

**St. Lawrence-Lewis BOCES
Board of Education Review
Educational Services Center
May 10, 2018 – 6:00 p.m.**

Program Re-Approval 2017-2018

A. Program Information

NYSED approval of three CTE programs; **Culinary Arts, HVAC/R and Metalworking Technology** will expire on June 30, 2018.

| Program of Study | Credits Approved | Yr. Approved Re-approved | Program Review | Re-approval Date |
|---|--|--------------------------|----------------|------------------|
| Culinary Arts CIP #12.0500 Non-trad - Female | 1 Unit Specialized Math 1 Unit Integrated Science | 20013-2014 | 3/7/2018 | 9/2018 |
| HVAC/R (Heating, Ventilation & Air Conditioning) CIP #47.0201 Non-trad - Female | 1 Unit Integrated Math 1 Unit Integrated Science | 20013-2014 | 3/7/2018 | 9/2018 |
| Metalworking Technology CIP #48.0508 Non-trad - Female | 1 Unit Integrated Math 1 Unit Integrated Science | 20013-2014 | 3/7/2018 | 9/2018 |

Approval by New York State Education Department allows students to receive Technical Endorsement. They must be re-approved by NYSED this spring in order to be offered to our students as approved programs in September 2018.

Culinary Arts and Metalworking Technology is offered at all the CTE Centers.

HVAC/R is offered only at Seaway CTE Center.

B. Achievements

| Program Achievements Since 2013-2014 (Does not include 2017-2018 school year statistics) | | | | |
|---|-------------------------------------|---|--|--|
| CTE Program of Study | Students Completing since 2013-2014 | Students Completing with Special Education Services | Students receiving Technical Endorsement | Percentage of students receiving Technical Endorsement |
| Culinary Arts | 141 | 74 | 80 | 56.7% |
| HVAC/R | 32 | 7 | 16 | 50% |
| Metalworking Technology | 150 | 50 | 117 | 78% |

C. Program Content

Curricular changes have been communicated to the component districts through:

- Superintendents CTE Sub Committee
- Secondary Principal Meetings hosted in districts throughout the BOCES
- Guidance Counselor meetings
- Math and Science teachers from the component districts received online access via Rubicon Atlas to curriculum materials in advance of the external review meeting held at Seaway CTE Center on March 7, 2018. The teachers attended the External Review meeting, spoke with students, and concluded their day with a meeting with the CTE Math and Science Consultant teachers, and were able to visit the classrooms and participate in reviewing student presentations.
- Math and Science Integration Support Document Review Meetings included certified Science and Math teachers from component districts; Brasher Falls Central School, Madrid-Waddington Central School and Ogdensburg City School.

D. Work-Based Learning

All students completing the programs since approval have participated in work-based learning. Work-Based Learning hours and locations are now being tracked via School Tool which is new for the 2017-18 program year.

- On-Site projects
- Career Exploration Internship Program (CEIP)

E. Employability Profile

- The 21st century skills that refer to a broad set of knowledge, skills, work habits and character traits that are critically important to success in collegiate programs, contemporary careers and workplaces.
 - Communication Skills
 - Collaboration
 - Creativity & Innovation
 - Health & Safety
 - Problem Solving & Critical Thinking
 - Personal Management Skills
 - Interpersonal Skills
 - Conflict Resolution
 - Technology Skills
- Course Competencies that are specific to each program of study and have been updated.
- Will be generated from School Tool for the first time – June 2018 (Please see attached sample)

F. Technical Assessment (three parts)

- **Written and Practical:**
 - **Culinary Arts** - National Occupational Competency Testing Institute (NOCTI): Level 2 Cook #4536 Performance Exam; National Restaurant Association ProStart Written Exam
 - **HVAC/R** - National Occupational Competency Testing Institute (NOCTI): HVAC #3045 as well as EPA 608 Levels 1, 2 & 3 Certifications
 - **Metalworking Technology** - National Occupational Competency Testing Institute (NOCTI): Welding #4272 Written and Performance Exam

- **Senior Project** – Designed by instructors with students and assessed by instructors through the use of a rubric

G. Articulated Credit and Dual Enrollment Agreements:

Students benefit with college credit and advanced standing at post-secondary institutions:

