Course Syllabus

6 Months GIS & Remote Sensing Certificate Course

Gis Vision India

Master GIS, Remote Sensing, and Spatial Analytics.

Course Overview

Academic & Delivery Information

- Course Title: GIS Analyst Post Graduation Program
- Total Course Duration: 6 Months (4 month training +2 month project internship)
- Mode of Delivery: Live 1:1 Online Class
- Prerequisites: None

Learner Profile & Technology Stack

Target Audience (Students, Working Professionals, Civil Engineers, Planners, etc.)

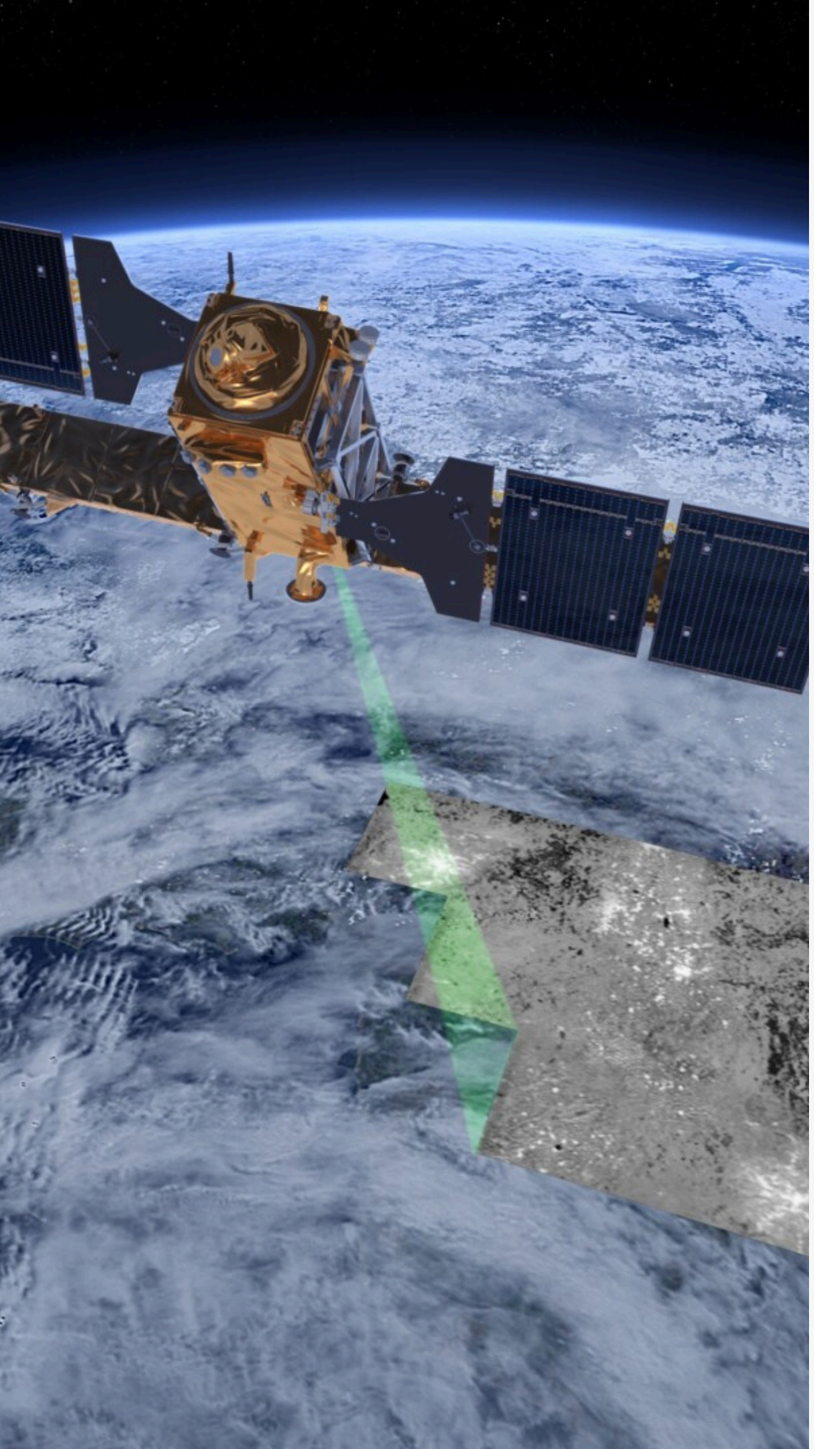
Learn GIS that actually gets you hired.

