld size and contour
- 4.f. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 4.g. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make corrective adjustments if needed

5. Perform GMAW spray weldments in the 1G position

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 5.1. Written Objective Test
- 5.2. Skill Demonstration in lab

Criteria

Performance will be satisfactory when:

- 5.1. Completed weldment meets specification of print
- 5.2. Completed weldment meets AWS D1.1 standards
- 5.3. Demonstrate different welding angles for horizontal welding
- 5.4. Identify weld defects and take corrective action to eliminate defect
- 5.5. Participate in shop management teams

Learning Objectives

- 5.a. Select and set up gas mix for spray transfer
- 5.b. Select electrode wire for spray transfer on steel
- 5.c. Adjust wire feed speed per wire diameter, weld position and groove geometry
- 5.d. Adjust voltage per wire diameter
- 5.e. Adapt technique for specified weld size and contour
- 5.f. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 5.g. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make corrective adjustments if needed
- 5.h. Experiment with varied root openings, root face dimensions, and groove angles

6. Setup the GMAW station for aluminum

Domain Cognitive Level Analyzing Status Active

Assessment Strategies

- 6.1. Written Objective Test
- 6.2. Demonstration in lab

Criteria

Performance will be satisfactory when:

- 6.1. Complete written exam with 75% or higher
- 6.2. Learner identifies correct gases and flow rates for spray transfer process
- 6.3. Learner identifies correct electrode for spray transfer (Solid, Metal Core)
- 6.4. Learner identifies the higher currents used for spray transfer
- 6.5. Demonstrates weld station set-up correctly
- 6.6. Participates in shop management teams

Learning Objectives

- 6.a. Explain the use of short circuit, spray, and pulsed spray transfer for aluminum
- 6.b. Differentiate aluminum GMAW wire types
- 6.c. List wire feed speed and voltage ranges for short circuit transfer on aluminum
- 6.d. List wire feed speed and voltage ranges for spray transfer on aluminum
- 6.e. List wire feed speed and arc length ranges for pulsed spray transfer on aluminum
- 6.f. Differentiate common gas mixes for short circuit and spray transfer on aluminum
- 6.g. Differentiate common gas mixes for aluminum
- 6.h. Select and install electrode wire, drive rolls, gun liner, diffuser, contact tip, and nozzle

7. Perform GMAW weldments in 1F and 2F positions on aluminum

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 7.1. Written Objective Test
- 7.2. Demonstration in lab

Criteria

Performance will be satisfactory when:

- 7.1. Complete written exam with 75% or higher.
- 7.2. Demonstrates correct welding procedures for spray transfer
- 7.3. Identify weld defects and take corrective measures to eliminate defect.
- 7.4. Learner identifies where it is used in industry
- 7.5. Participates in shop management teams

Learning Objectives

- 7.a. Select and set up gas mix for aluminum
- 7.b. Select electrode wire for aluminum
- 7.c. Adjust wire feed speed per wire diameter and welding position
- 7.d. Adjust arc length for optimum weld quality
- 7.e. Adapt technique for specified weld size and contour
- 7.f. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 7.g. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make corrective adjustments if needed

8. Perform GMAW weldments in the 1F and 2F positions on Stainless Steel

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 8.1. Written Objective Test
- 8.2. Demonstration in lab

Criteria

Performance will be satisfactory when:

- 8.1. Complete written test with 75% or higher
- 8.2. Completed weldments meet specification of print
- 8.3. Completed weldments meet AWS D1.1 standards
- 8.4. Demonstrates correct weld angles and travel speeds for horizontal welding
- 8.5. Demonstrates correct wire speed and volts for horizontal spray welding process.
- 8.6. Participates in shop management teams

Learning Objectives

- 8.a. Select and set up gas mix for stainless steel
- 8.b. Select electrode wire for stainless steel
- 8.c. Adjust wire feed speed per wire diameter and welding position
- 8.d. Adjust arc length for optimum weld quality
- 8.e. Adapt technique for specified weld size and contour
- 8.f. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 8.g. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make corrective adjustments if needed

Grading Information

Attendance will play a huge role in student success. Assessments that are missed can only be retaken with a doctor's excuse for that day. Written assessments to be retaken is the responsibility of the student and all written assessments will be taken the first day back in school. The lab component is based on one capstone project and four benchmark assignments. To complete a benchmark assignment all practice prints for that benchmark must be completed. If a student fails a benchmark assignment he or she must go back and redo practice prints before attempting that benchmark assignment again. Capstone projects can be attempted at anytime the student feels he or she is ready. Students will only have two attempts to complete a capstone project correctly. Be sure you are prepared before attempting a capstone. All lab components will be graded on a pass or fail scale. This means you receive full credit for an assignment done correctly or no credit for an assignment done incorrectly.

