SYLLABUS
DIESEL TECHNOLOGY
DT121 THRU DT223 (Clustered)

16 Credits
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COURSE DESCRIPTIONS

DT 121, 122, 123, 221, 222, 223, 16 credits *Prerequisite: Instructor permission*. 8 lecture hours, 16 lab hours. Vocational program course. May be used as a general elective in the AA degree.

DT 121, Introduction to Diesel Technology: A lecture-lab course to provide an introduction to safe shop work practices, work ethics, basic tool use, and introduction to basic mechanical tasks.

DT 122, Intermediate Diesel Technology: A lecture-lab course to build upon skills learned in DT 121. The course promotes work habits and safe work practices. Training increases skills and expands tasks learned in DT 121. Projects are completed to industry standards.

DT 123, Advanced Diesel Technology: A lecture-lab course to build upon skills learned in DT122. This course continues to promote safe work habits and safety are emphasized. Advanced Diesel Technology projects are completed to industry standards.

DT 221, Individual projects: A lecture-lab course to build upon skills learned in DT 121 thru DT 123. Individual projects are assigned that will challenge the student and expand upon the skills learned in DT 121 thru DT 123 and introduces diagnostic and problem solving to the student. Individual Projects are completed to industry standards.

DT 222, Advanced Individual Projects: A lecture-lab course to build upon skills learned in DT 121 thru DT 221. This course will see Advanced Individual Projects assigned to students that will emphasize diagnostic and problem solving by the student and will replicate, as close as possible, real world shop conditions for the student to work in.

DT 223, Certification and Testing: A lecture-lab course to build upon and confirm the diesel mechanics skills learned in DT 121 through DT 222. Course covers selected industry certification test requirements, procedures, and standards. Course includes a written and performance capstone exam to ensure retention of competency in previous Diesel Technology program course topics.

Students Learn by doing, not by listening. *Rod McDonald, Welding, 2 February 2005*

LEARNING OUTCOMES / COURSE OBJECTIVES

DT 121, 122, 123, 221, 222, 223
To meet the course standards and demonstrate the ability to meet the outcomes expectation of these courses (A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use), the student will:

Demonstrate personal responsibility necessary for success in the workplace. (D)
Demonstrate ability to comply with organizational rules and policies. (D)
Demonstrate safe work habits and safety awareness. (A, C, D)
Access technical data from manufacturer's reference publications and charts. (A, B, E)
Troubleshoot and fix tools and equipment that require minor repair or adjustment. (A, C)
Safely operate equipment common to the Diesel field. (A, C, E)
Demonstrate the ability to successfully complete assigned tasks. (A,B,C,D,E)
Measure accurately with a tape, scale, and various micrometers. (A, B, C, E)

DT 121

Students will be introduced to safe shop work practices, work ethics, basic tool use, and introduction to basic mechanical tasks. (A)
Course standards: A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use.

DT 122
Students will complete medium difficulty mechanical projects. (A)
Course standards: A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use.

DT 123
Students will complete medium to difficult mechanical projects. (A)
Course standards: A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use.

DT 221

This course provides an opportunity for practical shop application of students' knowledge and skills acquired by completion DT 121, 122, and 123. Students are introduced to simulated shop operations for the repair and maintenance of vehicles. Students are also introduced to the use of specialized equipment, tools, and machines used by the diesel mechanic in the modern shop. (A)

Course standards: A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use.

DT 222

This course is a continuation of the practical shop skills acquired in DT 221. Extensive practical applications of all aspects of diesel equipment repair are addressed in this course. The use of specialized equipment, tools, machines and techniques is emphasized. (A)

Course standards: A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use.

DT 223

Students will work to industry standards on all assigned projects. (A)
Students will demonstrate self direction and motivational skills. (A)
Students will demonstrate the abilities to diagnose and resolve a variety of mechanical problems. (A)
Demonstrate mastery and retention of skills and knowledge from DT 121 through DT-222. (A)
Course standards: A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use.