Don’t just learn maps—learn how decisions are made.

Supports beginners while also helping professionals upskill with structured learning

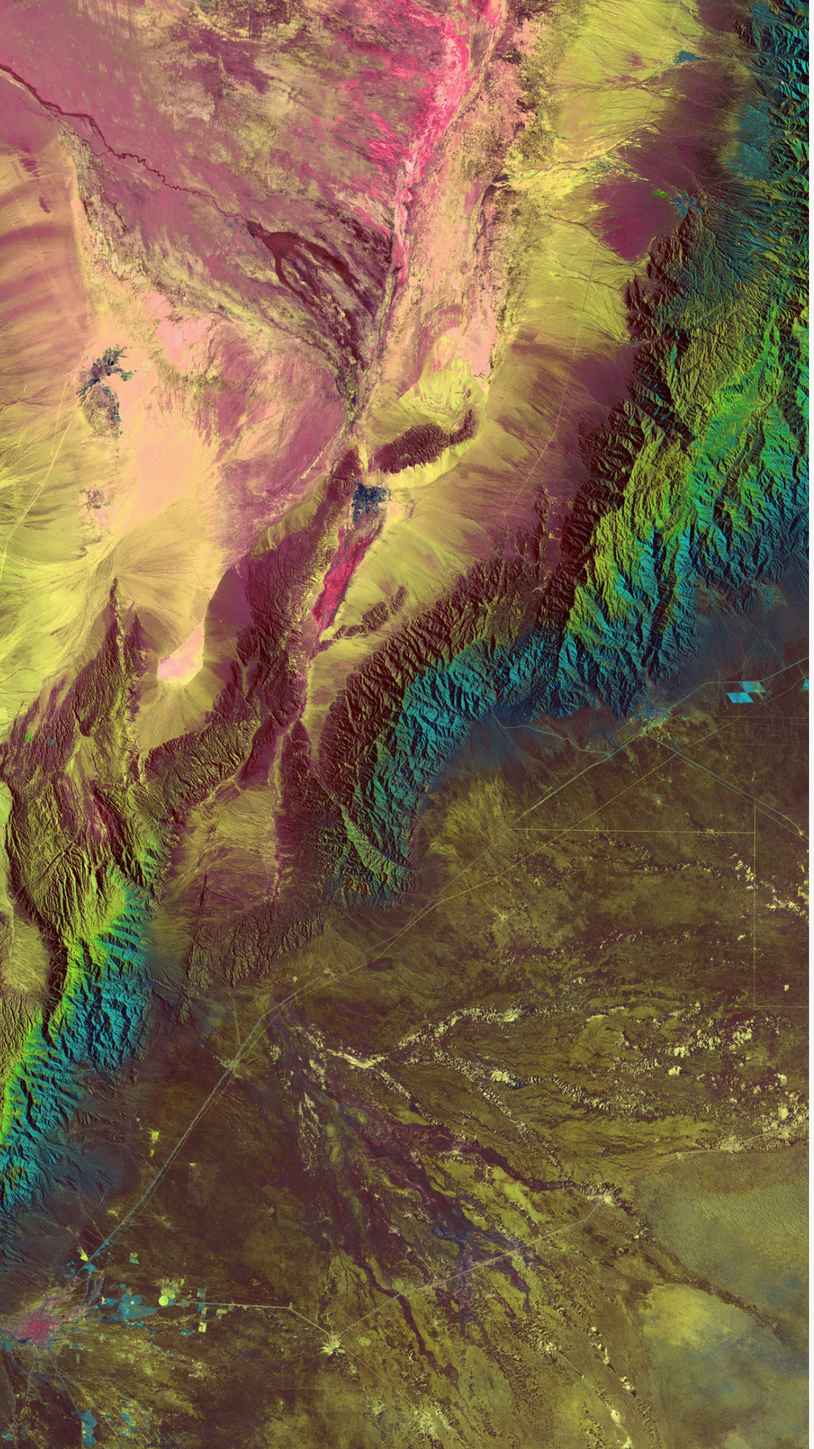
GIS is not software, it’s a career skill