Lab will represent 80% of final grade

Capstone projects: 30%

Capstone #1: Confined Space print or equivalent GMAW Spray (30%)

Benchmark Assignments: 50%

Benchmark #1: 2G Butt Weld 3/8 Open Root, Visual Inspection, GMAW-S (12.5%)

Benchmark #2: 2F Pipe to Plate, Visual Inspection, GMAW-S (12.5%)

Benchmark #3: 2F T-Weld Multi-Pass 5/16, 3/8 at 12" long, Visual Inspection, GMAW Spray (12.5%)

Benchmark #4: 1G Bend Test, GMAW Spray (12.5%)

Written assessment will represent 20% of final grade

Example:

Completed both capstone projects: = 30%

Completed #1, #2, #3, benchmarks: 3 x 12.5 = 37.5%

Scored 78% on written test: 78 x .2 = 15.6%

Overall Grade: $30\%+37.5\%+15.6\%=83.1\%$, put 83.1 into the grading scale below and the student receives a B- for the class.

Final Grade Scale

A= 95-100%
A- = 92-94%
B+ = 89-91%
B =87-88%
B- = 82-86%
C+ = 78-81%
C = 75-77%
C- = 70-74%
D = 60-69%
F = 0-59%

Attendance

Attendance is an embedded component of all course assessments, and therefore is a minimum expectation. Students must demonstrate similar attendance expectations as required by an employer in the manufacturing industry.

Course Learning Plans and Performance Assessment Tasks

Type	Title	Source	Status
LP	Complete written tests with 75% or higher	Course	Active
LP	Complete weldments to AWS D 1.1 standards	Course	Active
LP	Weldments meet specifications of print	Course	Active
LP	Chapter 7 Modern Welding	Course	Active
LP	Chapter 9 Modern Welding	Course	Active
LP	Lab Demonstration	Course	Active
LP	Weld station set up	Course	Active
LP	Lab Performance	Course	Active
LP	Hobart Advanced GMAW Technical Guide EW-473	Course	Active
LP	Changing a liner	Course	Active
LP	Joint Terminology, parts of weld, and nozzle to work relationship	Course	Active



Northcentral Technical College

10-442-173 Thermal Cutting (NTC, NATC, MSTC)

Course Outcome Summary

Course Information

Description	Develops skill in thermal cutting and gouging processes. Learners practice manual and machine oxy-fuel cutting, plasma cutting and gouging and air carbon arc gouging.
Career Cluster	Manufacturing
Instructional Level	A.A.S. - Associate in Applied Science
Total Credits	1
Total Hours	27

Types of Instruction

Instruction Type	Credits/Hours
Lecture	.5/9
Lab	.5/18

Course History

Revised By	Veronica Hope (HOPE)
Last Approval Date	3/20/2017

Textbooks

Modern Welding. Althouse.Turnquist.Bowditch.Bowditch.Bowditch
The Goodheart-Willcox Company,Inc

Learner Supplies

Safety Glasses
Gloves
Protective Clothing
Tape Measure
Paint Marker

Course Competencies

1. Set up the oxyfuel station

Domain Cognitive Level Evaluating Status Active

Assessment Strategies

- 1.1. Skill Demonstration
- 1.2. Written Objective Test

Criteria

- 1.1. you inspect the torch, hoses and regulators, and replace parts that exhibit excessive wear
- 1.2. you choose an appropriate tip size for the application
- 1.3. you select and set appropriate pressures for tip size
- 1.4. you clear area of hazards and combustibles
- 1.5. you clean the cutting tip as necessary
- 1.6. you light and adjust the torch properly
- 1.7. you position yourself and cutting flame safely in work zone
- 1.8. you extinguish and purge the torch properly
- 1.9. you score at least 70% on the written test

Learning Objectives

- 1.a. Identify hazards of oxyfuel cutting
- 1.b. Differentiate common fuel gases
- 1.c. Differentiate common cylinder sizes and pressures
- 1.d. Decode common tip size numbering systems
- 1.e. Select tip per material thickness
- 1.f. Install tip in torch
- 1.g. Select oxygen and fuel pressures per tip size
- 1.h. Set oxygen and fuel pressures on regulators
- 1.i. Verify that work area is free of combustibles
- 1.j. Demonstrate proper lighting procedure
- 1.k. Adjust the torch for a neutral flame
- 1.l. Demonstrate proper shut down & purge procedure

2. Cut steel with manual and mechanized oxyfuel process

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 2.1. Skill Demonstration

Criteria

- 2.1. Your cut quality conforms to acceptance criteria of AWS D1.1 –Structural Welding Code
- 2.2. Your cut part conforms to print specifications

Learning Objectives

- 2.a. Identify common cut defects and their causes
- 2.b. Set oxygen and fuel pressure per tip size
- 2.c. Demonstrate safe body, part, and drop positions
- 2.d. Demonstrate proper lighting procedure
- 2.e. Adjust the torch for a neutral flame
- 2.f. Preheat at cut start site
- 2.g. Maintain tip to work distance for optimal cut quality
- 2.h. Maintain travel speed for optimum cut quality
- 2.i. Maintain torch angle for optimum cut quality
- 2.j. Demonstrate proper shut down & purge procedure
- 2.k. Assess cut quality and correct as necessary

