Scientific diving and documentation techniques, 4 hp

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<td>2014-08-18 -- 2014-08-29</td>
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Course leader / Address for applications:
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Course description (Advertisement for Ph.D. students):

Scientific diving (SD) is an important tool for marine researchers to visit, document and perform empirical studies in the environment that they work with. Many terrestrial sciences have a great advantage compared to marine sciences in that natural phenomena can be observed first hand. This alone can create a greater understanding of the environment that is studied. Referring to the European Scientific dive panel, SD is defined as “diving that is science-led and is needed to support professional research and education and for the protection, conservation and monitoring of the natural and cultural environment”.

Aim: To give you important tools about using SD documentation techniques when illustrating your research and conducting empirical studies in the marine environment using SD techniques. Several of the skills provided during the course are required for the European Scientific Diver (ESD) certification. Documentation after this course can then be used if you apply for the ESD certificate.

The course will be conducted as a 12 day intensive course at the marine field station Kristineberg, Sven Lovén Centre for Marine Research, in Fiskebäckskil (for more info about the Lovén centre see www.loven.gu.se). The course will comprise a few introductory lectures but will mainly focus on practical hands-on sessions using scientific diving documentations techniques and learning how to conduct safe practice scientific diving. The syllable of the course will include

- How to illustrate marine research using scientific diving underwater digital photography such as handling of photographic equipment, in water, optimization of lighting and position of strobes during underwater photography, macro- and wide angle photography, composition of picture, imaging in photoshop
- How to use scientific diving underwater digital photography for empirical studies including stereo photography to quantify changes in the environment, quantification by visual census methods, underwater photography to study distribution and coverage and alternative methods such as sledges, drop-videos and underwater observatories
- Stereo-video system techniques for quantitative analysis and behavior of mobile organisms
• Medical examination and CPR course, which are required for diving during your studies.
• Rules and regulatory frames of Scientific Diving, dive planning and risk assessment, repetition of dive medicine and rescue techniques

Among the teachers of the course we have Anders Salesjö, Fredrik Pleijel and Lars-Ove Loo, Linus Hammar and Maria Asplund.

Anders is a marine biology teacher and one of Scandinavia's topmost underwater photographers. He has won both the Nordic and Swedish championships in underwater photography and has represented Sweden at several world championships organized by CMAS (Confédération Mondiale des Activités Subaquatiques). He is an elected member of the Association of Nature Photographers. He is best known for his macrofauna photographs from Nordic waters but also from other part of the world.

Fredrik Pleijel is a researcher in marine zoology specialized in polychaete phylogeny and taxonomy based on combined morphological and molecular data. Currently he has a grant from the Hasselblad Foundation to photo-illustrate Swedish marine invertebrates.

Lars-Ove Loo is a researcher in marine ecology and has worked with benthic-pelagic coupling in different ecosystems, mapping of different marine habitats and currently analyzing and processing historical marine biological data. He uses photography and filming as a tool in his research.

Linus Hammar will defend his PhD thesis in April 2014 about ecological risk assessment of offshore renewable energy. The aim of his work has been to generate knowledge to support that these new energy technologies are used in an environmentally friendly manner. The studies include resource mapping, field experiments on fish, and ecological risk assessment at the landscape level. In the field experiments he has used stereo-video system techniques to record and quantify detailed fish movements.

Maria Asplund is a researcher in marine ecology and responsible for the development of Scientific Diving at Sven Lovén Centre for marine research.

Responsible department and other participation departments/organisations:
Sven Lovén Center for Marine Sciences, Dept of Biological and Environmental Sciences, Undervattensbilder, Chalmers, PREVIA

Teachers:
Maria Asplund maria.asplund@gu.se (Course leader and main contact)
Lars-Ove Loo lars-ove.loo@loven.gu.se
Anders Salesjö anders@undervattensbilder.se
Fredrik Pleijel fredrik.pleijel@bioenv.gu.se
Faculty of Science; Sven Lovén Centre for Marine Sciences and Dept of Biological and Environmental Sciences

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Third cycle education

1. Confirmation
The syllabus was confirmed by the Head of the Department of Biological and Environmental Sciences (BioEnv) in consultation with head of Sven Lovén Centre for Marine Sciences 2014-01-20

Disciplinary domain: Science
Department in charge: Sven Lovén Centre for Marine Sciences and Dept of BioEnv
Main field of study: Marine science and Scientific Diving

2. Position in the educational system
Elective course; third-cycle education.

3. Entry requirements

Admitted to third cycle education, graduate students.