Helps learners understand long-term career pathways beyond just tool usage



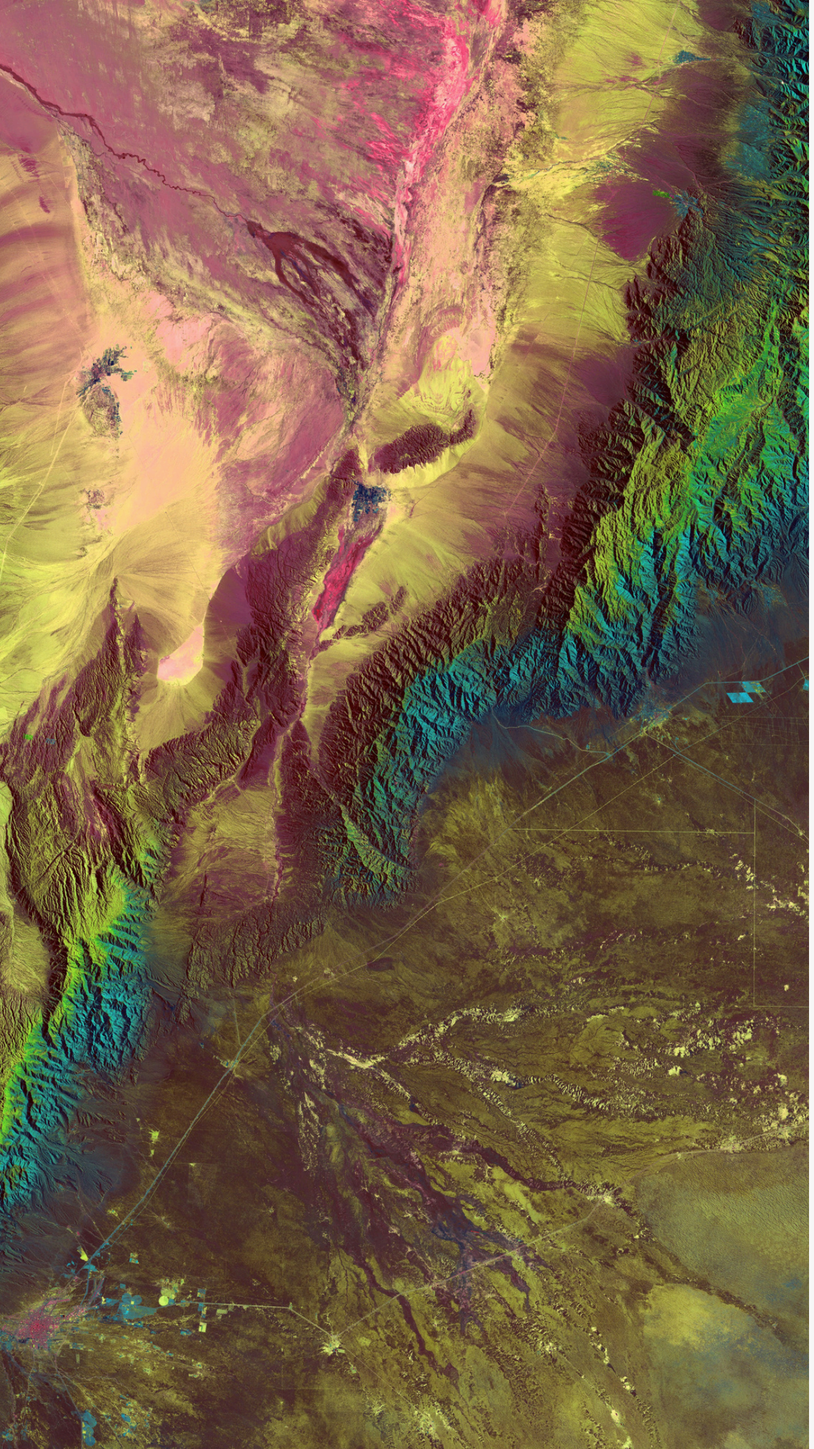
Topic 1:Geospatial Industry Landscape & Spatial Intelligence Frameworks

- Overview of the global geospatial industry and spatial data-driven decision systems.
- Evolution of GIS from desktop mapping to enterprise and cloud-based platforms.
- Role of GIS in digital transformation and location intelligence.
- Integration of GIS with planning, monitoring and asset management workflows.
- Core competencies expected from GIS professionals in the job market.
- Decision factors influencing platform selection.
- Industry demand trends including smart cities and infrastructure digitization.



