



NMSE '19 Technical Training Workshop Descriptions

OUTBOARD TRAINING (OB Series)

OB-302-08 Outboard 4-Stroke System Technology

This course is designed to teach the basics of four-cycle gasoline outboard theory as well as the terminology, measuring instruments, special tools and diagnostic software necessary for work on these engines. Extensive hands-on labs will be used during this course. This course is presented by **Mark Kramer and Sean Hill**. Mark Kramer is a master technician for diesel, automotive and marine with more than 20 years experience. His extensive experience covers all combustion engines and electrical systems, as well as DFI, EFI, engine diagnostics. **Sean Hill** has over 30 years experience in electronics and more than 20 years in the boating industry. He's a former EFI engineer for CDI Electronics.

➤ **(3-Hour Evening Course) OB-302.1-03 Outboard 4-Stroke Theory**

This condensed evening course will cover fuel and electrical systems of the 4-stroke engine. Basic troubleshooting tips will be covered. **Mark Kramer and Sean Hill** will conduct this course.

OB-E05-08 Outboard 2-Stroke Technology – Mercury Optimax / Yamaha HPDI / Evinrude E-TEC

the air/fuel delivery systems, operating ranges, engine component locations, maintenance/ service procedures, special tools, troubleshooting strategies, fault codes, break-in procedures, common failures, service bulletins, as well as do's and don'ts. Special attention will be placed on the electrical and fuel systems of each engine, as well as the diagnostics unique to each brand. This course is presented by **Mark Kramer and Sean Hill**.

➤ **(3-Hour Evening Course) OB-E05.1-03 Outboard 2-Stroke Theory**

This condensed evening course will cover fuel and electrical systems of the 2-stroke engine. Basic troubleshooting tips will be covered. **Mark Kramer and Sean Hill** will conduct this course.

OB-E02-08 Yamaha Maintenance and Service (Elective) (Updated Course)

This course will improve your skills in servicing and diagnosing Yamaha two and four-stroke engine systems. Included will be the operation & fundamental troubleshooting procedures for two-stroke PBS (Precision Blend) oiling systems and HPDI (High Pressure Direct Injection systems). Four-stroke EFI, electrical systems, VCT (Variable Valve Timing) operation, and servicing and troubleshooting will also be covered. This course is taught by **Mark Kramer and Sean Hill**.

TECHNICAL SKILL SET TRAINING (SS Series)

SS-103-08 CAN Bus Systems Technology (Prerequisite Course)

Today's hottest technology for both engine and boat system control is CAN Bus technology. CAN Bus is the new central nervous system (communication network) for modern marine systems and is used by virtually all engine manufacturers and most production boat builders. This technology allows the operator to observe and control the propulsion system, electronic navigation, and other systems such as fuel and water tanks. As complex as it sounds, the built-in diagnostics simplify the use and diagnostics of the CAN Bus system. This course will explain the architecture of the CAN Bus, how it works and the various versions used today. Not all CAN Bus systems are the same or compatible. Hands-on experience with a simplified CAN Bus system is used. **Conrad Kreuter** is the instructor for this course. Conrad is an instructor for Kingsborough Community College in Brooklyn, NY.

SS-102-08 Electrical Systems: Troubleshooting and Theory (Prerequisite Course)

Finally, understand how electricity works! This course provides students with the proper fundamental knowledge and theory of electricity and how it interfaces with marine systems. Topics to be covered are: basic DC electricity theory; ohm's law; magnetism; wire sizing; parallel and series circuits; batteries, basic wiring, switching devices, isolators, battery combiners; advanced battery systems; typical 20-foot boat wiring layout, and troubleshooting. ABYC specifications are used throughout the course. This course is taught by **Conrad Kreuter**, Kingsborough Community College.

➤ **(3-Hour Evening Course) SS-102.1-03 Electrical System Theory**

This evening course provides students with the basic fundamental knowledge and theory of electricity and how it interfaces with marine systems. This course is taught by **Conrad Kreuter**.