



ЦЕНТЪР ЗА ОБУЧЕНИЕ – БАН

1000 София
ул. „Сердика“ № 4
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Basic Information:

Course Title: OCANOGRAPHIC DATA AND INFORMATION MANAGEMENT

Lecturer: Prof. Dr. eng. Atanas Palazov

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

Annotation (up to 150 words)

The aim of the course is to introduce PhD students in the scientific specialty "Oceanology" with the current state and basic principles of oceanographic data and information management. To introduce PhD students with the types of oceanographic data, the physical and logical organization of data and the methods of their storage and preservation. To introduce PhD students with the types of metadata, metadata formats and standards, documentation and cataloging of oceanographic data. To introduce them with the technology and technique for collection, primary processing and quality control of oceanographic data. To provide basic theoretical knowledge about oceanographic databases, their structure and application, as well as their use in oceanography. To familiarize them with the international exchange of oceanographic data, the organization of national and international data centers, data access policies, data exchange and sharing, and international agreements on oceanographic data.

Course content (brief description by topics or modules)

1. Data and information. Physical and logical organization of data. Data representation formats - binary, hexadecimal, ASCII. Data and information carriers. Data storage and preservation.
2. Oceanographic data. Parameters and units of measurement. Data coding and nomenclatures. Data sets.
3. Metadata. Metadata types. Metadata formats and standards. Inventory and documentation. Oceanographic data catalogs. Cruise summary report (CSR).
4. Oceanographic data collection. Sensors, instruments, sampling devices and platforms. Accuracy and errors of measurements. Sensor calibration.
5. Management of oceanographic data and information. Basic principles of management. Oceanographic data centers. National and international data exchange.
6. Cost and value of oceanographic data. Data accessibility and access. Data access policy. Data exchange and sharing. International agreements on oceanographic data.
7. Primary processing of oceanographic data. Logs and data linking. Formats for presentation and archiving of oceanographic data. Formats: CSV, NetCDF, GF-3, MEDAR-METATLAS, NATO-TU Black Sea.
8. Quality control of oceanographic data. Principles, methods and techniques for data quality control.
9. Oceanographic databases - basic concepts, structure and application. Database management systems. DB models - relational, network, hierarchical. Interfaces to oceanographic databases. Data search strategies.
10. World, regional and national data centers. International programs for collection, organization and provision of oceanographic data.



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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 oceanographic data types and their organization.
2. Skills for searching, discovering and using oceanographic data.
3. Skills for assessing the quality of oceanographic data.
4. Knowledge of international oceanographic data exchange, global, regional and national data centers.

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. Маклаков А.Ф., В.А. Снежинский, Б.С. Чернов. Океанографические приборы, Л., Гидрометеиздат, 1975
4. Цветков, В.Я. Геоинформационные системы и технологии. Москва, Финансы и статистика, 1998, 287с.
5. Burrough, P. A. Principle of Geographical Information Systems for Land Resources Assesment. Oxford, 1986
6. Demers, M. Fundamentals Of Geographic Information Systems. NY, John Wiley&Sons Inc., 1999, 580 p.
7. Тейлор Дж. 1985. Введение в теорию ошибок. Мир. Москва
8. UNESCO/SCOR/ICES/IAPSO 1983 : Algorighms for computation of fundamental properties of seawater. Technical papers in marine science 44
9. Manual of Quality Control Procedures for Validation of Oceanographic Data, IOC, Manual and Guides 26, UNESCO, 1993
10. Manual for Coding and Keypunching Biological Data, National Oceanographic Data Center, Washington, 1965
11. Concise guide for Collection, Processing and Dissemination of CIM Data, World Data Center B, Moscow, 1972



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12. User Guide for the Exchange of Measured Wave Data, IOC, Manual and Guides 18, UNESCO, 1987
13. Общий формат магнитных лент МОК для международного обмена океанографическими данными, МОК, Пособия и руководства 9, ЮНЕСКО, 1980
14. UNESCO/IOC/IODE, 1987 : GF3 A General Formatting System for Geo-Referenced Data - Manual and Guides 17
15. UNESCO/IOC & ICSU, 1991 : Manual on Oceanographic Data Exchange. Manual and Guides
16. Руководство по измерению уровня моря и интерпретации результатов, Справочники и руководства 14, ЮНЕСКО, 1985
17. Сборник форматов записи океанографических параметров, Мировой центр данных, Обнинск, 1983
18. MEDAR MEDATLAS II project and Inventory of hydrological oceanographic cruises carried out in the Mediterranean and Black Sea. CDROM 1 Meta-data summary
19. ICES - GETADE Formatting Guidelines for Oceanographic Data Exchange (<http://www.ices.dk/ocean>)
20. ICES -MDM QA Guidelines - CTD - Marine Data Management working Group (CIEM) Reports
21. ICES WWW server of oceanographic codes (ship, country, geographical area ...)
22. Ref : UNESCO Intergovernmental Oceanographic Commission, 1994. IODE Handbook. Committee on International Oceanographic Data and Information Exchange
23. <http://ioc.unesco.org/oceanteacher/>
24. <http://ioc.unesco.org/iode/>
25. <http://www.grid.unep.ch/bsein/descript/tubsfmt.htm>

Additional information (optional) (e.g., special requirements, laboratory equipment, prior knowledge)

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