- **Culinary Arts**
 - Alfred State College
 - Bryant and Stratton
 - New England Culinary Institute
 - SUNY Cobleskill
 - SUNY Jefferson
 - The Culinary Institute of America

- **HVAC/R**
 - Alfred State College
 - Bryant and Stratton
 - Mohawk Valley Community College
 - SUNY Canton
 - University of Northwestern Ohio

- **Metalworking Technology**
 - Advanced Welding Institute
 - Bryant and Stratton
 - Mohawk Valley Community College
 - SUNY Canton
 - SUNY Cobleskill

H. Faculty and External Review Committee

- Mid and End of the Year Evaluation Meetings

- Program Indicators
- Self-study meetings conducted
- Advisory Committee Meetings for all programs
- External Review Meeting – March 7, 2018

I. Teacher Certification

Staff are highly qualified and hold NYS teacher certification in the academic content area(s) for which academic credit is being offered.

J. Staff Development (2014-2018)

- Comprehensive Behavior Management with Dr. Thomas Glanton of the Education Company.
- Understanding and Dealing with Challenging Students
- Effective Teaching
- Common Core State Standards Training (TCTW)
- Assessment Training (TCTW)
- Technology In-Service (Peer Presented-ongoing)
- Standards Shifts (Peer Presented-ongoing)
- Regional Visitations/Networking – program specific
- Project Based Learning with Marty Sugerik from SREB (Southern Regional Education Board)
- Project Based Learning Coach Training with Marty Sugerik from SREB (Southern Regional Education Board)
- Google Classroom and Google Drive
- Drug Impairment Training for Educational Professionals

Request for Board Approval

Programs requesting St. Lawrence-Lewis BOCES BOE approval for 2017-2018.

- Culinary Arts (SATC, NWT, & SWT)
- HVAC/R (SATC)
- Metalworking Technology (SATC, NWT & SWT)

Programs scheduled for approval / re-approval 2018-2019:

- Criminal Justice (SATC, NWT & SWT)
- Education Careers Academy (SUNY Potsdam – Offsite Program)
- Software Development and Business Design (SATC)

Culinary Arts –Year One
St. Lawrence-Lewis BOCES CTE Centers

| Unit of Study | | Unit Hours | Math Hours | Science Hours |
|----------------------|---|-------------------|-------------------|----------------------|
| I. | Introduction & Orientation: Preparing for a Successful Career | 10 | | |
| | A. Student Handbook | | | |
| | B. Classroom Policies and Procedures | | | |
| | C. School Awareness and Staff | | | |
| | D. Working in the Hospitality Business | | | |
| | E. Interest and Aptitudes | | | |
| | F. Career Planning Key Terms | | | |
| | G. Forming the Career Plan | | | |
| | H. Career and Financial Management | | 7 | |
| | I. Participation in CTE Annual Calendar of Events for Career Planning | | | |
| II.1 | Welcome – Food Service Industry | 30 | | |
| | 1.1 Overview of the Restaurant and Food Service Industry | | | |
| | 1.2 Career Opportunities in the Industry | | | |
| | 1.3 Overview of the Lodging Industry | | 3 | 3 |
| II.2 | Keeping Food Safe (ServSafe) | 75 | | |
| | 2.1 Introduction to Food Safety | | | 26 |
| | 2.2 Good Personal Hygiene | | | 1.5 |
| | 2.3 Preventing Hazards in the Flow of Food | | | |
| | 2.4 Food Safety Management Systems | | | |
| | 2.5 Cleaning and Sanitizing | | | 3 |
| II.3 | Workplace Safety | 30 | | |
| | 3.1 Introduction to Workplace Safety | | | 2.5 |
| | 3.2 Preventing Accidents and Injuries | | | 7 |
| | 3.3 First Aid and External Threats | | | 3 |
| II.4 | Kitchen Essentials 1 | 40 | | |
| | 4.1 Professionalism | | | |
| | 4.2 Using Standardized Recipes | | 33.5 | |
| II.5 | Kitchen Essentials 2 | 40 | | |
| | 5.1 Receiving, Storage and Pre- Preparation Equipment | | 3 | |
| | 5.2 Getting Ready to Cook | | 6 | 6 |
| | 5.3 The three types of cooking methods – Dry heat methods, moist heat methods and combination cooking | | 1 | |
| | 5.4 Cooking and Nutrition | | 3.5 | 4.5 |
| II.6 | Stocks, Soups and Sauces | 36 | | |