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COURSE ORGANIZATION AND CONTENT

DT 121
Introduction, orientation, and general safety
Brake System Inspection, servicing, relining, air brake chamber inspection and replacement
Greasing and Servicing, Oil Changing, Air and Fuel Filter maintenance
Tire Inspection, inflation and rotation
Cooling system maintenance, hose and belt inspection, replacement and adjustment
Clutch adjustment
Front end alignment and adjustment
Drive line servicing and inspection
Transmission servicing and inspection
Inspect and service electrical components and wiring, wire connector for trailer plug
Test Batteries

DT 122
Introduction, orientation, and general safety
Brake overhaul, including wheel bearing servicing, replacement and adjustment
Suspension system inspection
Engine tune-up, including adjusting valves and injectors
Front axle King Pin and Spring replacement
Drive line and U-Joint replacement
Disassemble, inspect and assemble light and medium duty transmissions
Test starter and charging circuits
Test for voltage drops in electrical circuits
Test cooling system for leaks, head gasket failure, R & R radiator
Test clutch fan and Thermostat for proper operation

DT 123
Introduction, orientation, and general safety
Air brake system operational checks and component inspection and replacement
Suspension system component replacement, set ride height
Inspect and repair 5^{th} wheel
Test Power steering for pressure and flow
Engine Head gasket replacement
Engine bearing replacement
Disassemble, inspect and assemble Medium and heavy duty transmissions
Repair faulty alternators and starters

DT 221
Introduction, orientation, and general safety
R & R Heavy duty engine Clutch
R & R Differential
Replace Engine Cam shaft
Replace engine mounts
Diagnose and repair engine fuel problems on mechanically injected engines

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Check engine faults with Scan tool, diagnose engine problems

DT 222
Introduction, orientation, and general safety
In frame overhaul of diesel engine
Diagnose and repair electronic engine problems
Rebuild twin countershaft transmission
Overhaul differential

DT 223
Introduction, orientation, and general safety
Capstone written review
Performance testing on assigned tasks and repairs
Certification test practice and review

TEXTBOOKS
See bookstore or the instructor for the current book(s) required for this course. You are to bring the required book(s) to class with you each day. Not having the book(s) in your possession will result in your being sent home for the day.

OTHER INSTRUCTIONAL MATERIALS
You will need the tools required for the course available each day. Hand tools on the required tool list are not available in the shop tool room. Using other student's tools is unacceptable. If you do not have your own tools present, you will be sent home for the day. See tool list.

INSTRUCTIONAL TECHNIQUE
All courses are taught for 4 hours daily, plus 1 - 15 minute break. The methods of instruction are lecture, discussion, classroom exercises, written homework, demonstrations, and lab work. Lab work is emphasized with one-on-one instruction when possible.

PROJECTS
Personal projects that are not part of the curriculum will not be done. If you have earned an "A TEAM" hat, you may ask either Dave or me for permission to work on your vehicle and the work you wish to do will be evaluated on a case-by-case basis. No "A TEAM" hat, the answer is always going to be no.

DISABILITIES
If you have a documented disability that may interfere with your ability to fully participate in this class, you may be eligible for accommodations. Contact your instructor or the Disability Support Services located on campus in Student Services (HUB), room 119. Information regarding a disability will be kept confidential.

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WORK HABITS

Attendance, punctuality, and other appropriate work habits are critically important for success on the job. The standards of this course reflect what industry demands. You are expected to be here everyday, on time, clean, fed, wide awake, neatly completed homework ready for turn in, and thinking about diesel mechanics and your task for the day. When class starts, participate. Keep safety first. Treat the tools and equipment well. Be conscientious of other students. Make productive use of the time available. Clean up after yourself. Feel good about yourself, your work, and your progress.