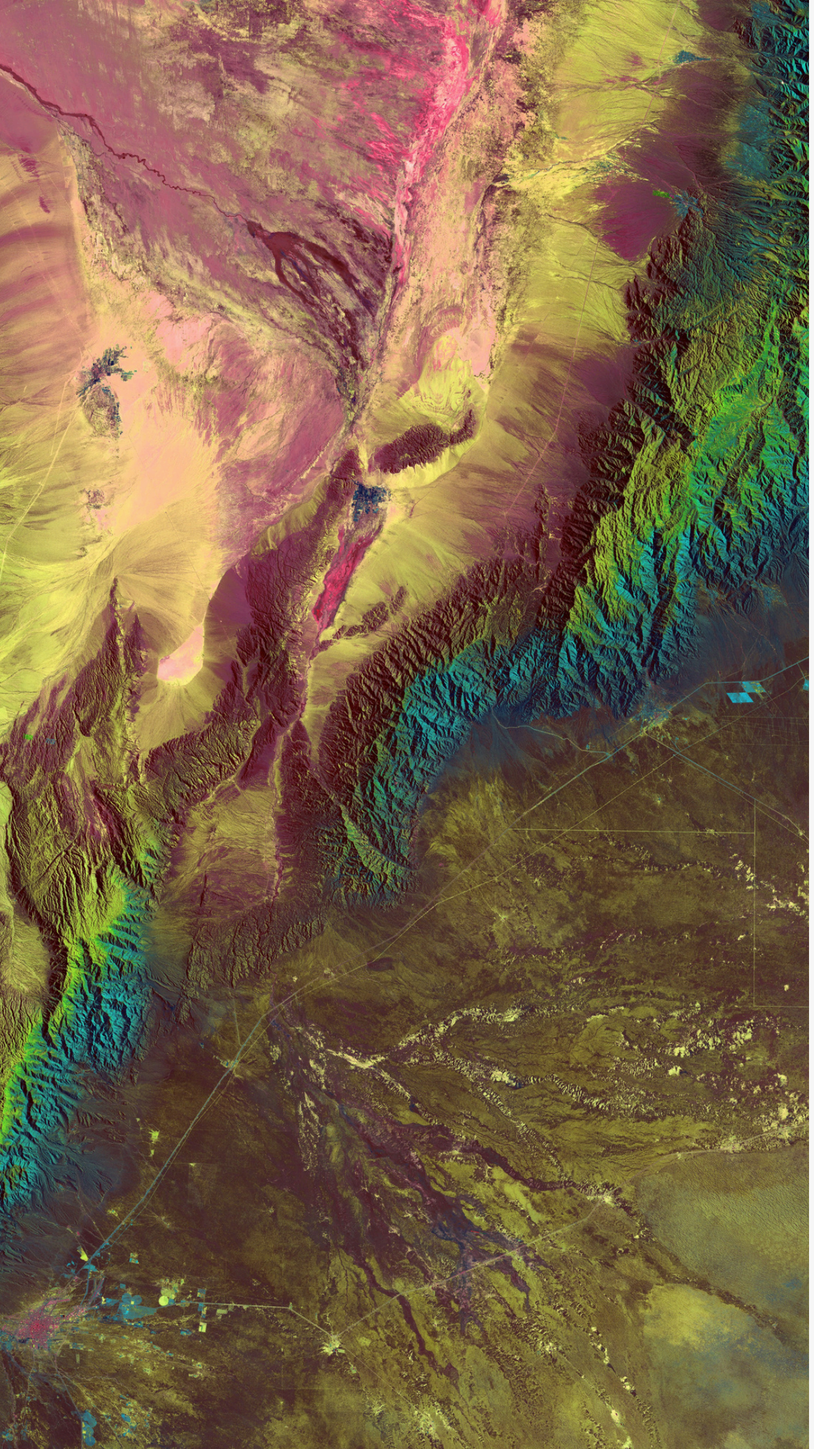
Topic 2: Spatial Data Models, Feature Geometry & Attribute Architecture

- Vector geometry types and their analytical significance
- Raster data structures and grid-based representation
- Attribute schema design and relational data modeling
- Spatial indexing mechanisms and performance implications
- Feature datasets and dataset hierarchy
- Multipart and complex geometries handling
- Data normalization and integrity constraints
- Spatial data storage optimization techniques
- Handling high-volume geospatial datasets
- Industry standards for spatial data architecture



