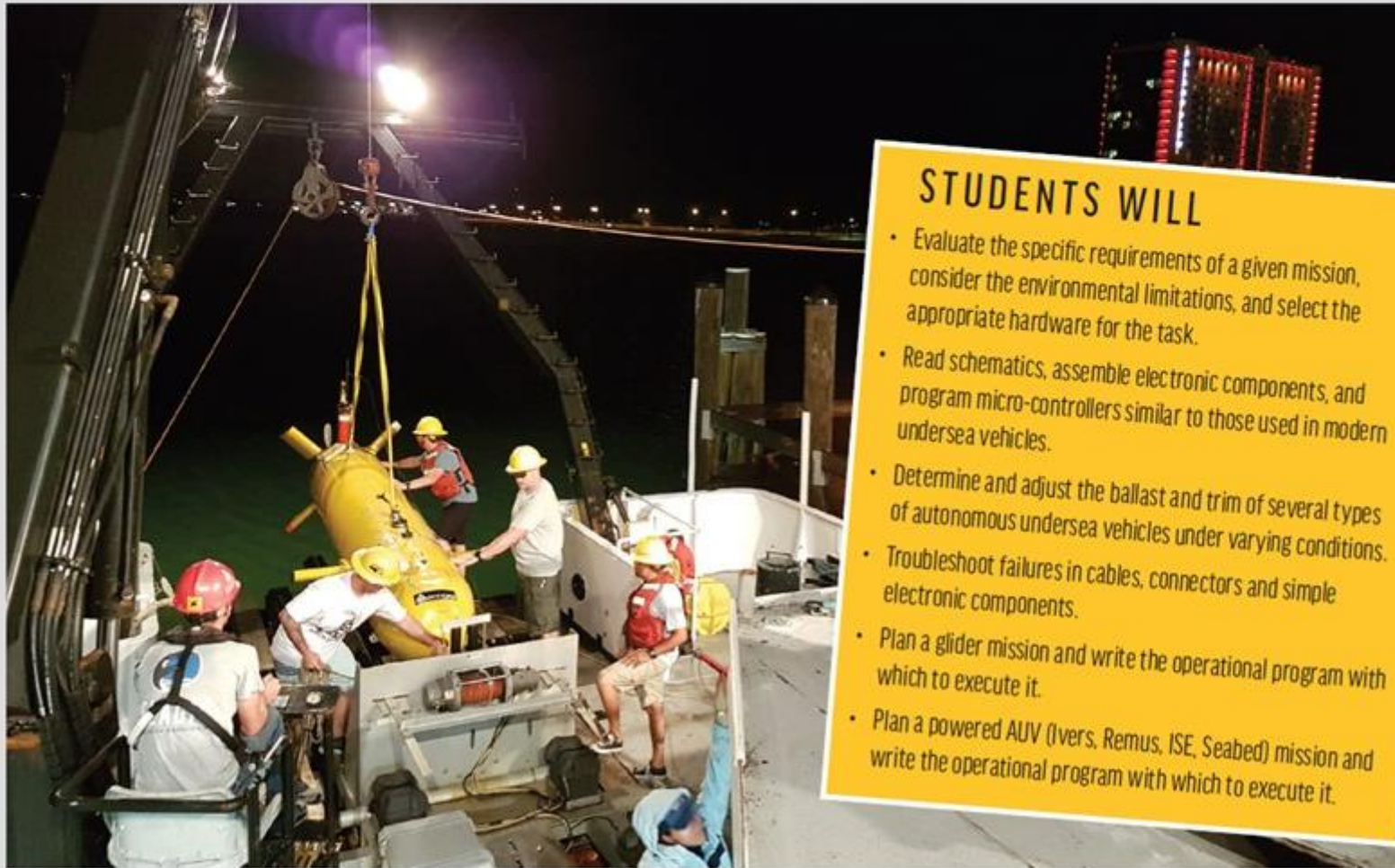


THE UNIVERSITY OF SOUTHERN MISSISSIPPI

# UNMANNED MARITIME SYSTEMS

CERTIFICATE PROGRAM



## STUDENTS WILL

- Evaluate the specific requirements of a given mission, consider the environmental limitations, and select the appropriate hardware for the task.
- Read schematics, assemble electronic components, and program micro-controllers similar to those used in modern undersea vehicles.
- Determine and adjust the ballast and trim of several types of autonomous undersea vehicles under varying conditions.
- Troubleshoot failures in cables, connectors and simple electronic components.
- Plan a glider mission and write the operational program with which to execute it.
- Plan a powered AUV (Ivers, Remus, ISE, Seabed) mission and write the operational program with which to execute it.