| Unit of Study | | Unit Hours | Math Hours | Science Hours |
|----------------------|---|-------------------|-------------------|----------------------|
| | 6.1 Preparing Stocks | | | |
| | 6.2 Preparing Soups | | | |
| | 6.3 Preparing Sauces | | | |
| II.7 | Communication Skills: Successful Customer Relations, Working with People | 30 | | |
| | 7.1 The Communication Process | | | |
| | 7.2 Communication Skills | | | |
| | 7.3 Types of Communication | | | |
| II.8 | Management Essentials | 30 | | |
| | 8.1 Learning to Work Together | | | |
| | 8.2 Being a Successful Leader | | | |
| | 8.3 Interviewing and Orientation | | | |
| | 8.4 Training and Evaluation | | | |
| II.9 | Fruits and Vegetables | 37 | | |
| | 9.1 Fruits | | | |
| | 9.2 Vegetables | | | |
| II.10 | Serving Your Guests | 30 | | |
| | 10.1 The Importance of Customer Service | | 2 | |
| | 10.2 Ensuring a Positive Dining Experience | | | |
| | 10.3 Service Styles, Set-ups and Staff | | | |
| II.11 | Potatoes and Grains | 32 | | |
| | 11.1 Potatoes | | | |
| | 11.2 Legumes and Grains | | | |
| | 11.3 Pasta and Dumplings | | | |
| II.12 | Building a Successful Career in the Industry | 30 | | |
| | 12.1 Starting a Career in Foodservice | | | |
| | 12.2 Completing an Application Effectively | | | |
| | 12.3 The Job Interview | | | |
| | 12.4 Advancing in a Career | | | |
| | 12.5 Careers in the Industry | | | |
| Total | | 450 | 59 | 56.5 |

Culinary Arts - Year Two
St. Lawrence-Lewis BOCES CTE Centers

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|---|------------|------------|---------------|
| I. Student Orientation | 10 | | |
| A. Student Handbook | | | |
| B. Classroom Policies and Procedures | | | |
| C. School Awareness and Staff | | | |
| D. Working In The Hospitality Industry | | | |
| E. Interest and Aptitudes | | | |
| F. Career Planning Key Terms | | | |
| G. Forming the Career Plan | | | |
| H. Career and Financial Management | | | |
| I. Participation in CTE Annual Calendar of Events for Career Planning | | | |
| II.1 Breakfast Food and Sandwiches | 40 | | |
| 1.1 Dairy Products and Eggs | | | 11 |
| 1.2 Breakfast Foods and Drinks | | | |
| 1.3 Sandwiches/Hors d'oeuvres | | | 2.5 |
| II.2 Nutrition | 32 | | |
| 2.1 The Basics of Nutrition | | 7.5 | 15 |
| 2.2 Making Menu Items More Nutritious | | 3.5 | 3.5 |
| II.3 Cost Control | 32 | | |
| 3.1 Introduction to Cost Control | | 2 | |
| 3.2 Controlling Food Costs | | 8 | |
| 3.3 Labor Cost Control | | | |
| 3.4 Quality Standards | | | |
| II.4 Salads and Garnishes | 26 | | |
| 4.1 Salads | | | 2.5 |
| 4.2 Dressings and Dips | | | 5 |
| 4.3 Garnishes | | | |
| II.5 Purchasing and Inventory Control | 34 | | |
| 5.1 Introduction to Purchasing | | | |
| 5.2 Making Purchasing Decisions | | 7 | |
| 5.3 Managing Purchases | | 9 | |
| II.6 Meat, Poultry and Seafood | 96 | | |
| 6.1 Meat | | | 17 |
| 6.2 Poultry | | | |
| 6.3 Seafood | | | |
| 6.4 Charcuterie and Garde-manger | | | |