Productive use of time is essential – the Diesel Technology Assignment Lists (see Syllabus for the course you are enrolled in) are designed to require effective time management for successful completion. Just like on the job, you can expect to have to work on two or more assignments concurrently to avoid unnecessary and costly delays waiting on parts or shared equipment.

The main goal of this program is to build technical and workplace skill, not self-esteem. The quantity and skill requirements of the assignments, and the enforcement of high work habits standards, are intended to keep you working slightly ahead of your comfort zone – so keep a good attitude. If you are doing well in the program, you are accomplishing something you can be proud of!

HOME WORK

In order to receive credit, written assignments will be word processed, 14 lines minimum, double spaced, 12 font, with 1" margins. All assignments must be completed entirely to receive credit. In case of an absence, it is your responsibility to find out what homework assignments were given. All homework that is/was required of the rest of the class will also be due from you the day you return. Now would be a good time to get a few phone numbers of some of the other members of the class. (Don't call me.)

LETTERS OF RECOMMENDATION / ACADEMIC PROGRESS

Letters of recommendation will only be provided (if requested) to students who earn "A's" in their core diesel courses. Please be aware that the degree and all certificates in Diesel Technology require at least a 2.0 grade point average both in core courses and overall.

ATTENDANCE POLICY

Attendance is graded. You are expected to be present every day for the entire two year program. Lost points cannot be made up. There are no "excused" absences. If you are involved in a sport that requires you to be absent anytime during the quarter, these days will be counted as absences. It will be up to you to determine your priorities. If a problem arises that will cause you to miss enough class to fail the course, see admissions to request an official withdrawal.

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INCLEMENT WEATHER

The college President may cancel early morning classes, or delay the opening of the college due to weather conditions. If main campus classes start or resume during the time period (i.e. 10:00) Diesel classes are normally in session, our classes will start at that same time (i.e. 10:00).

CONTINUOUS ENROLLMENT

Once you enroll in a core disciplinary course, continuous enrollment must be maintained to retain priority for reenrollment. If you take a quarter off (fall, winter, or spring), you will not automatically have a spot held for you in the program. If you are going to take a quarter or more off and you intend to return, you must get yourself placed on the program waiting list for reentry once a spot again becomes available.

SATISFACTORY PROGRESS

You must maintain satisfactory progress to retain priority and remain eligible for reenrollment. If you do not maintain satisfactory progress, you will be dropped from the program. If you are dropped and wish to return, you must get yourself placed on the program waiting list for reentry. Keep in mind that you can't be placed back on the waiting list if you are on Low Scholarship Status (see definition in college catalogue).

You will be dropped from the program for the following reasons:

Any occurrence of an "F" or "V" grade in a core disciplinary course due to or combined with vanishing from the program

2 consecutive occurrences of a grade less than a "C", including "W's", in a core disciplinary course or courses

3 occurrences of a grade less than a "C", including "W's", in a core disciplinary course or courses

Any subsequent occurrence of a grade less than a "C", including "W's", in a core disciplinary course, upon reentry of program after having been dropped for less than satisfactory progress

Additionally, if a grade of "C" or better is not earned in a core disciplinary course, it must be repeated and a "C" or better earned before enrollment in the next course in the program sequence will be allowed.

METHOD OF EVALUATION

To earn any letter grade below in DT 121-222, you must accomplish ***BOTH*** of the minimum requirements listed directly below each letter. For example a "B" would require at least 90% for work habits ***AND*** at least 80% for shop assignments. **When different, Work Habits and Shop Assignment grades are not averaged. The lower of the two grades earned for work habits and shop assignments is the overall grade earned**.

If you are awarded and accept a local scholarship, you must attend the scholarship award ceremony in the spring and attend any other "get-to-gethers" the sponsor or the college may have to qualify for an "A" or "B" grade in the quarter that the ceremony is held. Expect to receive the grade you earn for yourself. Plus and minus grades will not be used. The minimum requirements are listed for whole grades. Final grade computed will automatically be lowered by one full letter if you are absent or do not participate full on the last class day of each quarter (shop clean-up day).