A short abstract (max 200 words) describing the applicants research and how the applicant can foresee the usage of scientific diving documentation techniques within their research (if applicable), should be sent in with the application to the course.

A dive certificate; either a recreational (sports-) dive certificate corresponding to CMAS** or PADI rescue diver or a professional Swedish S30 or any other according to IDSA level 1 standards. A documentation (log book) of at least 20 logged dives whereof at least 5 dives with a max depth of at least 18 m. Documentation of previous cold-water diving.
4. Course content
Day 1-2 (Maria Asplund and PREVIA)
- Dive medical examination according to AFS 2006:5*
- Practical CPR training and emergency first responses training including administration of oxygen **
- Theoretical repetition of Dive medicine and dive physics, dive rescuing techniques
- Group work with dive planning and risk assessments for scientific diving.

Day 3 (Maria Asplund (Eric Bergwall))
- Refreshment dives, dive planning, risk assessment of safe practice scientific diving techniques and rescue scenario training

Days 4-7
Illustrating your marine research using scientific diving underwater digital photography (Undervattensbilder; Anders Salesjö (Fredrik Pleijel, Lars-Ove Loo))
- Hands-on handling of photographic equipment for underwater documentation
- Lecture on the difference of photography on land and in water, optimization of lighting and position of strobes during underwater photography, macro- and wide angle photography, composition of picture
- Practical sessions with underwater photography both macro- and wide angle while diving
- Hands on Imaging in Photoshop (element)

Days 8-9 Using scientific diving underwater digital photography for empirical studies (Lars-Ove Loo)
- Hands on practice with in-field practice and image analysis of underwater stereo photography to quantify changes in the environment
- Hands on practice with in-field practice and image analysis of underwater photography to study organisms distribution and coverage
- Practical sessions using quantification by visual census methods
- Alternative techniques, such as MOV (underwater sledges) and drop-video techniques for observation and quantification in the marine environment
- Visit to Lovén Centre Underwater Observatory

Days 10-11 Stereo-video system techniques for quantitative analysis and behavior of mobile organisms (Linus Hammar)
- Introductory lecture on the stereo-video system techniques
- Practical session with calibration of stereo-video unit
- Dive transects and stationary positioning of the stereo-video system
- Hands on analysis of the films, measuring of distance, mobility and behavior, size of marine organisms

Day 12 Examination (Fredrik Pleijel and Maria Asplund)
5. Outcomes

1. Knowledge and understanding
After completion of the course the Ph.D. student is expected to have received tools needed to use SD methods and scientific diving documentation techniques:
   - to illustrate their marine research
   - to be able to conduct empirical studies in the marine environment using SD techniques

2. Skills and abilities
Several of the skills provided during the course are required in the European Scientific Diver (ESD) certification, which is a mobility certificate within Europe. Therefore documentation after the course will be provided to the students, which can then be used when they apply for the ESD certificate.

3. Judgement and approach
We need to foster the new generation of researchers so that they can implement scientific diving into their marine research. Further, the candidates will learn how to adapt to the new legislations and practice safe scientific diving.

This course aims to be a prototype that further can be used for competence enhancement of researchers within the EMBRC.

6. Required reading
The required reading will be sent out prior to the course and will include:
   - Research papers describing scientific diving documentation techniques that will be used during the course.
   - Diving work The Swedish Work Environment Authority’s Provisions on Diving Work and General Recommendations on the implementation of the Provisions 2010:16
   - Code of praxis for scientific diving
   - Dive rules for Gothenburg University (STYRDOKUMENT Dnr V 2013/511)

7. Assessment
Required steps in order for a student to pass the course:
1. Oral presentations of the documentation produced during the course and how the PhD students aim to apply the scientific documentation techniques in their research
2. Showed proof that they can make a dive plan and a risk assessment for scientific diving
3. Active participation during the course
4. All scheduled moments during the course are mandatory
8. Grading scale
The grading scale comprises Fail, (U), Pass (G).

9. Course Evaluation
The course evaluation is carried out together with the Ph.D. students at the end of the course, and is followed by an individual, anonymous survey. The results and possible changes in the course will be shared with the students who participated in the evaluation and to those who are beginning the course.

10. Language of instruction
The language of instruction is English.