| Unit of Study | | Unit Hours | Math Hours | Science Hours |
|----------------------|--|-------------------|-------------------|----------------------|
| II.7 | Marketing | 30 | | |
| | 7.1 Introduction to Marketing | | | |
| | 7.2 Market Analysis, Identity and Communication | | | |
| | 7.3 The Menu as a Marketing Tool | | 3 | |
| II.8 | Desserts and Baked Goods | 72 | | |
| | 8.1 Bakeshop Basics | | 5 | |
| | 8.2 Yeast Breads | | | |
| | 8.3 Quick Breads and Cakes | | | |
| | 8.4 Pies, Pastries and Cookies | | | |
| | 8.5 Chocolate | | | 4 |
| | 8.6 Specialty Desserts | | | |
| II.9 | Sustainability in the Restaurant and Foodservice Industry | 30 | | |
| | 9.1 Introduction and Water Conservation | | | 2 |
| | 9.2 Energy Conservation | | | 2 |
| | 9.3 Waste Management | | | 3 |
| | 9.4 Sustainable Food Practices | | | |
| II.10 | Global Cuisine 1: The Americas | 12 | | |
| | 10.1 North America | | | |
| | 10.2 Central American and Caribbean | | | |
| | 10.3 South America | | | |
| II.11 | Global Cuisine 2: Europe, The Mediterranean, The Middle East and Asia | 12 | | |
| | 11.1 Europe | | | |
| | 11.2 The Mediterranean | | | |
| | 11.3 The Middle East | | | |
| | 11.4 Asia | | | |
| III. | Senior Project | 24 | 24 | |
| Total | | 450 | 69 | 67.5 |

HVAC/R -Year One
St. Lawrence-Lewis BOCES CTE Centers

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|--|-------------------|-------------------|----------------------|
| I. General Safety (Cross-Curricular) | 20 | | |
| A. Safety Training – SATC Workplace Safety | | 11.5 | 12.5 |
| B. Building and Fire Safety | | | |
| C. Personal Safety and Practices | | | |
| D. Machinery and Equipment Safety | | | |
| II. Safety | 10 | | |
| A. General Safety Practices | | | |
| B. Identification and Proper Use of Chemicals | | | |
| C. Review Student Handbook (Building Handbook) | | | |
| D. Review Classroom Procedures (Rules and Regulations) | | | |
| III. Tools and Equipment | 30 | | |
| A. Identification and Proper Use of Hand Tools | | 19 | 3 |
| B. Identification and Proper Use of Power Tools | | 2 | 12 |
| C. Identify power tools used in HVAC | | | |
| D. Describe the proper procedures for using power tools | | | |
| E. Describe the proper safety required to be used with power tools | | | |
| F. Identification of Fasteners and Their Uses | | | |
| G. Tubing and Piping | | | 1 |
| IV. Plumbing | 35 | | |
| A. Tubing and Piping | | | 1 |
| V. Electricity | 40 | | |
| A. Structure of Matter | | 3 | 1.5 |
| B. Ohm's Law | | 3.5 | 5.5 |
| C. Use of Magnetism and Generating Power | | .5 | 1 |
| D. Circuit Safety Protection | | | |
| E. Basic Wiring of Circuits | | 8 | 10.5 |

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|---|-------------------|-------------------|----------------------|
| F. Identify Types of Electric Motors | | | |
| G. Application of Electric Motors | | | |
| H. Motor Controls | | 1 | |
| VI. Theory of Heat | 55 | | |
| A. Introduction to Different Types of Heat | | 10.5 | 16 |
| B. Pressures | | | 6 |
| C. Matter and Energy | | 3 | 6 |
| D. Refrigeration and Refrigerants | | 4.5 | 2.5 |
| VII. Heat and Humidification | 185 | | |
| A. Gas Heat | | | 2 |
| B. Oil Heat | | | |
| C. Hydronic Heat | | | |
| D. Alternative Heating | | | |
| VIII. Refrigeration Process | 55 | | |
| A. Evaporators | | | |
| B. Condensers | | | |
| C. Compressors | | | |
| D. Metering Devices | | | |
| IX. Career Planning | 20 | | |
| A. Interest and Aptitudes | | | |
| B. Career Planning Key Terms | | | |
| C. Forming the Career Plan | | | |
| D. Participation in CTE Annual Calendar of Events for Career Planning | | | |
| TOTAL HOURS | 450 | 66.5 | 80.5 |