DT 121-222	MINIMUM REQUIREMENTS FOR GRADE OF:			
	A	**B**	**C**	**D**
Work habits points	94%	90%	85%	80%
Shop assignments	90%	80%	70%	60%

DT 223	MINIMUM REQUIREMENTS FOR GRADE OF:			
	A	**B**	**C**	**D**
Work habits points	94%	90%	85%	80%

To receive any passing grade in DT 223 you must pass part "A" (written) of the capstone examination with a score of 90% or higher, and pass parts "B", "C", and "D" (performance tasks) of the capstone examination with a score of 100%. A score of at least 95% on Part "A" of the capstone exam is required to receive an "A" this quarter. You must also complete any assignments not completed in your first 5 quarters.

Finally, regardless of the quarter you actually complete the Diesel Technology program, to qualify for a "B" or "A", you must agree to participate in the June graduation ceremony provided you are still residing in Grays Harbor or Pacific Counties at that time.

Quarter: _____ Year: ____ NAME: _____

WORK HABITS POINT SHEET

Circle present week: 1 2 3 4 5 6 7 8 9 10 11 12

5 points are possible per day. Deduct 2 points for not having a ruler, light, or pencil, 3 points for arriving late, leaving early, or not turning in completed homework at the time it is collected. 5 points will be deducted (for you) if you are sent home, **inaccurately record your points for the day**, or take an unauthorized break. If you are absent you must turn in the homework that was assigned to get credit for that day (see "homework" above for clarification). Points cannot be made up.

	Points earned	Explanation if less than 5 points
Mon		
Tue		
Wed		
Thu		
Fri		

Total points earned as of last week: _____
(Enter on Monday)

Points earned this week: + _____
(Enter on Friday)

Total points earned to date: = _____ Total points possible _____
(Enter on Friday) (Enter on Monday)
Total points earned to date divided by total points possible = _____%
Current work habits grade (Enter on Friday): _____

	A	**B**	**C**	**D**
Work habits points	94%	90%	85%	80%
Shop assignments (see task list)	90%	80%	70%	60%

DIESEL SHOP SAFETY RULES

1. Safety Glasses will be worn in the shop at all times. **THIS MEANS YOU!** Entering the shop without safety glasses will result in your being removed from the class for the day. Keeping your safety glasses in your tool box will not work; you have to have them on to enter the shop. Any guests or family members will also have to have safety glasses if they enter the shop. If they are your guests, it is **YOUR** responsibility to assure compliance. If your guests do not have safety glasses on, they will be asked to leave. Remember, it is your responsibility. **This is not an option, it is a requirement.**
2. Shoes sufficient to protect feet from dropped tools or parts will be worn when in the shop. A good quality leather boot is best. It is highly recommended that they be steel toed. Shoes such as tennis shoes or bedroom slippers do not provide sufficient protection and will not be worn in the shop. If you are in the shop with inadequate foot protection, you will be sent home for the day.
3. Each student must have two pairs of coveralls and wear them when in the shop. They do not have to be new, but must be in good repair so as not to cause a safety hazard. They will be washed when soiled. If you do not know how to run the washing machine, ask. You will be given instruction.
4. Personal belongings will be stored in your locker, not the shop, tool room, or the classroom. No personal belongings other than tools will be stored in the shop over breaks without prior approval. If you leave it on the desks or on the shop tables, I will put it in the trash.
5. Class begins when the horn sounds at the assigned time. 7:30 means 7:30, not 7:35. Breaks are when signaled at 9:30 for 15 minutes. Anything other than working, smoking, standing around, talking on a phone, etc. is a break and if it is not break time, your work habits sheet will be charged points. If you are not in the classroom ready or back on task in the shop when the second tone sounds, your work habits sheet will be charged points. The horn is the official time clock for this course. Set your watch by it if you wish. Being in the building is not sufficient to avoid a late penalty. I expect you to have already used the restroom, retrieved your personal items from your locker and that you have pencil and paper and any other supplies present.
6. Homework will not be done in or around the 1800 building before class.
7. Turn off your cell phone or leave it in your locker. It is extremely rude to allow it to ring and disturb the rest of the class.
8. If you can not keep your eyes open during class, do one of the following:
   a. Stand up and quietly go to the rear of the classroom and remain standing
   b. Quietly gather your things and leave the classroom and shop
   c. If it has been awhile since a break, ask if we can take one

