**Charles Spencer High School Industrial Education**

**Teacher: Mr. Del Sheehan- B.Ed., M.Ed.**

**Course Outline: Auto Tech- 10 2016/2017**

**85 MINUTE BLOCKS/ QUARTER SYSTEM**

**Introduction:**

* The class will give students an opportunity to receive a minimum of three credits per quarter; some will exceed this depending on motivation and work ethic. The individual modules that will consist of the basic programming will include:

1. MECH 1010- Modes and Mechanisms
2. MECH 1015- Tools and Materials
3. MECH 1040- Engine Fundamentals
4. Additional modules as per student and teacher consultation.

* Students will be instructed in practical and theoretical safe work practices prior to the completion of modules and will demonstrate this in the form of written quizzes, work place hazard identifications, and in-class practical demonstrations of safe work practice, tool use, and understanding of course content.
* Students will/may cover content as per the outlines that follow each prescribed module from Alberta Education-CTS: <http://www.education.alberta.ca/teachers/program/cts/program-of-studies/tmt/>
* **Safety is a primary component of any industrial arts class; transgressions by students of safe work practices may result in removal from a class.**
* **MECH 1010 MODES & MECHANISMS:**

Level: Introductory Prerequisite: None

Description: Students research, design, build and test a model of a transportation vehicle, using a simple power source, common materials and tools.

Parameters: Access to tools and fasteners commonly used in the trade.

Outcomes: The student will:

1. Demonstrate the safe use of tools and follow established laboratory procedures 1.1 demonstrate knowledge of and follow safety rules and guidelines related to the use of basic hand and power tools 1.2 identify the hazards associated with the use of: 1.2.1 compressed gases 1.2.2 liquids under pressure 1.2.3 flammable materials 1.2.4 components under tension.

2. list and describe operating systems and structures common to all modes of transportation 2.1 identify a transportation mode that can be used to move passengers or goods in the following environments: 2.1.1 terrestrial 2.1.2 marine 2.1.3 atmospheric 2.1.4 space 2.2 describe, in a given environment, what forces must be overcome to start and keep a vehicle/craft in motion 2.3 list and describe the function of the following systems: 2.3.1 propulsion 2.3.2 guidance 2.3.3 control 2.3.4 suspension 2.3.5 structural 2.3.6 solar and wind 2.4 describe and demonstrate how energy produces motion using: 2.4.1 gravity 2.4.2 elastic or spring materials under tension 2.4.3 compressed gases 2.4.4 liquids under pressure 2.4.5 electromagnetic combustion structures and materials that are used to support vehicular systems to provide maximum safety and performance

3. Research, design, build and test a concept vehicle 3.1 research, design and construct a vehicle or craft for a predetermined use 3.2 identify an appropriate measurement technique used to assess factors including: 3.2.1 speed 3.2.2 pulling power 3.2.3 payload 3.2.4 efficiency 3.3 describe operation and construction of the transportation vehicle.

4. Demonstrate basic competencies 4.1 demonstrate fundamental skills to: 4.1.1 communicate 4.1.2 manage information 4.1.3 use numbers 4.1.4 think and solve problems 4.2 demonstrate personal management skills to: 4.2.1 demonstrate positive attitudes and behaviors 4.2.2 be responsible 4.2.3 be adaptable 4.2.4 learn continuously 4.2.5 work safely 4.3 demonstrate teamwork skills to: 4.3.1 work with others 4.3.2 participate in projects and tasks.

5. Make personal connections to the cluster content and processes to inform possible pathway choices 5.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences 5.2 create a connection between a personal inventory and occupational choices.

* **MECH 1015- TOOLS & MATERIALS:**

Level: Introductory Prerequisite: None

Description: Students develop knowledge, skills and attitudes in the safe use of specialty hand tools, measuring tools and fasteners. Parameters: Access to tools and fasteners commonly used in the trade.