HVAC/R -Year Two
St. Lawrence-Lewis BOCES CTE Centers

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|--|-------------------|-------------------|----------------------|
| I. General Safety (Cross-Curricular) | 10 | | |
| A. Safety Training – SATC Workplace Safety | | 6.5 | 9.5 |
| B. Building and Fire Safety | | | |
| C. Personal Safety and Practices | | | |
| D. Machinery and Equipment Safety | | | |
| II. Safety – Review Year One | 10 | | |
| A. General Safety Practices | | .5 | 3.5 |
| B. Identification and Proper Use of Chemicals | | | |
| C. Review of Student Handbook (Building Handbook) | | | |
| D. Review Classroom Procedures (Rules and Regulations) | | | |
| III. Tools and Equipment – Review Year One | 10 | | |
| A. Identification and Proper Use of Hand Tools | | 4 | 1 |
| B. Identification and Proper Use of Power Tools | | | |
| C. Identify power tools used in HVAC | | | |
| D. Describe the proper procedures for using power tools. | | | |
| E. Describe the proper safety required to be used with power tools | | | |
| F. Identification of Fasteners and their uses. | | | |
| IV. Theory of Heat – Review Year One | 25 | | |
| A. Introduction to Different Types of Heat | | 4.5 | 6.5 |
| B. Pressures | | | |
| C. Matter and Energy | | 2 | 3 |
| D. Refrigeration and Refrigerants | | 1 | |
| V. Electricity - Review Year One | 15 | | |
| A. Structure of Matter | | | |
| B. Ohm's Law | | 1.5 | 2 |
| C. Use of Magnetism and Generating Power | | .5 | .5 |
| D. Circuit Safety Protection | | | |

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|--|-------------------|-------------------|----------------------|
| E. Basic Wiring of Circuits | | 2 | 1 |
| VI. Electric Motors | 40 | | |
| A. Identifying Types of Electric Motors | | .5 | 2.5 |
| B. Applications of Electric Motors | | | |
| C. Motor Controls | | 1 | 1 |
| D. Troubleshooting with Electric Motors | | | 6 |
| VII. Domestic Appliances | 55 | | |
| A. Residential Refrigerators | | 3 | |
| B. Residential Freezers | | | |
| C. Window Air Conditioning Units | | | |
| VIII. Air Conditioning (Cooling) | 225 | | |
| A. Refrigeration Applied to Air Conditioning | | 4 | |
| B. Air Distribution and Balance | | 8 | 1.5 |
| C. Installation of Split Systems | | 4 | |
| D. Systems Control | | | |
| E. Discuss the control sequence for an A/C system | | | |
| F. Explain the 24 volt control functions | | | |
| G. Humidification and Air Filtration | | 9.5 | 4.5 |
| H. Heat Pumps | | | |
| IX. Refrigeration Management | 40 | | |
| A. Refrigerant Chemistry and Applications | | 2 | 3.5 |
| B. Refrigeration Oils and Applications | | | 2 |
| C. Ozone Depletion | | | |
| D. Montreal Protocol | | | |
| E. Legislation and Regulations | | | |
| F. Recovery, Recycling and Reclaiming | | | |
| G. Containers-Safe Handling and Transport of Refrigerants | | | |
| H. Servicing and Testing | | | |
| I. Waste Oil | | | |
| J. High Pressure and Low Pressure Industrial/Commercial Chillers | | | |
| K. Review of Technical Certification Test (EPA Exam) | | | |
| X. Career Planning | 20 | | |
| E. Interest and Aptitudes | | 3 | |
| F. Career Planning Key Terms | | | |
| G. Forming the Career Plan | | | |
| H. Career and Financial Management | | | |
| I. Participation in CTE Annual Calendar | | | |

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|-------------------------------|-------------------|-------------------|----------------------|
| of Events for Career Planning | | | |
| TOTAL HOURS | 450 | 57.50 | 48 |