   If you put your head down on the table, I will send you home for the day. Come back when you are rested.
9. Class instructional period ends at 11:30 daily at which time cleanup starts and continues until I either tell you to go to the classroom for the paperwork or the time becomes 45 minutes past the hour. Going to the classroom before either of these will forfeit your cleanup point for the day. There is always something more to do. Look around. It is your shop. Leave it cleaner than it was when you came this morning. Refer to **CLEAN UP PROCEEDURE** sheet for more information.
10. Students leaving the shop area before the end of the class period for any reason must notify the instructor. First offence you will sacrifice all points for the day. Second offense will result in more severe disciplinary action up to and including suspension from the class.

11 No repair projects are to leave the shop without instructor permission. This includes your vehicle if it is brought inside of the fenced yard. Violation of this rule will result in suspension from the class for the day and forfeiting of all points for the day. A second offense will result in more severe disciplinary action up to and including suspension from the class.

12 **No motorized vehicle larger than a Pick Up is to be moved or driven in the shop or bull pin areas without the express permission of the instructor. This includes all motorized vehicles. Trucks, Crawler Tractors, Forklifts, and etc. Violation of this rule may result in immediate expulsion from the class.**

13 The keys for any vehicle in the shop area will remain in the ignition of the vehicle at all times unless the keys are removed for safety reasons. Keys removed from the ignition will be given to the instructor. Do not put them in your pocket or tool box for any reason. If it is your vehicle, you should be aware that violation of this rule will prevent you from working on your vehicle in the shop or bull pin area in the future. If the vehicle keys can not be readily located and the vehicle is interfering with the instructional program, it will be moved by the instructor. Damage may occur. **Grays Harbor College will not be responsible for any damage caused moving a vehicle that has had the ignition key removed and whose key was not presented to the instructor. If you are not comfortable with this rule, DO NOT ask to bring your vehicle into the shop or bull pin areas.**

14 Keys for any equipment or vehicle parked in the bull pin area will be given to the instructor at the end of their use or the conclusion of the class period.

15 No vehicles or equipment assigned to this shop are to be left parked outside of the shop or bull pin areas. When parking the vehicle or equipment, lower all raised equipment, place the transmission in park or neutral, and apply the parking brake. Return the key to the instructor.

16 Student cars will not be parked in the front parking lot, bullpen area, shop, at the north end of the building, or any other area that is not designated for student parking unless **instructor permission has been obtain first**. This is the only warning you will get. I will simply call parking enforcement and have your vehicle ticketed. If the vehicle is parked in a marked handicap area, the ticket will probably be written by the Aberdeen police.

17 Access to exit doors, fire doors, and fire extinguishers shall not be blocked or obstructed in any way.

18 Doors to the tool rooms and storage cabinets will be closed at the end of the class period.

19 All tools, oil cans, shop manuals, etc. must be returned to their proper storage place after use. When you are done with it or class ends, put it up! Someone else may want to use it.

20 All tools must be cleaned before putting them away.

21 Students must have the required text book and tools sufficient to do current projects in the shop present each day.

22 When oil or grease is spilled onto the floor, it must be cleaned up right away. Do not wait until the end of the class period. Clean floor when moving equipment.

