MATE/UNOLS Six-Month Internship Guidelines

www.marinetech.org/internships
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These guidelines have been developed to assist internship mentors in providing student interns with a broad exposure to the tasks performed by and responsibilities of a marine technician. These guidelines were developed for the six-month MATE/UNOLS internship but they are also appropriate for internships of shorter duration, however less breadth and depth would be expected. These guidelines were developed by MATE and UNOLS staff and technicians aboard UNOLS vessels using the Knowledge and Skills Guidelines (KSGs) for *Marine Technicians who work aboard research vessels* and the KSGs for *Oceanographic Instrumentation Technicians*. These guidelines are simply just that, guidelines. The actual internship will depend greatly on the science that will be conducted on the cruises in which the intern participates and also the knowledge and expertise of the internship host. We ask that the host keep the following guidelines in mind as the internship progresses.

I General Skills/Attributes

Below is a list of general skills/attributes we hope the intern will possess prior to the internship and also anticipate to develop further throughout the internship. When working with the *Areas of Specific Interest/Exposure* (see below), the internship host should make an effort to develop projects that require the intern to use and demonstrate the following General Skills/Attributes. For example, the host could give the intern a project that may be a bit beyond the intern's capabilities with the expectation that the intern will have to first work on his/her own, and if he/she gets stuck, he/she would have to figure out his/her limitations, define the problem and then seek additional resources or instruction to complete the project. The host could also require the intern to first put the problem in writing and then talk about the problem to practice both written and oral communication.

The Attitudes and Attributes of a successful intern are as follows:

- ☐ Resourceful
- ☐ Responsible
- ☐ Mechanical aptitude and dexterity
- ☐ Self-starter
- ☐ Able to communicate clearly both orally and in writing
- ☐ Patience
- ☐ Attention to detail
- ☐ Able to read and interpret manuals
- ☐ Able to troubleshoot and problem-solve
- ☐ Confident in decision making
- ☐ Able to work independently and in teams
- ☐ Able to recognize his/her limitations, seek help as needed
- ☐ Able to define & grasp the essence of the problem
- ☐ Follow-through, does not leave jobs unfinished
- ☐ Knowledge of and ability to use good customer relations skills
- ☐ Able to multi-task
- ☐ Able to think outside the box

General Academic Knowledge and Skills include:

- ☐ General computer skills, such as use of Microsoft Office programs, internet searches, and email
- ☐ Knowledge of and ability to apply basic electronic and mechanical skills

II Pre-Internship Reading

- ☐ MATE pre-internship quiz and associated resources
- ☐ Ship specifics for the internship host vessel(s)
- ☐ Cruise Planning Manual for the ship(s)
- ☐ UNOLS Research Vessel Safety Standards Manual
- ☐ Proposals/Pre-cruise planning information for all science cruises on which they will participate
- ☐ Basic Navigation
- ☐ Basic Oceanography
- ☐ Basic Knots
- ☐ MATE Knowledge and Skill Guidelines for *Oceanographic Instrumentation Technicians* and *Marine Technician who work aboard research vessels* (see www.marinetech.org/workforce)

III Areas of Specific Interest/Exposure

Cruise Preparation / Logistics

Expose the candidate to the pre-cruise preparation that occurs before each cruise. Some areas for the intern to observe/review/practice include:

- ☐ Pre-cruise databases or forms completed by the scientists
- ☐ Pre-cruise meetings/phone conversations
- ☐ Deck plans – understanding why certain equipment must go in certain places
- ☐ Scheduling of shared-use instrumentation
- ☐ Instrumentation preparation
- ☐ Coordination of shipboard scientific operations
- ☐ Loading/unloading and setup logistics
- ☐ Shipping procedures and time lines
- ☐ Customs requirements

Basic Seamanship

Expose the candidate to basic seamanship. Some areas to include:

- ☐ Common knots (square knot, sheet bend, clove hitch, trucker's hitch)
- ☐ Pertinent ship specifications
- ☐ Radio communication
- ☐ Beaufort Scale
- ☐ Basic navigation (see *Basic Navigation Further Suggestions/Activities* below)
- ☐ Ship terminology

Deck Rigging & Safety

Expose the intern to basic deck rigging and shipboard safety procedures. Some areas for the intern to observe/practice include:

- ☐ Hazmat receipt, storage, & basic clean-up (MSDS)
- ☐ Low Level Radioisotope Safety
- ☐ Safe operation of deck gear (e.g., winches, A-frames, cranes)
- ☐ Understanding of and ability to apply underway deck safety protocol
- ☐ Recognizing unsafe conditions and reacting properly
- ☐ Securing equipment (use of a ratchet strap, knots, etc)
- ☐ Basic deck & crane hand signals
- ☐ Launch and recovery of equipment and instrumentation and the rigging of equipment involved.
- ☐ Line handling, especially under tension
- ☐ When equipment can be safely deployed & why
- ☐ Parts of a block
- ☐ Dynamic vs. static loading
- ☐ Safe Working Loads (SWL) & breaking strength of wires, ropes, and equipment

Instrument set-up, operation and troubleshooting

Expose the intern to instrument set-up, operation, and troubleshooting. Specific instrumentation is listed in a separate section. Some areas for the intern to observe/practice include:

