Conservatoire national des arts et métiers

HBB370 - Data Management

Présentation

Prérequis

Entry requirements

Good knowledge of mathematics, physics and English

Relationship to other courses:

- HB300 Information technology
- HB310 navigation
- HB340 Tides and currents
- HB350 Geodesy & cartographic systems
- HB360 Hydrographic surveying
- HB380 Geology & cartographic systems
- HB390 Legal aspect
- HB500 Hydrographic practice

Objectifs pédagogiques

Module Outline:

- 1. ANALOGUE DATA CAPTURE
- Manual input of alphanumeric data
- Raster scanning processes and vector digitisation
- Description of digitising systems and scanners
- Georeferencing of paper maps
- Description of digital data formats
- Digital data transfer exercises

1. DATA MANAGEMENT, PROCESSING AND ANALYSIS

Approximation and estimation

Approximation and estimation procedures for survey measurements

Spatial data processing & analysis

- The concepts of Geographical Information Systems (GIS)
- The properties of spatial databases and Database Management Systems (DBMS)
- The concepts of raster and vector data, gridded and meshed models (including TINs)
- Spatial data selection algorithms: filtering, smoothing, approximation, estimation, correlation and analysis
- Digital Elevation Models (DEMs)

1. MARINE GIS

• The use of Geographical Information Systems (GIS) within the marine environment and their





Code : HBB370

Unité d'enseignement de type mixte

3 crédits

Volume horaire de référence (+/-10%) : **30 heures**

Responsabilité nationale :

EPN08 - Institut national des sciences et techniques de la mer (INTECHMER) / Claire MARION use in areas such as coastal zone management

- · Graphic presentation of data from marine data bases
- Data and metadata management and nautical charting
- The electronic charting concept as a special form of GIS

1. DATA PRESENTATION

Visualization and presentation

- Cartographic semiology, colour theory and schemes, shading and illumination techniques
- Manual and automatic plotting and contouring of hydrographic data: resolution, scale and vertical exaggeration
- The use of vector and raster digitising and plotting systems
- Hydrographic applications of 3D modelling and visualisation
- 1. MARINE CARTOGRAPHY
- Chart compilation process and flow line
- Application in the production flow of the instructions of the General Bathymetric Chart of the Oceans (GEBCO):
- Nautical charting & production; Chart Compilation

The process involved in selecting soundings and features for the nautical chart from a hydrographic survey or other sources

• Assessing and maintaining data quality throughout the compilation process

1. COASTAL TOPOGRAPHY & MAPPING

- GNSS-based and ground survey techniques to delineate coastline and attached cultural features
- Coastline map creation with aerial photographs
- The use of Ground photography in the depiction of coastline topography
- Relation between tidal datums and charted shorelines

1. PUBLICATIONS

• Required hydrographic data for navigational publications (including tide tables, sailing directions, light lists, radio aids to navigation, port guides, and notice to Mariners)

1. CHART PRODUCTION / REPRODUCTION OF ANALOGUE MAPS

- · The process of creating chart plates from graphic products and from digital files
- · Production of the Chart out of multiple plates
- 1. DIGITAL MAPS

From digital data to digital maps (on nautical devices and on the web)

1. CORRECTION OF CHARTS

- The importance of updating nautical charts and the dissemination of chart corrections
- The responsibilities of each element in the sequence from surveyor to mariner

• Obtaining latest information and checking for old data

Compétences

Learning Outcomes:

- 1. To be able to create the required data types, part of a standard exchange format and to configure systems for secure storage, transfer and backup of survey data.
- To be able to use data cleaning techniques using appropriate software, while distinguishing between noise, outliers and real features as well as assessing propagated errors of survey data.
- 3. Applying procedures used to assess, accept and reject data.
- Being able to apply spatial data processing techniques to create DTMs or gridded surfaces and contouring, as well as applying estimation procedures to assess survey measurements and volume computations.
- 5. To explain the concepts of Spatial Data Infrastructures (SDIs); raster and vector data models.
- 6. To be able to use file types that support the exchange of hydrographic data to transfer data between acquisition, database and GIS environments.
- 7. Explain the concept and use of GIS within the marine environment.

Programme

Contenu

Lecture 1 Analog data capture

Lecture 2 Management, processing and analysis of spatial data

Lecture 3 Marine GIS

Lecture 4 Data presentation

Lecture 5 Marine Cartography

Lecture 6 Coastal Topography & Mapping

Lecture 7 Publications

Lecture 8 Chart Production / Reproduction of Analogue Maps

Lecture 9 Digital Maps

Lecture 10 Correction of Charts

Modalités de validation

- Contrôle continu
- Projet(s)
- Examen final

Description des modalités de validation

Evaluation

Evaluation form

Written examination, partly with multiple choice, partly with open questions.

Fieldwork - permanent evaluation of the practical exercises

Assessment methodology

The final figure of assessment is composed of:

50% (written examination)

50% (permanent evaluation)

Assessment criteria

Permanent evaluation: this evaluation is based upon the training record book in relation to the number of tasks carried out and the comments of the supervisor(s) expressed in written in the book; workshops: proof of attendance: reports, exercises.

Theory examination: quality of knowledge, insight, relation between subjects, ...