3. Set up the plasma station

Domain Cognitive Level Evaluating Status Active

Assessment Strategies

- 3.1. Skill Demonstration
- 3.2. Written Objective Test

Criteria

- 3.1. you assemble and inspect torch parts, replace parts that exhibit excessive wear
- 3.2. you select and set appropriate amperage for application
- 3.3. you clear area of hazards and combustibles
- 3.4. you position yourself and parts safely in work zone
- 3.5. you demonstrate proper arc starting
- 3.6. you score at least 70% on the written test

Learning Objectives

- 3.a. Identify hazards of plasma cutting
- 3.b. Differentiate plasma torch parts
- 3.c. Explain wear limitations for nozzle, electrode and O ring
- 3.d. Assemble parts in torch
- 3.e. Set cut gas pressure per manufacturer's specifications
- 3.f. Select amperage per material thickness
- 3.g. Verify that work area is free of combustibles
- 3.h. Demonstrate proper arc starting procedure

4. Cut steels and aluminum with the plasma process

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 4.1. Skill Demonstration

Criteria

- 4.1. Your cut quality conforms to acceptance criteria of AWS D1.1 –Structural Welding Code
- 4.2. Your cut part conforms to print specifications

Learning Objectives

- 4.a. Identify common cut defects and their causes
- 4.b. Set amperage per material type and thickness
- 4.c. Verify cutting gas pressure per manufacturer's specifications
- 4.d. Demonstrate safe body, part, and drop positions
- 4.e. Maintain tip to work distance for optimal cut quality
- 4.f. Maintain travel speed for optimum cut quality
- 4.g. Maintain torch angle for optimum cut quality
- 4.h. Assess cut quality and correct as necessary

5. Set up the air carbon arc station

Domain Cognitive Level Evaluating Status Active

Assessment Strategies

- 5.1. Skill Demonstration
- 5.2. Written Objective Test

Criteria

Your performance will be successful when:

- 5.1. you inspect electrode holder and replace parts that exhibit excessive wear
- 5.2. you select an appropriate electrode for application
- 5.3. you select and set appropriate amperage for electrode
- 5.4. you clear the work area of hazards and combustibles
- 5.5. you position yourself and parts safely in work zone
- 5.6. you demonstrate proper arc starting
- 5.7. you score at least 70% on the written test

Learning Objectives

- 5.a. Differentiate common carbon arc electrode types and diameters
- 5.b. Explain wear limitations for carbon arc electrode holder
- 5.c. Select electrode diameter per material thickness
- 5.d. Select amperage per electrode diameter
- 5.e. Position electrode in electrode holder

- 5.f. Set air pressure per manufacturer's specifications
- 5.g. Verify that work area is free of combustibles
- 5.h. Demonstrate proper arc starting procedure

6. Gouge and remove welds with the air carbon arc process

Domain Psychomotor Level Practicing Status WIP

Assessment Strategies

- 6.1. Skill Demonstration

Criteria

Performance will meet expectations when:

- 6.1. You remove welds or defects completely, without removing base metal more than 1/8" beyond weld root

Learning Objectives

- 6.a. Identify common gouge defects and their causes
- 6.b. Set amperage per electrode diameter
- 6.c. Verify cutting gas pressure per manufacturer's specifications
- 6.d. Demonstrate safe body and positions
- 6.e. Maintain electrode depth distance for optimal gouge quality
- 6.f. Maintain travel speed for optimum gouge quality
- 6.g. Maintain electrode angle for optimum gouge quality
- 6.h. Assess gouge quality and correct as necessary

Grading Information

Welding skill assessment represents 80% of final grade

Grade based on percent completed

Written assessments represent 20% of final grade

Tests= 20%

Grading Scale

A	95%-100%
A-	92%-94%
B+	89%-91%
B	87%-88%
B-	82%-86%
C+	78%-81%
C	75%-77%
C-	70%-74%
D	60%-69%
F	0-59%

Student must have complete the course with 75% or higher to be successful.

Attendance

Attendance is an embedded component of all course assessments, and therefore is minimum expectation. Students must demonstrate similar attendance expectations as required by an employer in the manufacturing industry.

Course Learning Plans and Performance Assessment Tasks

Type	Title	Source	Status
LP	Written Exam with 75% or higher	Course	Active

LP	Complete lab activity to specification on print	Course	Active
LP	Completed print meets AWS D1.1 standards	Course	Active
LP	Demonstrates safe ethical procedures in lab	Course	Active
LP	Chapter 10 Plasma Arc Cutting	Course	Active
LP	Chapter 23 Air Carbon Arc Cutting	Course	Active
LP	Chapter 13 Oxyfuel Gas Cutting Equipment and Supplies	Course	Active
LP	Chapter 14 Oxyfuel Gas Cutting	Course	Active



Northcentral Technical College

10-442-174 Advanced Gas Metal Arc Welding (NTC, NATC, MSTC)