Metalworking Technology – Year One
St. Lawrence-Lewis BOCES CTE Centers

| Unit of Study | | Unit Hours | Math Hours | Science Hours |
|---------------|--|------------|------------|---------------|
| I. | Shop Safety | 15 | | |
| | A. Workplace Safety Structure | | | 2 |
| | B. Building and Fire Safety | | | 2 |
| | C. Personal Safety and Practices | | | 6 |
| | D. Machinery and Equipment Safety | | | 4 |
| II. | Manual Oxy-Acetylene Safety and Operation | 100 | | |
| | A. Perform Safety Inspections of Equipment and Accessories | | | 5 |
| | B. Disassemble and Assemble – Leak Detection and Correction | | | |
| | C. Set Up For Manual Oxy-Fuel Gas Cutting Operations on Plain Carbon Steel | | 4 | 4 |
| | D. Operate Manual Oxy-Fuel Cutting Equipment | | 8 | 15 |
| | E. Perform Straight Cutting Operations on Plain Carbon Steel | | | |
| | F. Perform Shape Cutting Operations on Plain Carbon Steel | | | |
| | G. Perform Bevel Cutting Operations on Plain Carbon Steel | | | |
| | H. Perform Weld Washing Techniques | | | 2 |
| III. | Metals | 35 | | |
| | A. Classification of Metals | | 2 | 13 |
| | B. Identification of Metals | | 2 | 6 |
| IV. | Bench and Floor Work | 25 | | |
| | A. Right Angle and Hand Grinder (RHAG) | | | |
| | B. Measurement | | 8 | |
| | C. Layout and Fabrication Techniques | | 16 | |
| | D. Metal Shapes and Applications | | | |
| | E. Hand/Power Tool Identification, Applications and Maintenance | | | |
| V. | Shop Drawings/Blueprints | 30 | | |
| | A. Interpret Blueprint Welding Symbol Information | | | |
| | B. Interpret Basic Elements of a Drawing or Sketch | | 20 | |
| | C. Fabricate Parts From a Drawing or Sketch | | 4 | |
| VI. | Shielded Metal Arc Welding (SMAW-Stick) | 100 | | |

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|--|-------------------|------------|---------------|
| A. SMAW Safety | | | |
| B. Essentials of SMAW | | | |
| C. Terms and Equipment | | 3 | 10 |
| D. Mild Steel Electrodes | | 4 | 8 |
| E. Running a Bead | | 3 | 6 |
| F. Weld Beads and Flaws | | | 1 |
| G. Weldments | | | |
| VII. Gas Metal Arc Welding (GMAW) | 100 | | |
| A. Safety | | | |
| B. Fundamentals | | | 2 |
| C. Filler Wire | | 3 | 2 |
| D. Shielding Gases | | | 2 |
| E. Transfer Methods | | | |
| F. Techniques | | 1 | |
| G. Essentials | | 3 | 3 |
| VIII. Gas Tungsten Arc Welding (GTAW) | 35 | | |
| A. Safety | | | |
| B. Fundamentals | | | 8 |
| C. Filler Rods | | | |
| D. Shielding Gases | | | |
| E. TIG Torch | | 1 | |
| F. Techniques | | | 2 |
| IX. Welding Inspection and Testing Principles | Integrated | | |
| A. Examine Cut Surfaces and Edges of Prepared Base Metal Parts | | | 2 |
| B. Compare and contrast the difference between a welding flaw and a defect | | | |
| C. Explain common welding flaws and defects that can be found in welding applications. | | | |
| D. Define tools used to measure and evaluate standard welds | | | |
| E. Define the difference between destructive testing and nondestructive testing. | | | 6 |
| X. Career Planning/Exploration | 10 | | |
| A. Interest and Aptitudes | | | |
| B. Career Planning Key Terms | | | |
| C. Forming the Career Plan | | | |
| D. Career and Financial Management | | 3 | |
| E. Participation in CTE Annual Calendar of Events for Career Planning | | | |
| F. State Personal Attributes that an employer looks for in an employee | | | |

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|---|-------------------|-------------------|----------------------|
| G. Describe job opportunities that exist in the metalworking profession | | | |
| TOTAL HOURS | 450 | 85 | 111 |

