



ЦЕНТЪР ЗА ОБУЧЕНИЕ – БАН

1000 София
ул. „Сердика“ № 4
<http://edu.bas.bg>

email: tdc-phd@cu.bas.bg
тел.: 02 987 31 67
02 979 52 60

Basic Information:

Course Title: TECHNICS AND TECHNOLOGY OF OCEANOGRAPHIC RESEARCHES

Lecturer: Prof. Dr. eng. Atanas Palazov

Phone: 0897868538

Email: palazov@io-bas.bg

Total Teaching Hours: 30 hours: lectures - 20 hours; seminars - 10 hours.

Annotation (up to 150 words)

The aim of the course is to teach the PhD students in the scientific specialty "Oceanology" with the modern and perspective techniques and technologies for exploring the world ocean. To teach PhD students with the techniques and technology of oceanographic surveys carried out on coastal stations, research vessels and other research platforms as well as methods of primary processing and presentation of oceanographic information. To teach PhD students with the history and milestones in the development of oceanography and oceanology, the contemporary state of oceanographic science and education. To introduce them to the main oceanographic features of the world ocean. To give the basic theoretical knowledge necessary for practical work during the scientific cruises and field work.

Course content (brief description by topics or modules)

1. Introduction. Main stages in the development of oceanographic research. International cooperation in the world ocean researches. National and international oceanographic organizations and their activities. Development of oceanology and oceanological education in Bulgaria.
2. Types of oceanographic researches. Systems for oceanographic observations: standard, special, complex, stationary, expeditionary, remote. Coastal stations, oceanographic stations and continuous measurements. Sea cruises and oceanographic polygons. Et route and episodic measurements. Remote sensing.
3. Technical instrumentation for oceanographic research. Research vessels. Manned and unmanned underwater vehicles. Remote operating vehicles. Oceanographic buoys and platforms. Oceanographic equipment.
4. Methods of oceanographic observations and measurements. On-site measurements. Remote sensing. Physical foundations of the functioning and main characteristics of sensors. Metrological support.
5. Primary processing and presentation of oceanographic information. Measurement errors. Quality control of oceanographic data. Graphical processing and presentation of data. Geographic information systems.
6. Basic rules for working at sea and safety requirements for oceanographic research. Working with ship equipment. Working in specific conditions: at night, at low temperatures and in stormy conditions.
7. Organizing and implementing sea cruises. Planning, conducting and reporting on an expedition. (Cruise order, expedition report).
8. Determining the location at sea and on land. Synchronization and repeatability of measurements. Automation of the processes of measurement, processing and presentation of oceanographic information.



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9. Trends in the development of oceanography. Operational oceanography. Modeling and forecasting. Remote sensing. Autonomous and automated systems.
10. Oceanographic data. Data and metadata. Data centers. Catalogs and databases. Publishing data on the Internet. National and international exchange of oceanographic data.

Teaching and assessment methods

Group and individual training.

In the seminar exercises, PhD students prepare written topics and solve practical problems, and then present what they have written orally. Depending on the performance, one to three additional questions are asked, which the PhD students answer orally. The grade that is given is from 3 to 6. A doctoral student with an average score of very good (5) in the current control is considered to have successfully completed the course. PhD students who meet this condition receive a grade of “PASSED”. If they fail, the PhD student takes an exam. In the exam, the PhD student solves a practical problem and prepare two topics in writing, and then presents what they have written orally. Depending on the performance, three to five additional questions are asked, which the PhD student answers orally. The grade that is given is from 3 to 6. A PhD student with an average score of very good (5) in the exam is considered to have successfully completed the course. PhD students who meet this condition receive a grade of “PASSED”.

Competencies acquired as a result of training (3–5 points)

1. Knowledge of the types of oceanographic research and ocean observation systems.
2. Knowledge of the technical means and technologies for oceanographic research.
3. Skills for preparing, conducting and reporting on marine expeditions.
4. Knowledge of the specific rules for working at sea and requirements for safety techniques in oceanographic research. Working with ship equipment. Working under specific conditions: at night, at low temperatures and in stormy conditions.

Literature:

1. Смирнов Г.В. и др. Океанология: средства и методы океанологических исследований, Наука, Москва, 2005
2. Ястребов В.С. Методы и технические средства океанологии. Л., Гидрометеиздат. 1986
3. Берто Г.О. Океанографические буи, Ленинград, Судостроение, 1979
4. Руководство по гидрологической практике. Л., Гидрометеиздат, 1975
5. Международные океанографические таблицы. ЮНЕСКО, т.3, 1981, т.4, 1987
6. Атласы океанов. Изд-во ВМФ. Атлантический и Индийский океаны. 1977. Тихий океан. 1974. Северный ледовитый океан. 1980
7. UNESCO/IOC & ICSU, 1991 : Manual on Oceanographic Data Exchange. Manual and Guides

Additional information (optional)

1. Бреховских Л.М. Океан и человек. Настоящее и будущее. М., Наука. 1987
2. Маклаков А.Ф., В.А. Снежинский, Б.С. Чернов. Океанографические приборы, Л., Гидрометеиздат, 1975
3. Тейлор Дж., Введение в теорию ошибок, Москва, Мир, 1985



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4. Сытин А.В. и др. Необитаемые подводные аппараты. Москва, Воениздат, 1975
 5. Милн П. Подводные инженерные исследования, Ленинград, Судостроение, 1984.....