Outcomes: The student will:

1. Create a health and safety plan with special emphasis on conditions and factors related to the specific pathway or series of courses 1.1 research and identify the following eight common elements of a health and safety management system: 1.1.1 management, leadership and organizational commitment including policies, guidelines and responsibilities 1.1.2 hazard identification and assessment 1.1.3 hazard control 1.1.4 worker competency and training including: technical competence, safe work practices and procedures, personal protective equipment 1.1.5 work site inspection 1.1.6 incident investigation 1.1.7 emergency response 1.1.8 management system administration including: evaluation, records and statistics, maintenance of system 1.2 explain each of the elements reflecting on occupational health and safety implications 1.3 define health and safety elements relevant to the world-of-work 1.4 present a health and safety plan clarifying its relevance to the work world and society in general.

2. Research common processes and methods of hazard identification, assessment and control specific to the pathway or series of courses 2.1 research and identify common job site hazard identification processes 2.2 research and identify common methods for assessment and control of hazards 2.3 explain and demonstrate appropriate health and safety effective practices 2.4 demonstrate a proactive personal commitment toward improvement of workplace health and safety including concern for others and following instructions, rules and guidelines.

3. Identify, describe and demonstrate the safe and correct use of shop procedures and equipment 3.1 demonstrate knowledge of and follow safety rules and guidelines related to the use of specialty hand and measuring tools, as well as shop/laboratory routines 3.2 identify the hazards with the use of: 3.2.1 adhesives 3.2.2 sealers.

4. Identify, describe and demonstrate the safe and correct use of power and specialty hand tools used in the trade 4.1 identify and describe the following common specialty tools: 4.1.1 tube flare kit 4.1.2 tubing cutter 4.1.3 tubing bender 4.1.4 twist drills 4.1.5 reamers 4.1.6 taps and tap handles 4.1.7 dies and diestock 4.1.8 stud extractors 4.1.9 pneumatic tools 4.1.10 drill press 4.1.11 pedestal grinder 4.1.12 vises 4.1.13 hack saws.

5. Identify, describe and demonstrate the safe and correct use of measuring tools used in the trade 5.1 describe and use the following common measuring tools: 5.1.1 steel rule 5.1.2 feeler blades 5.1.3 Vernier, dial and digital slide calipers 5.1.4 micrometer 5.1.5 dial indicator 5.1.6 transfer gauges 5.1.7 Plastigauge™ 5.1.8 torque wrench 5.1.9 pull scale.

6. list and describe fastening devices used in the trade 6.1 identify and describe the following: 6.1.1 threaded fasteners 6.1.2 bolt grades 6.1.3 bolt identification 6.1.4 nuts 6.1.5 washers 6.1.6 torqueing techniques 6.1.7 snap rings and clips 6.1.8 set screws 6.1.9 keys 6.1.10 splines 6.1.11 pins 6.1.12 plastic trim fasteners 6.2 describe the use of: 6.2.1 adhesives 6.2.2 sealers.

7. Demonstrate proper techniques when using fastening devices 7.1 select or modify a plan for a simple product that will meet a defined need 7.2 identify and select the appropriate tools, materials and processes required to make the product 7.3 list the steps that are required to make a product in a safe and logical order 7.4 demonstrate the following tasks: 7.4.1 tap a blind hole 7.4.2 cut threads with a die and diestock 7.4.3 repair threads using thread-restoring inserts 7.4.4 broken fastener removal 7.4.5 convert numbers between decimals and fractions 7.4.6 identify linear measurements in imperial and SI units 7.4.7 identify torque measurements in imperial and SI units .

8. Demonstrate basic competencies 8.1 demonstrate fundamental skills to: 8.1.1 communicate 8.1.2 manage information 8.1.3 use numbers 8.1.4 think and solve problems 8.2 demonstrate personal management skills to: 8.2.1 demonstrate positive attitudes and behaviors 8.2.2 be responsible 8.2.3 be adaptable 8.2.4 learn continuously 8.2.5 work safely 8.3 demonstrate teamwork skills to: 8.3.1 work with others 8.3.2 participate in projects and tasks.