Metalworking Technology – Year Two
St. Lawrence-Lewis BOCES CTE Centers

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|--|------------|------------|---------------|
| I. Shop Safety Review | 12 | | |
| A. Workplace Safety Structure | | | 1 |
| B. Building and Fire Safety | | | 1 |
| C. Personal Safety and Practices | | | 4 |
| D. Machinery and Equipment Safety | | | 1 |
| II. Machine Oxy-Fuel Cutting | 36 | | |
| A. Perform Safety Inspections of Equipment and Accessories | | | 3 |
| B. Make Minor External Repairs to Equipment and Accessories | | | |
| C. Set Up For Machine Oxy-Fuel Gas Cutting Operations on Plain Carbon Steel | | 6 | 2 |
| D. Operate Machine Oxy-Fuel Cutting Equipment | | | |
| E. Perform Straight Cutting Operations on Plain Carbon Steel | | | |
| F. Perform Bevel Cutting Operations on Plain Carbon Steel | | | |
| III. Metals | 12 | | |
| A. Properties of Metals | | | 7 |
| B. Heat Treatment of Metals | | | 3 |
| IV. Shop Drawing/Blueprints – Review and Enhancement | 20 | | |
| A. Interpret Blueprint Welding Symbol Information | | | |
| B. Interpret Basic Elements of a Drawing or Sketch | | | |
| C. Fabricate Parts From a Drawing or Sketch | | 6 | |
| V. Air Carbon Arc Cutting (CAC-A) | 21 | | |
| A. Perform Safety Inspections of Equipment and Accessories | | | |
| B. Make Minor External Repairs of Equipment and Accessories | | | |
| C. Set Up For Manual Air Carbon Arc Gouging and Cutting Operations on Plain Carbon Steel | | 5 | |
| D. Operate Manual Air Carbon Arc Cutting Equipment | | | 3 |
| E. Perform Metal Removal Operations on | | | |

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|---|------------|------------|---------------|
| Plain Carbon Steel | | | |
| F. Perform Metal Removal Operations on Nonferrous Material | | | |
| VI. Shielded Metal Arc Welding (SMAW) | 101 | | |
| A. Perform Safety Inspections of Equipment and Accessories | | | |
| B. Make Minor External Repairs to Equipment and Accessories | | | |
| C. Set Up and Operations of SMAW on Plain Carbon Steel | | | 2 |
| D. Strike and Maintain an Arc | | | |
| E. Weld Straight Bead Patterns on Plain Carbon Steel | | | 1 |
| F. Weld Weave Bead Patterns on Plain Carbon Steel | | | |
| G. Construct Fillet Welds, All Positions Using E6010 or E6011 and E7018 Electrodes on Plain Carbon Steel | | | |
| H. Construct Groove Welds, All Positions Using E6010 or E6011 and E7018 Electrodes on Plain Carbon Steel | | | |
| I. Perform 2G-3G Limited Thickness Qualification Test on Plain Carbon Steel | | | |
| J. Construct an Outside Corner Weld Using E6010 or E6011 and E7018 in all Positions on Plain Carbon Steel | | | |
| VII. Flux Cored Arc Welding (FCAW, FCAW-G) | 72 | | |
| A. Perform Safety Inspections of Equipment and Accessories | | | |
| B. Make Minor External Repairs of Equipment and Accessories | | | |
| C. Set Up For Flux Cored Arc Welding Operations on Plain Carbon Steel | | 1 | 4 |
| D. Operate Flux Cored Arc Welding Equipment | | 2 | |
| E. Make Fillet Welds, All Positions, on Plain Carbon Steel | | | |
| F. Perform Groove Welds, All Positions, on Plain Carbon Steel | | | |
| VIII. Plasma Arc Cutting/CNC Plasma | 71 | | |
| A. Perform and Demonstrate Safety Inspections of Equipment and Accessories | | | |
| B. Make Minor External Repairs of Equipment and Accessories | | | |

| Unit of Study | Unit Hours | Math Hours | Science Hours |
|--|-------------------|-------------------|----------------------|
| C. Set Up For Manual Plasma Arc Cutting Operations on Plain Carbon Steel, Aluminum and Stainless Steel. | | 1 | 3 |
| D. Perform Shape Cutting Operations on Plain Carbon Steel, Aluminum and Stainless Steel | | 2 | |
| E. Identify consumables and equipment needed for Plasma and CNC plasma operations | | | |
| F. Compare and Contrast the set up and operation of manual Plasma cutting versus CNC plasma cutting operations | | | |
| IX. Welding Inspection and Testing Principles | 42 | | |
| A. Examine Cut Surfaces and Edges of Prepared Base Metal Parts | | | |
| X. Career Planning/Exploration | 63 | | |
| A. Interest and Aptitudes | | | |
| B. Career Planning Key Terms | | | |
| C. Forming the Career Plan | | | |
| D. Career and Financial Management | | 10 | |
| E. Participation in Guidance Counselor Annual Calendar of Events for Career Planning | | | |
| F. State Personal Attributes that an employer looks for in an employee | | | |
| G. Describe job opportunities that exist in the metalworking profession | | | |
| H. Work-Based Learning | | | |
| TOTAL HOURS | 450 | 30.5 | 34 |