Course Outcome Summary

Course Information

Description	Builds on skills developed in Gas Metal Arc Welding. Learners use the “mig” process in the flat, horizontal and vertical positions on steel, stainless steel and aluminum. Required welds include fillet and groove welds with spray and pulsed spray transfer.
Career Cluster	Manufacturing
Instructional Level	A.A.S. - Associate in Applied Science
Total Credits	3
Total Hours	99

Types of Instruction

Instruction Type	Credits/Hours
Lecture	.5/9
Lab	2.5/90

Course History

Revised By	Jessica Towle (TOWLE)
Last Approval Date	3/21/2017

Textbooks

Althouse, Andrew; Bowditch, Kevin; Bowditch, Mark; Bowditch, William; Turnquist, Carl. Modern Welding. Goodheart-Willcox (publisher), 2013. Eleventh Edition. ISBN# 978-1-60525-795-2. This book may be purchased at Midstate, NATC and NTC's bookstores.

Learner Supplies

Welding Helmet
Safety Glasses
Protective Clothing

Weld Pliers
Right Angle Magnet
Tape Measure
Fillet Gauges
Welding Gloves

Course Competencies

1. Perform 20"-24" weldments with the GMAW spray process

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

1.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 1.1. Your weld length, size, and location meet print specifications
- 1.2. Your weld quality meets the visual inspection criteria of AWS D1.1 - Structural Welding Code

Learning Objectives

- 1.a. Practice tie-ins in the same travel direction
- 1.b. Practice tie-ins from opposite travel directions
- 1.c. Practice shuffling feet to complete weld
- 1.d. Practice sliding guide hand on work surface
- 1.e. Practice dragging gun on work surface

2. Perform GMAW spray and GMAW-S with limited joint access

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

2.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 2.1. Your weld length, size, and location meet print specifications
- 2.2. Your weld quality meets the visual inspection criteria of AWS D1.1 - Structural Welding Code

Learning Objectives

- 2.a. Practice welding left to right (or right to left for lefties)
- 2.b. Practice welding with non-dominant hand
- 2.c. Practice welding front to back and back to front
- 2.d. Weld the backside of a T joint by reaching over the front
- 2.e. Weld corners with less than 3" of gun clearance
- 2.f. Weld through an access hole
- 2.g. Investigate common joint access challenges in local industry

3. Perform GMAW spray weldments in the 2G position on carbon steel

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

3.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 3.1. Your weld length, size, and location meet print specifications
- 3.2. Your weld quality meets the visual inspection criteria of AWS D1.1 - Structural Welding Code

- 3.3. Your weld passes the transverse bend test per AWS D1.1 – Structural Welding Code

Learning Objectives

- 3.a. Select and set up gas mix for spray transfer
- 3.b. Select electrode wire for spray transfer on steel
- 3.c. Adjust wire feed speed per wire diameter, weld position and groove geometry
- 3.d. Adjust voltage per wire diameter
- 3.e. Experiment with varied root openings, root face dimensions, and groove angles
- 3.f. Compare weave and stringer techniques in groove layers
- 3.g. Adapt technique for specified weld size and contour in horizontal position
- 3.h. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 3.i. Compare backgouging methods
- 3.j. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make corrections as needed

4. Perform GMAW pulsed spray weldments in the vertical down position on carbon steel

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 4.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 4.1. Your weld length, size, and location meet print specifications
- 4.2. Your weld quality meets the visual inspection criteria of AWS D1.1 - Structural Welding Code

Learning Objectives

- 4.a. Select and set up gas mix for pulsed spray transfer
- 4.b. Select electrode wire for pulsed spray transfer on steel
- 4.c. Adjust wire feed speed per wire diameter for vertical down welding
- 4.d. Adjust arc length per wire diameter
- 4.e. Adapt technique for specified weld size and contour in vertical down position
- 4.f. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 4.g. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make corrections as needed

5. Perform GMAW-S weldments in the 3F position on carbon steel

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 5.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 5.1. Your weld length, size, and location meet print specifications
- 5.2. Your weld quality meets the visual inspection criteria of AWS D1.1 - Structural Welding Code

Learning Objectives

- 5.a. Explore the use of GMAW short circuit in local industry
- 5.b. Explain the advantages of GMAW short circuit for overhead and vertical welding
- 5.c. Select and set up gas mix for short circuit transfer
- 5.d. Select electrode wire for short circuit transfer on steel
- 5.e. Adjust wire feed speed per welding position and material thickness
- 5.f. Adjust voltage per welding position and material thickness
- 5.g. Compare weave and stringer techniques in weld layers
- 5.h. Adapt technique to vertical position
- 5.i. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 5.j. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make adjustments as needed

6. Perform GMAW-S weldments in the 3G position on carbon steel

Domain *Psychomotor* **Level** *Practicing* **Status** *Active*

Assessment Strategies

6.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 6.1. Your weld length, size, and location meet print specifications
- 6.2. Your weld quality meets the visual inspection criteria of AWS D1.1 - Structural Welding Code
- 6.3. Your weld passes the transverse bend test per AWS D1.1 – Structural Welding Code

