Why Build an Electrathon?

The areas of knowledge and skills that encompassed by the design, construction and operation of an Electrathon car are wide-ranging. Consider some of the things that you will learn about:

Electronics, Electricity and Electromechanics

The vehicle runs on electricity. It needs to be instrumented which may mean separate gauges or a PLC. Power needs to be controlled with a microprocessor or PLC to keep the motor at the desired speed. Current has to channeled where it is desired, with proper sizing of wiring, fuses and other components. Laws and equations regarding electricity and electric motors need to be learned, understood and applied.

Physics

Let's start with Power=Volts x Amps= Force x Velocity. Need Torque? Got efficiency? The laws of physics apply here. How fast do you want to go? How much power will you need? Physics will help you figure it out.

Chemistry

Isn't there some way to squeeze more electricity out of those batteries? Sure there is. But you need to understand how a battery stores chemical energy and releases it as electrical energy. How can the chemistry of the lead-acid battery be used to store more energy?

Machine Design

How will you get the power from the battery to the motor to the wheel(s)? Ingenuity, perserverance, and undoubtedly the use of some simple machines. AutoCad drawings and simple machine design are the building blocks of getting work done.

Planning , Organization and Project Management

Think a working, powered vehicle will just assemble itself out of thin air? Not a chance. You need a plan. You need to organize your team and your time so things happen, and happen when you need them to happen. You need the components, the parts, the AutoCad drawings , a place to work, a place to test, and time - lots of time. To make all that come together logistically, you need Project Management Software with timelines and Gantt Charts to pull it all together.

Construction and Assembly Techniques

Can you build something from AutoCad drawings? Can you use a Drill press, welder and hand tools? You might even see a CNC machine in action. Did you ever wonder why are things built the way they are? Usually to reduce cost and increase reliability. What works, and what doesn't? The opportunity to physically put something together. Learn to use your hands for something other than driving a keyboard or pushing a pen. Lego and model kits are popular because it is fun to make things.

Budgeting

You may need to raise funds to support this project. You certainly have to know how much you have to spend. No point in building the best Electrathon car in the world if you can't afford batteries or a motor for it. It's a pretty cheap form of motor sport, but it isn't free But you may get some donations if you think about what you want, where to get it, and show them the AutoCad drawings and the budgets for what you want to build.

Teamwork

You need people to design the vehicle, build the vehicle, transport the vehicle, drive the vehicle, possibly raise funds, do school and community liaison, and a host of other tasks. It takes a team. If you can't make the team work, you can't make the vehicle work. Negotiation, compromise, learning to listen are all valuable skills. There is no question that Engineering is a team endeavor and that dealing with human behaviorial factors are a part of the equation.

Writing & Communication

The team may use a website to manage, communicate and document the project or do an article for a school newspaper. Proposals and letters may have to be written to obtain sponsorship and carry out fundraising.

Materials Science

What materials are strong enough, light enough, workable enough and affordable? Welcome to the world of engineering. What is the effect of efficiency on the performance of the vehicle? Where should additional effort be made to get the most gain?

Aerodynamics, Aesthetics, Ergonomics

When you put this much effort into something, you want it to look good. Form may follow function, but it doesn't have to look that way. Streamlining is for more than just appearance. Strive for the elegant solution, not just an answer that works.

Research Skills

You need ideas, solutions, parts. What's available? How have others gone about solving similar problems? Which is more critical, rolling losses or aerodynamic drag?

Energy Infrastructure

The world economy depends on the secure and stable supply of energy. Are conventional fossil fuels a viable energy source for the future? What are the political implications of dependence on foreign oil, and how does the balance of payments associated with purchasing off-shore oil affect us?

Environmental Sciences

Last on this list, but by no means the least interesting aspect of a pollution-free means of transportation. Where does the electricity come from? What is the overall impact of computer controlled electric propulsion systems on the environment? How does it compare to the conventional internal-combustion engine fueled by gasoline or diesel fuel? Does it make a difference if we switch to electric drive? Does it matter?

Adapted from the Electric Vehicle Council of Ottawa