23 **DO NOT** track oil and grease around the shop. **YOU** will just have a bigger mess to clean up.

24 **Do not put greasy hand prints on the walls.** You will just have to clean them off. Be careful around the phone, you do not have to hold the wall up to talk on the phone.

25 The phone is primarily for the use of the instructor. You should plan not to receive phone calls during class unless they are of an emergency nature. You may make calls on the phone during breaks. Please try to keep them short as someone else may wish to use the phone. You need to dial 9 to get an outside line. No long distance is permitted, however you can dial "800" numbers. If you need to make long distance calls, get a prepaid phone card. The phone number to use is 360.538.4184. It rings on my desk, in the shop, and if not answered goes to voice mail. My phone (the one in my office) is for my use only.

26 No food in the shop. Food and drinks are OK in the classroom, but no food during classroom instruction. Put your empty food containers in the trash can. Do not leave your empty pop cans around the shop or classroom. Put them in the trash cans or take them with you if you want the pop machine to stay.

27 If you want to drink coffee, you will have to bring it or get together with others in the class and have a community pot. If you have a community pot, you must keep it and the area around it clean. **If it becomes a mess, I will put it in the dumpster.**

28 **Smoking in the building is prohibited by state law.** You can smoke outside of and behind the building (on the wash rack or bull pen area). **No Smoking in front of the building by the front door.** Do not throw your "butts" on the ground as you will just have to pick them up later. No chewing during class period, only during breaks. If you can not go for the class period without a "chew", see me for help. **If you chew, you will not spit!** Not on the floor, in the garbage cans, in jugs or cups, or on the concrete anywhere around this building.

29 **Possession of illegal drugs or liquor is strictly forbidden.** I will call the cops, no second chance.

30 **NO** firearms, even if they are in pieces. This is law.

31 My office and the Mezzanine area are off limits.

32 No tools or property belonging to Grays Harbor College or the State of Washington will be removed from the area without written permission.

33 Your co-operation in the prevention of theft and vandalism is requested. The tool you may need for the next project will do you no good if it has been stolen or vandalized. If you break or damage a tool, please tell me so that I can get a new one.

34 In addition to safety glasses, additional protective devices will be worn when appropriate. Devices such as ear plugs and face shields are available and will be worn when designated by the instructor or it is appropriate.

35 Observe safety practices when lifting heavy objects. A lot of money has been spent to install cranes in this area. Use them when needed. If the object is over 35 pounds, you need help.

36 Do not leave creepers lying on the floor. Pick them up as you stand up and put them away when finished with them.

37 Approved jack stands or blocking of sufficient capacity to support the equipment being worked on will be placed under raise objects before work is started or you go under the object for any reason. I don't care if you are on top, if it is unsupported you will support it before commencing work. Test your supports by shaking the equipment while standing clear.

38 No radios or other noise making devices. Don't even ask.

39 **Do not leave personal items in the shop unless instructor permission has been obtained first.**

40 No one is to operate the crane without passing the operation and safety test.'

41 Report any injury to the instructor immediately.

42 No butane or plastic lighters on your person while in the shop or bull pen area.

43 Any project (oil change, work on your car, etc) must be approved by the instructor **BEFORE** commencing work. No project will be started that can not be completed in one day and within a designated time frame.

44 Do not operate machinery that you are not familiar with. If you have not received a block of instruction on its use or operated it before, ask for directions from the instructor. Do not assume you know how to use it.

45 Report any broken or out of adjustment machinery to the instructor immediately.

46 No chairs or stools in the shop. No sitting on benches or anything else during shop presentations.

47 **No horseplay of any kind. You will be sent home for the day and a second offense will result in ejection from the course.**

DIESEL TECHNOLOGY TOOL LIST

This required list of tools and supplies will be needed to complete the Diesel Technology program. You may purchase additional tools of your own choice, after consulting your instructor for advice or questions. Please consult your instructor for information on tool types, equivalents, area suppliers, and special on-going programs for students through local suppliers that will save you money on tool purchases.

