



UNIVERSIDAD LIBRE®

Personería Jurídica No. 192 de 1946 de Mingobierno
Nit.: 860.013.798-5



FREE UNIVERSITY PEREIRA SECTION

UNDERGRADUATE PROGRAM IN ENVIRONMENTAL ENGINEERING



SUBJECT: GEOGRAPHIC INFORMATION SYSTEMS

CODE: -----

SEMESTER: TENTH

HOURS WEEKLY: 4

THEORETICAL: 2

PRACTICES: 2

REQUIREMENTS: PHOTOGRAMMETRY AND REMOTE SENSING

GOALS.

That the student becomes familiar with the principles and trends of the systems of geographic information and be able to apply its conceptual bases in the field of Environmental Engineering

METHODOLOGY.

The course will be developed with a presentation by the professor on the basic content of the subject;

Later, the students will be responsible for carrying out the practices and exercises





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leading to strengthening the knowledge of the topics learned, elaborating with said

elements throughout the course a project that will be presented at the end of the course.



WORK PROGRAM.

1. GENERAL CONCEPTS

- What is a GIS
- Components and subsystems
- Cartography and GIS
- Sciences and technologies related to GIS
- Technical resources: Hardware, Software, Human Resources

2. GEOGRAPHIC INFORMATION

- Graphic and alphanumeric components
- Points, lines, polygons, volumes, figures, toponymy
- Elements of spatial reasoning: Georeferenced, continuity, continuity, connectivity
- Spatial and temporal resolution of the data
- Traditional methods of representation



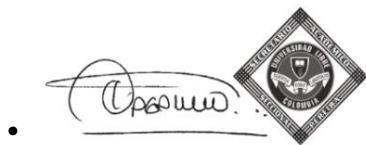


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- Photogrammetry and Digital Cartography
- Cartographic process in modern systems



3. DATA COLLECTION SOURCES

- Data acquisition, management and entry
- Sources of information
- Global positioning systems (GPS)

4. PROJECTIONS AND COORDINATES

- Development and evolution of geography
- Interpretation of photogrammetric plans
- Projections
- Coordinate systems
- Coordinate transformation

5. DATA CAPTURE AND MANIPULATION

- Digitization methods
- Most common mistakes

Evaluation, preparation and standardization of information



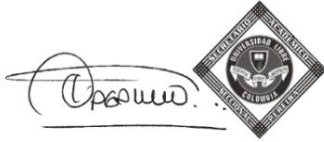


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Attribute encoding



6. DATA STORAGE STRUCTURES

- Topology
- Raster Structure
- Vector structure

7. DATABASE

- Definition
- Database management systems
- Models: Relational, Network, Hierarchical, Object-Directed

Models: Relational:

Tables

Data duplication

Data redundancy

Repetition of groups

Identifier

Table Normalization

Entities and relationships





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Properties

Skeletons of boards

Attributes

- Data quality



8. ANALYSIS IN GIS

- Steps for an analysis in GIS
- Functions used in a GIS
- Map overlay (Intersection, union, clipping, updating, deletion)
- Classification, generalization, integration, breakdown
- Applications of Relational Algebra
- Dimensioning: lengths, areas, dimensions
- Neighborhood: location, contiguity, belonging
- Transformations: Projections and scales
- Digital terrain models
- Networks

9. MODELS

- Model classes.
- Model creation





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10. GENERAL CONCEPTS FOR THE DESIGN AND IMPLEMENTATION OF A GIS

- Project scope
- Identification of GIS users
- Data model design
- Data sources and collection methods
- Classification of elements
- Descriptions
- Current information flows and operations
- Functional requirements of the project
- Alternatives and cost-benefit analysis



11. APPLICATIONS AND PRODUCTION OF RESULTS

- Project scope
- Final exits

Production of maps, lists, tables

Graphic display or alphanumeric display

12. GIS APPLICATIONS





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- General:

Territorial planning

Planning and development

Natural resources

Mapping

Security

Rural and urban cadastre

- Specific:

Public services

Infrastructure

Disaster prevention

- Databases



LITERATURE.

CEPIS 13 Theory, Design and Control of Water Clarification Processes.