Learning Objectives

- 6.a. Select and set up gas mix for short circuit transfer
- 6.b. Select electrode wire for short circuit transfer on steel
- 6.c. Adjust wire feed speed per welding position and material thickness
- 6.d. Adjust voltage per welding position and material thickness
- 6.e. Compare weave and stringer techniques in weld layers
- 6.f. Adapt technique to vertical position
- 6.g. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 6.h. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make adjustments as needed

7. Perform GMAW-S weldments in the 4F position on carbon steel

Domain *Psychomotor* **Level** *Practicing* **Status** *Active*

Assessment Strategies

7.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 7.1. Your weld length, size, and location meet print specifications
- 7.2. Your weld quality meets the visual inspection criteria of AWS D1.1 - Structural Welding Code

Learning Objectives

- 7.a. Select and set up gas mix for short circuit transfer
- 7.b. Select electrode wire for short circuit transfer on steel
- 7.c. Adjust wire feed speed per welding position and material thickness
- 7.d. Adjust voltage per welding position and material thickness
- 7.e. Compare weave and stringer techniques in weld layers
- 7.f. Adapt technique for overhead position
- 7.g. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 7.h. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make adjustments as needed

8. Perform GMAW-S weldments in the 4G position on carbon steel

Domain *Psychomotor* **Level** *Practicing* **Status** *Active*

Assessment Strategies

8.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 8.1. Your weld length, size, and location meet print specifications
- 8.2. Your weld quality meets the visual inspection criteria of AWS D1.1 - Structural Welding Code

Learning Objectives

- 8.a. Select and set up gas mix for short circuit transfer
- 8.b. Select electrode wire for short circuit transfer on steel
- 8.c. Adjust wire feed speed per welding position and material thickness
- 8.d. Adjust voltage per welding position and material thickness

- 8.e. Compare weave and stringer techniques in weld layers
- 8.f. Adapt technique to overhead position
- 8.g. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 8.h. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and make adjustments as needed

9. Perform GMAW weldments in the 3F position on stainless steel

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 9.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 9.1. Your weld length, size, and location meet print specifications
- 9.2. Your weld quality meets the visual inspection criteria of AWS D1.1 - Structural Welding Code

Learning Objectives

- 9.a. Investigate stainless steel GMAW applications in local industry
- 9.b. Select and set up gas mix for stainless steel
- 9.c. Select electrode wire for stainless steel
- 9.d. Adjust wire feed speed per wire diameter and welding position
- 9.e. Adjust arc length for optimum weld quality
- 9.f. Adapt technique for specified weld size and contour
- 9.g. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 9.h. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and adjust as needed

10. Perform GMAW weldments in the 3F position on aluminum

Domain Psychomotor Level Practicing Status Active

Assessment Strategies

- 10.1. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 10.1. Your weld length, size, and location meet print specifications
- 10.2. Your weld quality meets the visual inspection criteria of AWS D1.1 - Structural Welding Code

Learning Objectives

- 10.a. Select and set up gas mix for aluminum
- 10.b. Select electrode wire for aluminum
- 10.c. Adjust wire feed speed per wire diameter and welding position
- 10.d. Adjust arc length for optimum weld quality
- 10.e. Adapt technique for specified weld size and contour
- 10.f. Maintain electrode extension, work and travel angles, and travel speed for optimum weld quality
- 10.g. Assess weld quality per AWS D1.1 visual inspection acceptance criteria and adjust as needed

Grading Information

Attendance will play a huge role in student success. Assessments that are missed can only be retaken with a doctor's excuse for that day. Written assessments to be retaken is the responsibility of the student and all written assessments will be taken the first day back in school. The lab component is based on two capstone projects and six benchmark assignments. To complete a benchmark assignment all practice prints for that benchmark must be completed. If a student fails a benchmark assignment he or she must go back and redo practice prints before attempting that benchmark assignment again. Capstone projects can be attempted at anytime the student feels he or she is ready. Students will only have two attempts to complete a capstone project correctly. Be sure you are prepared before attempting a capstone. All lab

components will be graded on a pass or fail scale. This means you receive full credit for an assignment done correctly or no credit for an assignment done incorrectly.

Lab will represent 80% of final grade

Capstone projects: 30%

Capstone #1: AWS entry level print or equivalent GMAW-S (15%)

Capstone #2: AWS entry level print or equivalent GMAW Spray (15%)

Benchmark Assignments: 50%

Benchmark #1: 3G Vertical Up, Bend Test, GMAW-S (8.33%)

Benchmark #2: Picture Frame, GMAW-S (8.33%)

Benchmark #3: Confined Space, GMAW-S (8.33%)

Benchmark #4: 2G Bend Test, GMAW Spray (8.33%)

Benchmark #5: 4G Visual Inspection, GMAW-P (8.33%)

Benchmark #6: Aluminum T-joint, vertical up on one side and vertical down on other, visual inspection, GMAW-P, (8.33%)

Written assessment will represent 20% of final grade

Example:

Completed both capstone projects: $2 \times 15 = 30\%$

Completed #1, #2, #3, #5, #6 benchmarks: $5 \times 8.33 = 41.65\%$

Scored 78% on written test: $78 \times .2 = 15.6\%$

Overall Grade: $30\% + 41.65\% + 15.6\% = 87.25\%$, put 87.25 into the grading scale below and the student receives a B for the class.

