Kuwait Institute for Scientific Research
In collaboration with
The IOC Science and Communication Centre on Harmful Algae

PURPOSE
The course will give the participants a basic knowledge of methodology and taxonomic principles for the study of harmful marine microalgae. The course will focus on various groups of harmful algae taking into consideration HAB examples in the Gulf region and in the Western Indian Ocean. It aims at both university students and monitoring personnel. Participants will be introduced to the HAB species within diatoms, dinoflagellates and other groups of flagellates.

COURSE DESCRIPTION
The course will give the participants 100 hours of teaching and is divided into two parts.

1) The first part of the course is an internet teaching programme giving general introductions to the various groups of harmful algae; this part is mainly for self-study and estimated to 40 hours of reading. Part 1 will be available on the IOC UNESCO teaching platform ‘OceanTeacher’ two months prior to Part 2.

2) The second part is a practical course in species identification which includes 60 hours of teaching. A microscope will be available to each participant during the entire period. This part of the course will finish with a 3-hours practical exam in species identification.

PARTICIPANTS
The participants should have at least a Bachelor’s degree or diploma in science. The number of participants is limited to 12; priority will be given to applicants who have direct research or management responsibilities with regard to the occurrence of harmful algae.

COURSE FEE
A course fee applies. All participants, except university students who are given a 50% discount, must pay of course fee of 350 KWD; organizations sponsoring more than two participants will be given a 10% discount on course fees. The fee covers all teaching materials, use of facilities including microscopes, breakfast, lunch and refreshments during breaks.

The participants will have to pay for their travel including local transport, accommodation, and meals. Please, note visa requirements when planning your travel to Kuwait.

INSTRUCTORS
• Dr. Manal AL-KANDARI, KISR, EBMMR/ELSRC, Kuwait
• Dr. Jacob LARSEN, IOC, Denmark
• Dr. Igor POLIKARPOV, KISR, EBMMR/ELSRC, Kuwait
• Dr. Maria SABUROVA, KISR, EBMMR/ELSRC, Kuwait
MAIN ACTIVITIES AND EXPECTED ACHIEVEMENTS
• At the end of the course, participants will be able to:
  • Collect microalga samples as well as benthic samples
  • Preserve and process microalgal samples for both LM and SEM
  • Identify main HAB species using LM and SEM
  • Isolate and maintain cultures of HAB species for taxonomical and molecular purposes.
  • Count microalgal samples and understand the statistics behind the method
  • Molecular methods and phylogenetic analysis will be introduced
  • Lectures on the ecology of harmful algal blooms will be included
  • Participants will receive copies of all lectures and additional identification literature as pdf-files

COURSE TOPICS:
• Introduction to Main HAB groups
• HAB Identification Techniques using LM and SEM
• Microalgal Culture Techniques
• Microalgal Counting Methods
• Type of HAB blooms
• HABs in the Arabian Gulf

DATE, DURATION & TIME
10th-21th March 2019
Eleven (11) days, 9:00 am-4:00 pm

LOCATION
Ecosystem-Based Management of Marine Resources Program,
Environment and Life Sciences Research Center,
Kuwait Institute of Scientific Research

COURSE ORGANIZATION
The course is organized by the Manpower Development Department (MDD) of the Human Resources Division (HRD) at the Kuwait Institute for Scientific Research (KISR).

FURTHER INFORMATION AND APPLICATION
Please contact the Training Program Section, through:

Tel. +965 24989453 (direct)
Fax +965 24989429
E-Mail: training@kisr.edu.kw

Dr. Manal Al-Kandari
Tel. +965 24956348
E-Mail: mkandari17@gmail.com
# LOCATION AND TIME

The course venue is ‘Ecosystem-Based Management of Marine Resources/Environment and Life Sciences Research Center, KISR’, Ras-Salmiya, Kuwait.

10-21 March 2019

# FURTHER INFORMATION AND APPLICATION

Dead-line for applications is 1 February 2019. Please contact the Training Program Section, through Mr. Abdullah Alnassar, Tel. +965 2498 (direct), E-Mail: training@kisr.edu.kw or Dr. Manal Al-Kandari
Tel. +965 24956348
E-Mail: mkandari17@gmail.com

### Tentative programme, part 2.

<table>
<thead>
<tr>
<th>Date</th>
<th>Morning 9-12</th>
<th>Afternoon 13.00-16.00</th>
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<tbody>
<tr>
<td><strong>Sunday, 10 March</strong></td>
<td>Welcome address</td>
<td>Lecture and microscope demonstration: harmful Raphidophytes</td>
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<td>Introductions by the participants, 15 min.</td>
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<td></td>
<td>Lecture: Biology of harmful algae</td>
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<tr>
<td><strong>Monday, 11 March</strong></td>
<td>Lecture and microscope demonstration: harmful Haptophytes</td>
<td>Introduction to dinoflagellates</td>
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<td>Lecture: harmful Dictyochophytes</td>
<td>Lecture and microscope demonstration: planktonic species of Prorocentrum</td>
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<tr>
<td><strong>Tuesday, 12 March</strong></td>
<td>Lecture and microscope demonstration: <em>Dinophysis/Phalacroma</em></td>
<td>Lecture and microscope demonstration: <em>Pyrodinium</em> and other Gonyaulacales</td>
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<tr>
<td><strong>Wednesday, 13 March</strong></td>
<td>Lecture: Introduction to benthic dinoflagellates</td>
<td>Benthic dinoflagellates: <em>Gambierdiscus, Ostreopsis, Coolia</em></td>
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<td>Lecture and microscope demonstration: benthic species of <em>Prorocentrum</em></td>
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<td><strong>Thursday, 14 March</strong></td>
<td>Lecture and microscope demonstration: <em>Alexandrium</em></td>
<td>Lecture and microscope demonstration: <em>Alexandrium</em>, continued</td>
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<td></td>
<td>Mixed samples</td>
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<td><strong>Friday, 15 March</strong></td>
<td>Free</td>
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<tr>
<td><strong>Saturday, 16 March</strong></td>
<td>Lecture and microscope demonstration: Unarmored dinoflagellates</td>
<td>Lecture and microscope demonstration: Peridiniales</td>
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<td><strong>Sunday, 17 March</strong></td>
<td>Lecture and microscope demonstration: <em>Pseudo-nitzschia</em></td>
<td>Lecture and microscope demonstration: Cyanobacteria. Mixed samples</td>
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<td><strong>Monday, 18 March</strong></td>
<td>Lecture: Sampling techniques and strategies Microscopy of mixed samples / own samples</td>
<td>Lecture: Molecular methods and phylogenetic analysis Microscopy of mixed samples / own samples</td>
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<td><strong>Tuesday, 19 March</strong></td>
<td>Lecture: culture techniques Workshops: 1) enumeration techniques: 2) culture techniques</td>
<td>Lecture: scanning electron microscopy techniques Workshop: microalgae preparation and observation with scanning electron microscope</td>
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<tr>
<td><strong>Wednesday, 20 March</strong></td>
<td>Exam</td>
<td>General discussion, evaluation</td>
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<td><strong>Saturday, 23 March</strong></td>
<td>Free</td>
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