Tools made in the USA are recommended. Tools of any reasonable quality are satisfactory. Ask tool suppliers about their warranty. It is **strongly** suggested to stay away from any import tools or tools sold by mail order. These tools should be readily replaceable.

Item #	Description
1	Standard Combination wrench set: 3/8" - 1-1/8",
2	METRIC Combination wrench set: 8MM thru 19, include 15mm
3	Standard socket set - 1/2" drive: 7/16" - 1-1/4" (6 or 12 point), drive ratchet, breaker bar, universal joint, 3 extensions (approx. 3", 6", and 10" long), speed handle,
4	Standard socket set - 3/8" drive: 3/8" - 13/16" (6 or 12 point, , deep sockets 3/8" - 3/4", including drive ratchet, universal joint, drive handle, and 3 extensions (approx. 3", 6", and 10" long)
5	Metric sockets 8MM thru 19MM, 3/8 drive
6	Flex sockets 7/16" - 3/4", 3/8 drive
7	Torex drivers T-15 thru T-55, 1/4 or 3/8 drive
8	Standard socket set - 1/4" drive: 3/16" - 1/2" (6 or 12 point - 1/4" socket should be 12 point), , drive ratchet, universal joint, drive handle, and 2 extensions (approx. 2" and 4" long)
9	Metric sockets 5MM to app 10MM, 1/4 drive
10	Spark plug socket, 3/8" drive, 5/8" and 13/16"
11	Crescent style wrench (approx. 6" and 12")
12	Small Allen wrench set (up to approx. 3/8")
13	Small Metric Allen wrench set
14	Feeler gauge set (approx. 25 blades)
15	Gasket scraper or putty knife
16	Straight tip screwdriver set (approx. 6 pieces including Stubby)
17	Phillips tip screwdriver set (approx. 6 pieces including Stubby)
18	Punch and chisel set (approx. 12 pieces including center punch)
19	Snap ring pliers, internal and external
20	Diagonal cutting pliers (approx. 7")
21	Needle nose pliers (approx. 6")
22	Adjustable joint pliers (approx. 10")
23	2 pair standard pliers (approx. 6" and 8")
24	2 pair vise grip style pliers (approx. 7-1/2" and 10")
25	Plastic tip hammer (approx. 12 oz.)
26	Ball peen hammer (approx. 16 oz.)
27	Rolling head pry bar (approx. 18")
28	Aligning pry bar (approx. 18")
29	Steel tape measure (approx. 10')
30	Telescoping magnet,
31	Telescoping mirror (rectangular if available)
32	Flashlight, standard size
33	Heavy duty “Brake Spring Pliers”
34	Machinist file (approx. 10"-14"), File card, and Wire brush
35	4 piece “O” ring pick set
36	Ear Protection (ear plugs, ear muffs, etc.)

Item #	Description
37	Tool box capable of holding all tools (lockable)
38	6" pocket ruler
39	2 pair of Safety goggles or safety glasses
40	2 pair of coveralls in serviceable condition (NO large holes, tears, or frayed cuffs)
41	Hat or hair net (baseball type, only needed if your hair hangs lower than your collar)
42	Electrical test light (continuity tester)
43	DVOM multimeter capable of testing low voltage circuits and resistance with a temperature probe (a quality DVOM is approximately $100)
44	Brass drift (approx. 10" long by 3/4" diameter)
45	Steel toe boots or heavy work boots providing protection for your feet and toes
46	2 padlocks (one for your locker and one for your tool box)
47	Torque Angle Gauge, OTC 4554 or equivalent
48	Dial Indicator, Magnetic Base (Empire 27088 sold by Sears or equivalent)
49	Dial Indicator Gauge (Empire 2788 sold by Sears of equivalent)
50	Approximately 10 – 25 red shop rags