Final Grade Scale

A = 95-100%

A- = 92-94%

B+ = 89-91%

B = 87-88%

B- = 82-86%

C+ = 78-81%

C = 75-77%

C- = 70-74%

D = 60-69%

F = 0-59%

Course Learning Plans and Performance Assessment Tasks

Type	Title	Source	Status
LP	Complete written tests with 75% or higher	Course	Active
LP	Weldments meet specifications of print	Course	Active
LP	Weldments meet AWS D 1.1 standards	Course	Active

LP	Chapter 9 Modern Welding	Course	Active
LP	Lab Demonstration	Course	Active
LP	Lab Performance	Course	Active
LP	Hobart Advanced GMAW Technical Guide EW-473 Lecture	Course	Active
LP	Terminology, parts of weld, and nozzle to work relationship	Course	Active



Northcentral Technical College

31-804-305 Applied Mathematics 1

Course Outcome Summary

Course Information

Description	Review and application of basic arithmetic skills involving whole numbers, fractions and decimals. Introduction and application of percents, area, volume, ratios and proportions will also be covered. The measurement system, angle, perimeter, square and board feet and formulas for geometric shapes as well as algebra will be taught.
Instructional Level	31 One-Year Technical Diploma
Total Credits	2
Total Hours	72

Types of Instruction

Instruction Type	Credits/Hours
lecture	2/72

Course History

Revised By	Bonnie Osness (OsnessB)
Last Approval Date	9/14/2016

Textbooks

Carman & Saunders; Mathematics for the Trades: A Guided Approach, 9th edition; Pearson-Prentice Hall, 2011; ISBN: 978-0-13-609708-2

Learner Supplies

Scientific Calculator, Casio fx-300MS is recommended
(online) MyMathLab Student Access Code for use with Applied Math.

Course Competencies

- Apply mathematical operations to whole numbers with an emphasis on the correct order of operations.**

<i>Domain</i>	<i>Cognitive</i>	<i>Level</i>	<i>Applying</i>	<i>Status</i>	<i>Active</i>
---------------	------------------	--------------	-----------------	---------------	---------------

Assessment Strategies

- 1.1. tests, quizzes, and/or graded assignments

Criteria

Performance will meet expectations when:

- 1.1. you correctly work with whole numbers.
- 1.2. you correctly add, subtract, multiply, and divide whole numbers.
- 1.3. you correctly use proper order of operations with whole numbers.

Learning Objectives

- 1.a. Work with whole numbers.
- 1.b. Add whole numbers.
- 1.c. Subtract whole numbers.
- 1.d. Multiply whole numbers.
- 1.e. Divide whole numbers.
- 1.f. Use correct order of operations with whole numbers.

2. Apply mathematical operations to fractions with an emphasis on the correct order of operations

Domain Cognitive Level Applying Status Active

Assessment Strategies

- 2.1. tests, quizzes, and/or graded assignments

Criteria

Performance will meet expectations when:

- 2.1. you correctly work with fractions.
- 2.2. you correctly write fractions in lowest terms.
- 2.3. you correctly convert improper fractions to mixed numbers and mixed numbers to improper fractions.
- 2.4. you correctly add, subtract, multiply, and divide fractions and mixed numbers.
- 2.5. you correctly use proper order of operations with fractions.

Learning Objectives

- 2.a. Work with fractions.
- 2.b. Write fractions in lowest terms.
- 2.c. Convert mixed numbers to improper fractions.
- 2.d. Convert improper fractions to mixed numbers.
- 2.e. Add fractions and mixed numbers.
- 2.f. Subtract fractions and mixed numbers.
- 2.g. Multiply fractions and mixed numbers.
- 2.h. Divide fractions and mixed numbers.
- 2.i. Use correct order of operations with fractions and mixed numbers.

3. Apply mathematical operations to decimal numbers with an emphasis on the correct order of operations.

Domain Cognitive Level Applying Status Active

Assessment Strategies

- 3.1. tests, quizzes, and/or graded assignments

Criteria

Performance will meet expectations when:

- 3.1. you correctly work with decimal numbers.
- 3.2. you correctly convert fractions to decimals and decimals to fractions.
- 3.3. you correctly add, subtract, multiply, and divide decimal numbers.
- 3.4. you correctly use proper order of operations with decimal numbers.

Learning Objectives

- 3.a. Work with decimals.
- 3.b. Convert fractions to decimals.
- 3.c. Convert decimals to fractions.
- 3.d. Add decimal numbers.

- 3.e. Subtract decimal numbers.
- 3.f. Multiply decimal numbers.
- 3.g. Divide decimal numbers.
- 3.h. Use correct order of operations with decimal numbers.

