Board/Authority Authorised Course
Mechanical Trades Sampler - Automotive

School District/Independent School Authority Name	Kamloops/Thompson
School District/Independent School Authority Number	#73
Developed by	Allen Kotani
Date Developed	December 2013
School Name	NorKam Secondary School
Principal's Name (District)	Sheryl Lindquist
Superintendent Approval Date (for School Districts only)	
Superintendent Signature (for School Districts only)	
Board/Authority Approval Date	
Board/Authority Chair Signature	
Course Name	Mechanical Trades Sampler - Automotive
Grade Level of Course	12
Number of Course Credits	4
Number of Hours of Instruction	120
Prerequisite(s)	Completion of Grade 10 as well as successful application process.

Synopsis

This course has been developed to offer students the opportunity to gain theoretical and practical experience, examining four different mechanical trades. This mechanical sampler and initiative, set forth by The Ministry of Jobs, Tourism, and Skills Training, Ministry of Education, School District #73, and Thompson Rivers University (TRU) will explore four career paths; Automotive Service Technician, Heavy

Duty Technician-Commercial Transport Technician, Motorcycle Technician, and Welding Trade. The Industry Training Authority (ITA) and Ministry of Education Instructional Resource Package have been used as guidelines for the content covered within this sampler.

Rationale

This course is intended to introduce students to specific trades training in the area of Automotive Service Technician (AST). This will provide students with an overview of the Foundations (AST) program.

This program will explore;

- Introduction of safe work practices employed in a mechanical/instructional facility
- Overview of the practices, skill sets needed for the mechanical trade
- Theory and practical applications within mechanical trades
- Direct exposure to Foundation Training content, post-secondary and job ready expectations. Therefore, providing students with the ability to make informed choices regarding the direction they choose to embark during Senior Secondary School and/or thereafter.

Unit/Topic	Title	Time
Unit 1	Safety	10 hours
Unit 2	Fasteners/Tools/Equipment	10 hours
Unit 3	Wheels-Tires/Brakes	20 hours
Unit 4	Steering/Suspension/Align	20 hours
Unit 5	Engine Management	20 hours
Unit 6	Support Systems	40 hours
	Total Hours	120

Unit 1 - Safety

Objective: Safe worksite practices are of the utmost importance. Students need to be aware of safety-oriented rules and regulations, and be able to perform all industry tasks in a safe and responsible manner.

Prescribed Learning Outcomes

Students will acquire skills related to identification and use of:

- WCB Regulation
- WorkSafeBC
- Workplace Hazardous Materials Information System (WHMIS)

- Fire Safety and Prevention
- Hoisting, jacking, supporting, slinging
- Personal safety

Unit 2 – Fasteners/Tools/Equipment

Objective: Trades and technology fields have a very strong practical component. Tools are used regularly and must be used properly, from basic hand tools to precision-measuring instruments.

Prescribed Learning Outcomes

Students will acquire skills related to identification and use of:

1. Fasteners
    - Types of fasteners.
2. Tools
    - Hand
    - Electric
    - Portable power
    - Pneumatic
    - Hydraulic
    - Precision-measuring mathematical calculations
    - Engine management
3. Equipment
    - Lifting
    - Supporting
    - Cutting/welding
    - Tire mounting
    - Tire balancing
    - Alignment
    - Air conditioning

Unit 3 – Wheels-Tires/Brakes

Prescribed Learning Outcomes

Students will acquire skills related to identification and use of:

1. Wheels and Tires
    - Bearings
    - Hubs
    - Wheels
    - Tires
    - Tire-changing equipment
    - Tire-balancing equipment
    - Tire-pressure monitoring system (TPMS)

2. Brakes
    - Hydraulic systems
    - Disc brake systems
    - Drum brake systems
    - Anti-locking braking systems (ABS)

Unit 4 – Steering/Suspension/Alignment

Prescribed Learning Outcomes

Students will acquire skills related to identification and use of:

1. Steering
    - Steering gears
    - Steering linkage
    - Steering components
    - Power steering
2. Suspension
    - Suspension geometry
    - Suspension components
    - Suspension systems
    - Electronic suspension
3. Wheel Alignment
    - Alignment machine
    - Alignment angles
    - Alignment adjustment

Unit 5 – Engine Management

Prescribed Learning Outcomes

Students will acquire skills related to identification and use of:

1. Fuel injection
    - Theory of operation.
    - Technical service information
    - Tune up.
    - Scan tools/test equipment
2. Ignition Systems
    - Theory of operation
    - Technical service information
    - Tune up
    - Scan tools/test equipment

Unit 6 – Support Systems

Prescribed Learning Outcomes

Students will acquire skills related to identification and use of:

1. Changing/starting systems
    - 12 volt batteries
    - Charging systems
    - Starting systems
2. Cooling systems
    - Principles of heat transfer
    - Cooling systems
    - Cooling system components
3. Lubrication systems
    - Lubrication systems
    - Lubrication system components
4. Air conditioning
    - Air conditioning systems
5. Electrical
    - Principles of electronics
    - Common electrical and electronic components
    - Electrical diagrams
    - Multimeters/test equipment

Instructional Component

- Direct instruction
- Indirect instruction
- Interactive (peer) instruction
- Independent instruction
- Modeling
- Practical creativity
- Brainstorming
- Group work
- Analysis of own and classmates' project work
- Project-based learning

Assessment Component

- Daily quizzes
- Unit quizzes
- Demonstration of skills related to practical activities

Eighty per cent (80%) of the grade will be based on safety tests and project evaluations throughout the course. This portion of the grade will reflect the students' most consistent level of achievement throughout the course, although special consideration will be given to the more recent evidence of achievement.

Twenty per cent (20%) of the grade will be based on student research, documentation, reflection, and demonstration of proper employability skills (proper industrial work habits ranging from the safe use of equipment to good "Housekeeping" techniques.

Learning Resource

- Teacher handouts
- Guest speakers from the community in related fields
- Visit/interview local trades people in related fields
- ILMs

Facility Requirements

Classroom Area

- Comfortable seating and tables for training, teaching, lecturing.
- Compliance with all Local and National Fire Code and occupational safety requirements.
- Lighting controls to allow easy visibility of projection screen allowing students to take notes.
- Windows must have shades or blinds to adjust sunlight
- Heating/air conditioning for comfort all year round.
- In-room temperature regulation and ventilation to ensure comfortable room temperature.
- Acoustics in the room must allow the instructor to be heard.
- White marking board with pens and eraser (optional: flipchart in similar size).
- Projection screen or projection area at front of classroom.
- Overhead projector and/or multimedia projector.

Shop Area

- Ceiling shall be a minimum height of 15' 6" or as varied by good engineering practices and codes.
- Appropriate lifting devices (hoists) used in industry.
- Suitable demonstration area.
- Lighting appropriate for good vision in ambient light.
- Compliance with all Local and National Fire Code and occupational safety requirements.
- Must meet Municipal and Provincial bylaws in regard to waste water management and environmental laws.
- Approved ventilation systems.

Reference Materials

Alberta Apprenticeship Resource Package, Crown Publications
Automotive Technology, James D. Halderman
Industry Training Authority (ITA), www.itabc.ca
Ministry of Education, Instructional Resource Package (IRP), www.bced.gov.bc.ca
WorkSafeBC, Workers' Compensation Board of BC (WCB), www.worksafebc.com
Workplace Hazardous Materials Information System (WHMIS), www.hc-sc.gc.ca
CDX Automotive, Jones & Bartlett Learning, www.cdxauto.com