Under Water Robotics

Topics to be covered on day – 1

Underwater Robotics – Basics and why is it different?

What is already in place

Types of underwater robot

Application of underwater robotics

What can you do in the future

Time: 1 hour

Maneuvering of Underwater/Surface water vehicles:

Conventional thruster based System

Surface water locomotion

The all thruster Models

Fin Rudder Models

Bio-mimic mechanisms

Time: 1.5 hour

Understanding the underwater Sensing System:

Depth Sensors and Altitude sensors

Sonar (side scan sonar, over look sonar)

Acoustic Ranging (USBL,SSBL,SBL,LBL)

GPS for surface water vehicles

Compass and IMU

Accelerometers and Gyroscopes

Underwater cameras

Time: 1.5 hour

Fabrication of a Remotely Operated Vehicle (ROV) using the kit provided

Open loop Behavior can be tested in the water tank

Understanding of Degree of Freedom of vehicle

Time: 2 hours

Discussion on the topics covered
Time: 1 hours

Topics to be covered on day-2

Application of sensors to develop different kind of abilities for vehicles
Station-keeping
Depth-only keeping
Obstacle avoidance
Towing arrays
Acting as surface beacon for communication
Survey Vehicle (Remember discovery of titanic wreck?)
Time: 1.5 hours

Modeling of System
Understanding the Importance of Hydrodynamics
Modeling the vehicle for control
Time: 0.5 hours

Control and Navigation
Remotely Operated control.
Autonomous Navigation using feedback control.
Various kinds of Autopilot.
Dynamic Positioning of Vehicle.
Online system identification.
Time: 2 hours

The Development on the kit and the testing in the tank
Develop mission deployment plan and program the vehicle to do that - Dead reckoning.
Depth keeping deployment.
Time: 4 hours