4. Apply mathematical operations to signed numbers with an emphasis on the correct order of operations.

Domain Cognitive Level Applying Status Active

Assessment Strategies

- 4.1. tests, quizzes, and/or graded assignments

Criteria

Performance will meet expectations when:

- 4.1. you correctly work with signed numbers.
- 4.2. you correctly add, subtract, multiply, and divide signed numbers.
- 4.3. you correctly use proper order of operations with signed numbers.
- 4.4. you correctly calculate exponents and square roots.
- 4.5. you correctly use proper order of operations with exponents and square roots.

Learning Objectives

- 4.a. Work with signed numbers.
- 4.b. Add signed numbers.
- 4.c. Subtract signed numbers.
- 4.d. Multiply signed numbers.
- 4.e. Divide signed numbers.
- 4.f. Use correct order of operations with signed numbers.
- 4.g. Calculate exponents.
- 4.h. Calculate square roots.
- 4.i. Use correct order of operations with exponents and square roots.

5. Solve application problems involving percent.

Domain Cognitive Level Applying Status Active

Assessment Strategies

- 5.1. tests, quizzes, and/or graded assignments

Criteria

Performance will be satisfactory when:

- 5.1. you accurately define the mathematical concept of percent.
- 5.2. you correctly convert decimal numbers to percents and percents to decimals.
- 5.3. you correctly convert fractions to percents and percents to fractions.
- 5.4. you correctly solve percent problems for part.
- 5.5. you correctly solve percent problems for base.
- 5.6. you correctly solve percent problems for rate.
- 5.7. you correctly apply the concept of percent to find discount, sales tax, commission, efficiency, and tolerances.
- 5.8. you correctly calculate percent increase and percent decrease.

Learning Objectives

- 5.a. Define the mathematical concept of percent.
- 5.b. Convert decimal numbers to percents.
- 5.c. Convert fractions to percents.
- 5.d. Convert percents to decimal numbers.
- 5.e. Convert percents to fractions.
- 5.f. Solve percent problems for part.
- 5.g. Solve percent problems for base.
- 5.h. Solve percent problems for rate.
- 5.i. Apply percent to find discount, sales tax, commission, efficiency, and tolerances.
- 5.j. Calculate percent increase and percent decrease.

6. Translate within and between U.S. Customary and metric measurement system units.

Domain Cognitive Level Analyzing Status Active

Assessment Strategies

6.1. tests, quizzes, and/or graded assignments

Criteria

Performance will be satisfactory when:

- 6.1. you correctly work with measurement numbers.
- 6.2. you correctly report precision and accuracy using significant digits.
- 6.3. you correctly calculate values and report the appropriate number of significant digits.
- 6.4. you correctly calculate decimal equivalents including the error involved.
- 6.5. you accurately define English/US Customary units of measure for length, weight, and capacity.
- 6.6. you correctly convert units in the US Customary system using unity fractions.
- 6.7. you accurately define and work with compound units.
- 6.8. you correctly investigate compound units for measuring area, volume, pressure, and board feet.
- 6.9. you correctly apply units of time and temperature for measurement.
- 6.10. you accurately define metric units of length, weight, area, volume, and temperature.
- 6.11. you correctly convert units in the metric system using prefixes.
- 6.12. you correctly convert between US Customary units and metric units.

Learning Objectives

- 6.a. Work with measurement numbers.
- 6.b. Report precision and accuracy using significant digits.
- 6.c. Calculate values and report the appropriate number of significant digits.
- 6.d. Calculate decimal equivalents including the error involved.
- 6.e. Examine English/US Customary units of measure for length, weight, and capacity.
- 6.f. Convert units in the US Customary system using unity fractions.
- 6.g. Examine and work with compound units.
- 6.h. Investigate compound units for measuring area, volume, pressure, and board feet.
- 6.i. Apply units of time and temperature for measurement.
- 6.j. Examine metric units of length, weight, area, volume, and temperature.
- 6.k. Convert units in the metric system using prefixes.
- 6.l. Convert between US Customary and metric units.

7. Interpret readings on measurement devices used on the job.

Domain Cognitive Level Understanding Status Active

Assessment Strategies

7.1. tests, quizzes, and/or graded assignments

Criteria

Performance will meet expectations when:

- 7.1. you correctly select an appropriate measuring tool to perform a task.
- 7.2. you correctly use a ruler or tape measure to make a length measurement.
- 7.3. you correctly use a micrometer to make a length measurement.
- 7.4. you correctly use a caliper to make a length measurement.
- 7.5. you correctly use a protractor to make an angle measurement.
- 7.6. you correctly investigate using a measuring device with a vernier scale.

Learning Objectives

- 7.a. Select an appropriate measuring tool to perform a task.
- 7.b. Use a ruler or tape measure to make a length measurement.
- 7.c. Use a micrometer to make a length measurement.
- 7.d. Use a caliper to make a length measurement.
- 7.e. Use a protractor to measure an angle.
- 7.f. Investigate using a measuring device with a vernier scale.