- ☐ Recognizing valid data, basic quality control procedures
- ☐ Reading, following, and understanding technical manuals and written procedures
- ☐ Reading schematics and mechanical drawings
- ☐ Troubleshooting systems
- ☐ Basic electronics repair and tool usage (soldering, etc.)
- ☐ Interfacing equipment (serial, GPS, data source)
- ☐ Calibrating procedures and standards
- ☐ Writing clear, concise log entries
- ☐ Maintaining calibration records & properly entering subsets of coefficients
- ☐ Completing an inventory of equipment and supplies
- ☐ Using correct units of measure

IT, Networks and Comms

Expose the intern to IT systems, networking and shipboard communication systems. Some areas for the intern to observe/practice include:

- ☐ Using software such as databases, spreadsheets, word- processing, communication (e-mail), ArcGIS, and PowerPoint
- ☐ Installing and maintaining operating systems, software, firmware, hardware, and networks
- ☐ Understanding peripherals, such as monitors, switches, adapters, routers, hubs
- ☐ Using basic network applications
- ☐ Using basic Linux Commands
- ☐ Processing, reducing, displaying, and storing data
- ☐ Backing up and storing data
- ☐ Distributing data, including Rolling Deck to Repository (R2R)

Introduction to Ocean Sciences and Communicating with Scientists

Although knowing the technical aspects is essential to succeeding as a Marine Technician, knowing the science behind why the technical aspects are needed is beneficial to see the big picture. Additionally, in order to fully support the science, communication is essential between the technician and the science party. Expose the intern to the science occurring on the cruises and encourage appropriate discussions with the scientists to develop rapport.

IV Instrumentation and Equipment

Expose the intern to the following instrumentation as much as possible with an emphasis on Level 1 instrumentation, followed by exposure to and experience with the level 2 and 3 instruments (see below).

Level 1: the goal is for the intern to become as proficient as possible in set-up, use, monitoring and troubleshooting this equipment alone by the end of the 6 months

- ☐ CTD and carousel (including sampling)
- ☐ Wire Termination (EM & Wire rope)
- ☐ Underway instrumentation (TSG, fluorometer, etc)
- ☐ Met Sensors
- ☐ Echosounders
- ☐ Basic Test Equipment (e.g. multimeters, megometer, etc)

Level 2: the goal is for the intern to have experience in using and troubleshooting this equipment by the end of the 6 months

- ☐ Shipboard Networks
- ☐ Satellite Communication Systems
- ☐ Shipboard Data Acquisition System
- ☐ ADCP

Level 3: the goal is for the intern to have exposure to and perhaps experience using this equipment by the end of the 6 months

- ☐ Multibeam
- ☐ Dredging
- ☐ Nets/Trawls (including MOCNESS)
- ☐ XBT
- ☐ Salinometer
- ☐ Coring (multi-coring, gravity coring, Kaston, Box)
- ☐ Mooring Deployment and Recovery

V Additional Ideas for Mentors

Basic Navigation

- ☐ Convert decimal degrees to degrees and decimal minutes and reverse
- ☐ Understand why miles are measured on the sides of a chart and not the top and bottom
- ☐ Understand the difference between a nautical mile and a statute mile
- ☐ Understand why Greenland looks so big on a Mercator projection
- ☐ Understand the difference between Magnetic and True compass directions
- ☐ Understand the difference between compass variation and deviation
- ☐ Understand what differentiates uncorrected GPS, differential GPS, and WAAS GPS
- ☐ Plot the ship's position
- ☐ Plot the current position, a lat/lon pair
- ☐ Draw a course line (of say 235 degrees)
- ☐ Assuming no current, determine and plot the ship's new lat/log after 2.5 hours at 10knots.

Basic Knots

The intern should be proficient in at least the following knots:

- ☐ Bowline
- ☐ Square Knot
- ☐ Sheet Bend
- ☐ Clove Hitch
- ☐ Trucker's Hitch

About the MATE Center

The Marine Advanced Technology Education (MATE) Center is a national partnership of organizations working to improve marine technical education and in this way help to prepare America's future workforce for ocean-related occupations. Headquartered at Monterey Peninsula College (MPC) in Monterey, California, the MATE Center has been funded as a National Science Foundation (NSF) Advanced Technological Education (ATE) Center of Excellence since 1997. The MATE Center works with community colleges, high schools, universities, research institutions, professional societies, working professionals, and employers to facilitate the development of courses and programs based on occupational knowledge and skill guidelines. In this way, the Center is working to create a flexible education system that meets the needs of students, working professionals, employers, and educators, and that promotes direct interactions between these groups. The Center is also working to increase the awareness of ocean-related careers and to provide students, educators, workers, and employers with up-to-date information to assist them in making informed choices concerning their education and future directions.

About UNOLS

University-National Oceanographic Laboratory System (UNOLS) is an organization of 61 academic institutions and National Laboratories involved in oceanographic research and joined for the purpose of coordinating oceanographic ships' schedules and research facilities. The original UNOLS Charter was written in 1972 and most recently revised in 2010. As of May 1, 2009, the office for UNOLS is located at the University of Rhode Island Graduate School of Oceanography in Narragansett, Rhode Island. One of the primary functions of UNOLS is to ensure the efficient scheduling of scientific cruises aboard the 21 research vessels located at 16 operating institutions in the UNOLS organization.

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