9. Make personal connections to the cluster content and processes to inform possible pathway choices 9.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences 9.2 create a connection between a personal inventory and occupational choices.

* **MECHANICS 1040 ENGINE FUNDAMENTALS:**

Level: Introductory Prerequisite: None

Description: Students investigate and describe operating principles, construction and applications of engines. Parameters: Access to engine measuring tools, related resources and engine units.

Outcomes: The student will:

1. Demonstrate the safe use of tools and follow established laboratory procedures 1.1 demonstrate knowledge of and follow laboratory safety procedures 1.2 describe the hazards associated with: 1.2.1 gasoline and other flammable liquids 1.2.2 exhaust gases 1.2.3 hot coolants and liquids.

2. Compare operating principles of two- and four-cycle piston engines 2.1 identify and use measuring tools in both imperial and metric systems of measurement including: 2.1.1 steel rule 2.1.2 calipers and dividers 2.1.3 micrometer 2.1.4 dial indicator 2.1.5 torque wrench 2.1.6 pressure gauges 2.1.7 other 2.2 identify and use fasteners associated with engines (measurements in both imperial and metric) including: 2.2.1 bolts, studs and nuts 2.2.2 washers 2.2.3 pins 2.2.4 keys 2.2.5 snap rings 2.2.6 machine screws 2.2.7 other 2.3 describe the effects of heating a gas in an enclosed space 2.4 identify the types of fuels commonly used in combustion engines 2.5 describe the difference between an internal and external combustion engine 2.6 identify the type of engines and fuels that are used for air, land, sea and space applications.

3. Determine the condition of an internal combustion engine 3.1 locate and use resources related to: 3.1.1 service bulletins and repair manuals 3.1.2 engine specifications documentation 3.1.3 parts numbers and assembly procedures 3.2 identify and label the major parts of a reciprocating engine 3.3 demonstrate how reciprocating motion is converted to rotary motion 3.4 explain the difference between a two- and a four-stroke cycle 3.5 explain the purpose of the following support systems: 3.5.1 cooling 3.5.2 lubrication 3.5.3 ignition 3.5.4 fuel 3.5.5 exhaust 3.6 demonstrate how engines differ according to their: 3.6.1 number of cylinders 3.6.2 design 3.6.3 size 3.6.4 make and model 3.6.5 other 3.7 appraise the condition of an engine.

4. Describe the by-products of combustion and their impact on the environment 4.1 describe the by-products of combustion and their effects on personal health and the environment.

5. Demonstrate basic competencies 5.1 demonstrate fundamental skills to: 5.1.1 communicate 5.1.2 manage information 5.1.3 use numbers 5.1.4 think and solve problems 5.2 demonstrate personal management skills to: 5.2.1 demonstrate positive attitudes and behaviors 5.2.2 be responsible 5.2.3 be adaptable 5.2.4 learn continuously 5.2.5 work safely 5.3 demonstrate teamwork skills to: 5.3.1 work with others 5.3.2 participate in projects and tasks.

6. Make personal connections to the cluster content and processes to inform possible pathway choices 6.1 complete/update a personal inventory; e.g., interests, values, beliefs, resources, prior learning and experiences 6.2 create a connection between a personal inventory and occupational choices.

**Student Evaluation:**

Assignments, Quizzes and Tests………………….. 20%

Safety ……………….………………………………………… 20%

Skill Application…………………………………………… 30%

Major Project……………………………………………… 30%

Major project, in my understanding, is an opportunity for a student to display skills acquired in a holistic, personally meaningful, and academically challenging manner. It will be open-ended in nature, design, and the assessment is as much CONVERSATION in nature between student and teacher that will be translated into a % based on things like degree of difficulty, innovation, quality of workmanship, and practical and theoretical application of curriculum, teacher critique, and student reflection regarding the process and finished project.

The CTF assessment below is the Gr.5-8 assessment for industrial arts; this information is provided to help understand the progression of assessment from junior high to high school level structures.