## Foundational Curriculum (Tier 1)

When: Five Week Course (USM  
10 Credit hours)

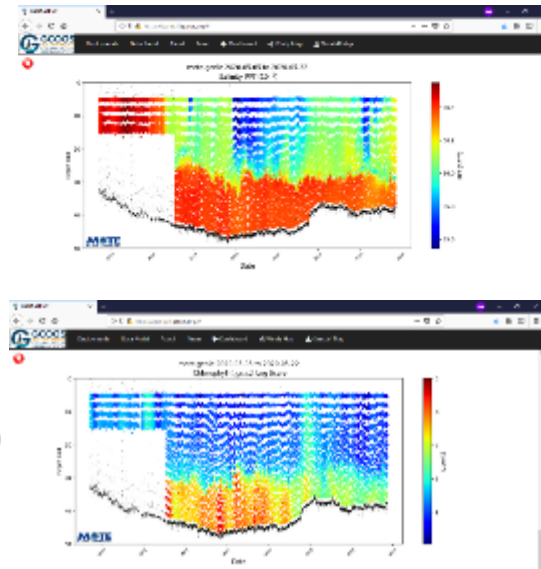
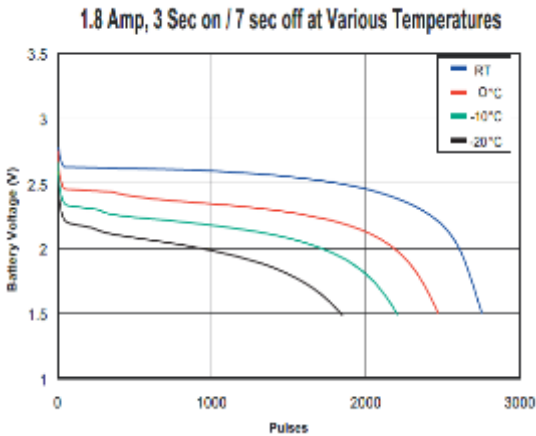
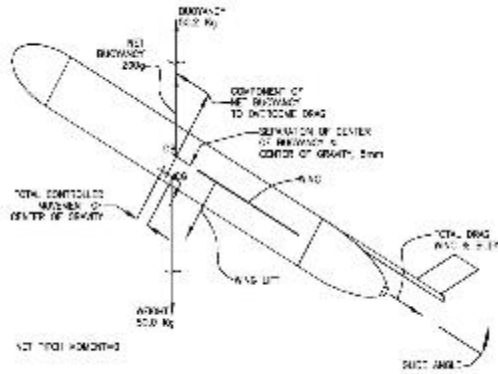
1<sup>st</sup> Half, Fall Semester  
Aug 24 – Sep 25, 2020

Where: Marine Research Center  
(MRC), Port of Gulfport

Who: Undergraduate (400 level)  
and Agency employees – Navy,  
Marine Science and Ocean  
Engineering

<https://www.usm.edu/school-ocean-science-and-technology/unmanned-maritime-systems-ums-certification>

# UMS Operator Certificate (Tier 2 Advanced) Program



- Advanced concepts and real-world case studies upon which to build more detailed understanding of specific platforms
- Four 400-level courses totaling 12 credit hours over 5-week period
  - Nominally during the second half of Fall semester, not simultaneously to Tier 1
- Classroom content is vehicle agnostic; field project specific to one type of vehicle, e.g., glider, AUV, USV.

First Offering being considered for postponement to Fall 2021



# Tier 2 Courses – Description, Learning Objectives, and Topics

## Operating Instrumentation in Marine Environments II (MAR 435)

- Detailed understanding and working knowledge of specific marine sensors and their calibration, parameters, limitations, power usage, and data output.
- Students will be able to develop a matrix of mission requirements matched to instrument & sensor capabilities, considering estimated power utilization and data quality during platform deployment.
- Topics will include types of marine instruments (in-situ, remote), power consumption, calibration, corrosion, biofouling, data flow, and quality assurance/quality control.

## Unmanned Maritime Systems Vehicle Planning (MAR 436)

- Develop mission planning requirements including listing objectives for different types of sampling tasks, analysis of the physical environment and geographic conditions affecting mission objectives, and logistical considerations.
- Students will be able to develop and analyze of an oceanographic sampling mission(s) and the factors that will impact the probability of success. This analysis will include the purpose and operating environment of the mission: specific feature/event to measure, climatology, general data collection; method of sampling; environmental features.
- Topics will include vehicle purpose and tasking, mission goals and costs, physical environment impacts, sampling goals and scheme, power budget, buoyancy considerations, and flight control.



# Tier 2 Courses – Description, Learning Objectives, and Topics (continued)

## Unmanned Maritime Systems Vehicle Management (MAR 438)

- Detailed understanding and working knowledge of specific marine platforms, their operating characteristics, limitations, power usage, and data output.
- Students will be able to determine system capabilities, logistic & operating factors, and deployment preparations in order to select and configure vehicles for a specific mission or task.
- Topics will include platform types, logistics, vehicle preparation, communications, and data management.

## Unmanned Maritime Systems Vehicle Field Project (MAR 440)

- Provide students with increased knowledge and proficiency in technical and logistical preparation an unmanned system then deploy, operate, recover and demobilize the system in a field environment.
- Students will be able to prepared specific vehicles, deploy/recover, communicate with the system, data manage, and conduct contingency planning.