

Mechanical Engineering Technology Students Design Amphibious Vehicles

High water and rough terrain are hardly obstacles for the University of Maine's Mechanical Engineering Technology students. In conjunction with their annual senior projects, they are designing and building amphibious vehicles capable of taking to the water or leaving the beaten path.

Their efforts will culminate in the 1993-94 Human Powered Amphibious Vehicle Competition at 9 a.m., Saturday, April 30, in the Stillwater River and on the UMaine campus. The event is free and open to the public.

"I'm impressed how well they (the vehicles) worked this year," said Herb Crosby, professor and coordinator of Mechanical Engineering Technology. MET students constructed amphibious vehicles for the first time in 1982. Again in 1986, they built amphibians. The MET students also created devices for persons with disabilities for several years.

The senior projects, graded on the basis of their logbooks, teamwork, safety, design and other criteria, are decided by the students. Twenty-five students have formed four teams of five or six persons each to build four human powered amphibious vehicles. Crosby points out there have been several changes in construction concepts with this year's amphibians. For example, the design has been simplified with three wheels instead of four and brakes have been improved. The one-person vehicles will be outfitted with Styrofoam to provide buoyancy for the river portion of the contest.

The competition includes evaluation of the vehicles by a team of four judges for best design, safety and appearance. The first leg is a drag race across the UMaine Mall from Long Road to the steps of Fogler Library. The teams must then switch drivers and race back to Long Road.

The second leg is a braking and maneuvering test on the Hilltop Road hill behind Androscoggin Hall. In the third leg, a bike trail race designed to test for endurance and speed, drivers will be changed at least twice. The fourth leg consists of an amphibious relay race in the Steam Plant parking lot and Stillwater River. Final points are awarded by the judges on vehicle durability and teamwork.

One of the rules of the race is that no additions or subtractions may be made to the vehicle. If wheels are to be removed for the water after the race has started, they must stay in the vehicle. If oars are used in the water course, they must be carried during the other races.

The driver must wear a helmet and be able to swim free of the vehicle in case of overturning.

Although many of the components used in the construction of the vehicles are bicycle parts such as wheels, handlebars, pedals and brakes, the designs reflect the depth of the students' creativity. One example is a canoe donated by Old Town Canoe, a reject because of a hole in the stern. The students cut the vessel in half and built a square stern, waterproofing it with a silicon sealer. The vehicle is capable of moving in reverse and is equipped with a unique steering device consisting of a wheel in the stern activated by a joystick instead of handlebars. Styrofoam is attached to the sides to achieve more stability in the water.

The projects also are a lesson in dedication on the part of the students. As a result of a volleyball accident, Vernon Fullerton of Princeton suffered a torn knee ligament but still works on his vehicle from a chair. "I spent 30-35 hours just learning how to



The University of Maine's Mechanical Engineering Technology students are designing and building amphibious vehicles as their annual senior projects. Jason Spencer of Passadumkeag makes a test run with his vehicle which will be entered in the 1993-94 Human Powered Amphibious Vehicle Competition on Saturday, April 30, in the Stillwater River and on the UMaine campus. Styrofoam will be added to the vehicle to provide buoyancy for the river portion of the competition. Photo by Monty Rand

weld," he said. Peter Day of North Reading, Mass., who did some research in ergonomics, the science of human engineering, positioned the seat, pedals and frame in such a way as to maximize the power of the body's leg thrust.

Another vehicle has an all-aluminum frame and is estimated to weigh under 100 pounds. "We just wanted to make it as light as we could," according to Scott Hood of Hulls Cove. The vehicle also is fitted with anodized aluminum sections of a yellowish hue similar to brass.

The fourth vehicle is more conventional and contains snowmobile parts and a steering system similar to an auto.

The MET students began designing their vehicles in September. Working with a small budget, many of the students obtained parts donated by local merchants. Crosby notes they obtained a permit for the Stillwater River portion of the race from the Maine Department of Inland Fisheries and Wildlife. ▲