8. Solve application problems involving ratios and proportions.

Domain **Cognitive** **Level** **Applying** **Status** **Active**

Assessment Strategies

8.1. tests, quizzes, and/or graded assignments

Criteria

Performance will be satisfactory when:

- 8.1. you accurately define the mathematical concepts of ratio and proportion.
- 8.2. you correctly use the cross-product rule to solve proportions.
- 8.3. you correctly apply ratio and proportion to scale drawings and similar figures.
- 8.4. you accurately investigate the concept of direct versus inverse proportions.
- 8.5. you correctly apply ratio and proportion to gears and pulleys.

Learning Objectives

- 8.a. Define the mathematical concept of ratio.
- 8.b. Define the mathematical concept of proportion.
- 8.c. Use the cross-product rule to solve proportions.
- 8.d. Apply ratio and proportion to scale drawings.
- 8.e. Apply ratio and proportion to similar figures.
- 8.f. Investigate the concept of direct versus inverse proportions.
- 8.g. Apply ratio and proportion to gears and pulleys.

9. Apply principles of linear measurement to surface area and volume measurements.

Domain **Cognitive** **Level** **Applying** **Status** **Active**

Assessment Strategies

9.1. tests, quizzes, and/or graded assignments

Criteria

Performance will meet expectations when:

- 9.1. you correctly define an angle.
- 9.2. you correctly label the sides and vertex of an angle.
- 9.3. you correctly classify angles as acute, right, or obtuse.
- 9.4. you correctly define vertical, adjacent, interior, exterior, and corresponding angles.
- 9.5. you correctly analyze the properties of angles in a triangle.
- 9.6. you accurately define a polygon.
- 9.7. you correctly identify different triangles, quadrilaterals, hexagons, and other regular and irregular polygons.
- 9.8. you correctly calculate perimeters and areas of polygons and composite figures.
- 9.9. you correctly define prisms and other three-dimensional figures.
- 9.10. you correctly calculate lateral and total surface areas, and volumes of prisms, cylinders, spheres, pyramids, and cones.
- 9.11. you correctly calculate surface areas and volumes of composite figures.

Learning Objectives

- 9.a. Define an angle.
- 9.b. Label the sides and vertex of an angle.
- 9.c. Classify angles as acute, right, or obtuse.
- 9.d. Define vertical, adjacent, interior, exterior, and corresponding angles.
- 9.e. Analyze the properties of angles in a triangle.
- 9.f. Define polygons.
- 9.g. Identify different triangles, quadrilaterals, hexagons, and other regular and irregular polygons.
- 9.h. Calculate the perimeters of a polygons and composite figures.
- 9.i. Calculate the areas of a polygons and composite figures.
- 9.j. Define prisms and other three-dimensional figures.
- 9.k. Calculate lateral and total surface areas of prisms, cylinders, spheres, pyramids, and cones.
- 9.l. Calculate volumes of prisms, cylinders, spheres, pyramids, and cones.
- 9.m. Calculate surface areas and volumes of composite figures.

10. Investigate fundamentals of the rectangular coordinate system.

Assessment Strategies

10.1. quizzes and/or graded assignment

Criteria

Performance will meet expectations when:

- 10.1. you correctly define the rectangular coordinate system and the coordinate plane.
- 10.2. you correctly define a number line and positive/negative areas on it.
- 10.3. you correctly construct a coordinate plane using an x and y-axis.
- 10.4. you correctly label the axes, origin, and four quadrants on a coordinate plane.
- 10.5. you correctly plot points on a coordinate plane.
- 10.6. you correctly interpret graphs in applied problems.

Learning Objectives

- 10.a. Define the rectangular coordinate system and the coordinate plane.
- 10.b. Define a number line and positive/negative areas on it.
- 10.c. Construct a coordinate plane using an x and y-axis.
- 10.d. Label the axes, origin, and four quadrants on a coordinate plane.
- 10.e. Plot points on a coordinate plane.
- 10.f. Interpret graphs in applied problems.

Grading Information

Letter grade % or Points needed to achieve grade
 *All competencies must be met to earn a C or above

- A 94 - 100% and has met all course competencies
- A- 90 – 93.99% and has met all course competencies
- B+ 88 – 89.99% and has met all course competencies
- B 82 – 87.99% and has met all course competencies
- B- 80 – 81.99% and has met all course competencies
- C+ 78 – 79.99% and has met all course competencies
- C 70 – 77.99% and has met all course competencies
- D 65 – 69.99% and/or has not met all course competencies
- F less than 65% and has not met all course competencies

Course Learning Plans and Performance Assessment Tasks

Type	Title	Source	Status
LP	Applied Calculations Project	Course	Active
LP	LP1 - Arithmetic of Whole Numbers	Course	Active
LP	LP2 - Arithmetic of Fractions	Course	Active
LP	LP3 - Arithmetic of Decimal Numbers	Course	Active
LP	LP4 - Ratio, Proportion, and Percent	Course	Active
LP	LP5 - Measurement	Course	Active
LP	LP6 - Pre-Algebra	Course	Active
LP	LP7 - Practical Plane Geometry	Course	Active
LP	LP8 - Solid Figures	Course	Active
LP	LP9 - The Coordinate Plane	Course	Active