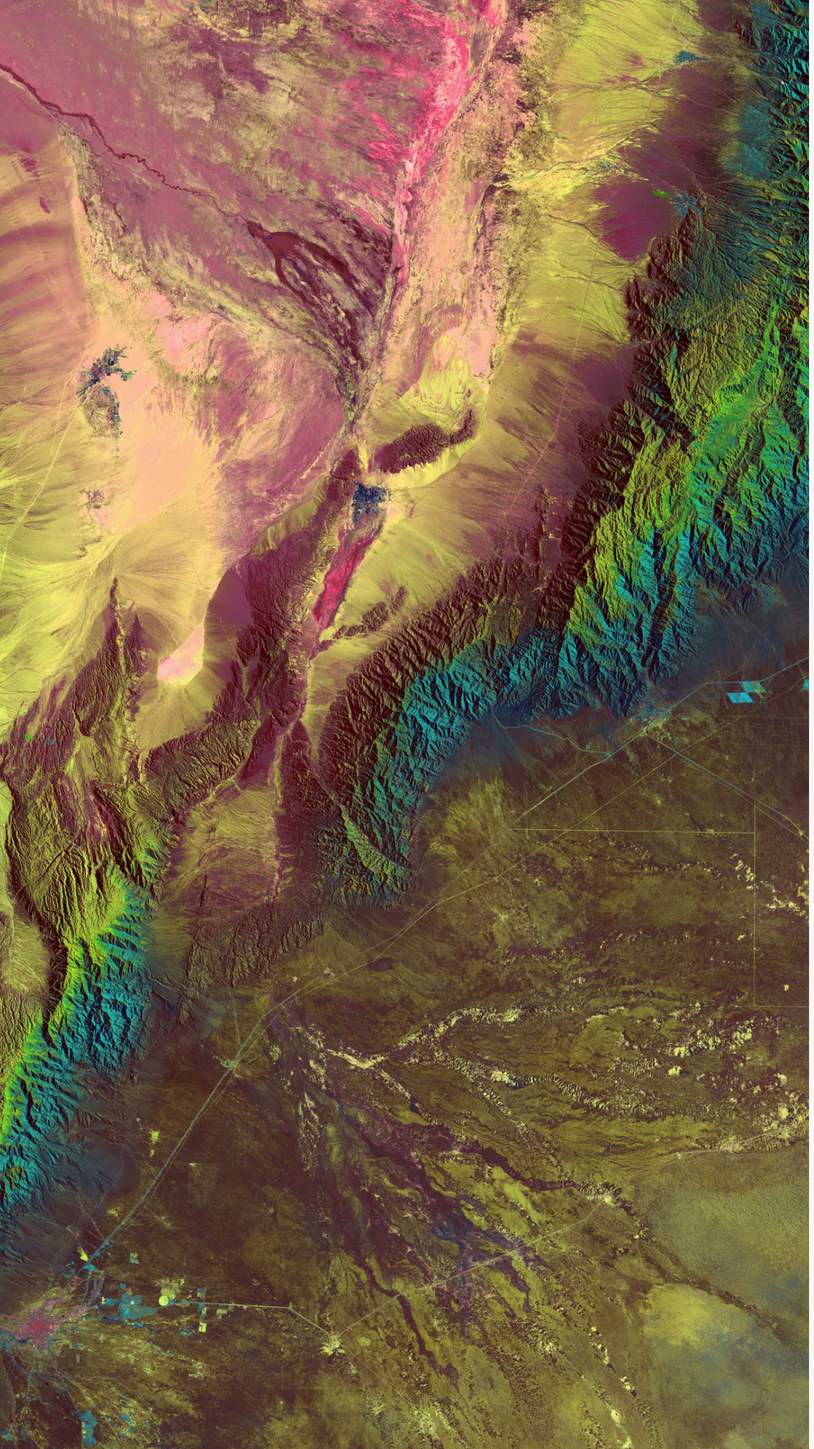
Topic 3: Spatial Topology, Validation & Data Quality Control

- Topological relationships and rules
- Detection of spatial inconsistencies
- Geometry repair and correction techniques
- Precision and scale considerations
- Attribute validation workflows
- Spatial data auditing procedures
- QA/QC documentation standards
- Managing edits in shared datasets
- Data reliability assessment
- Industry compliance requirements



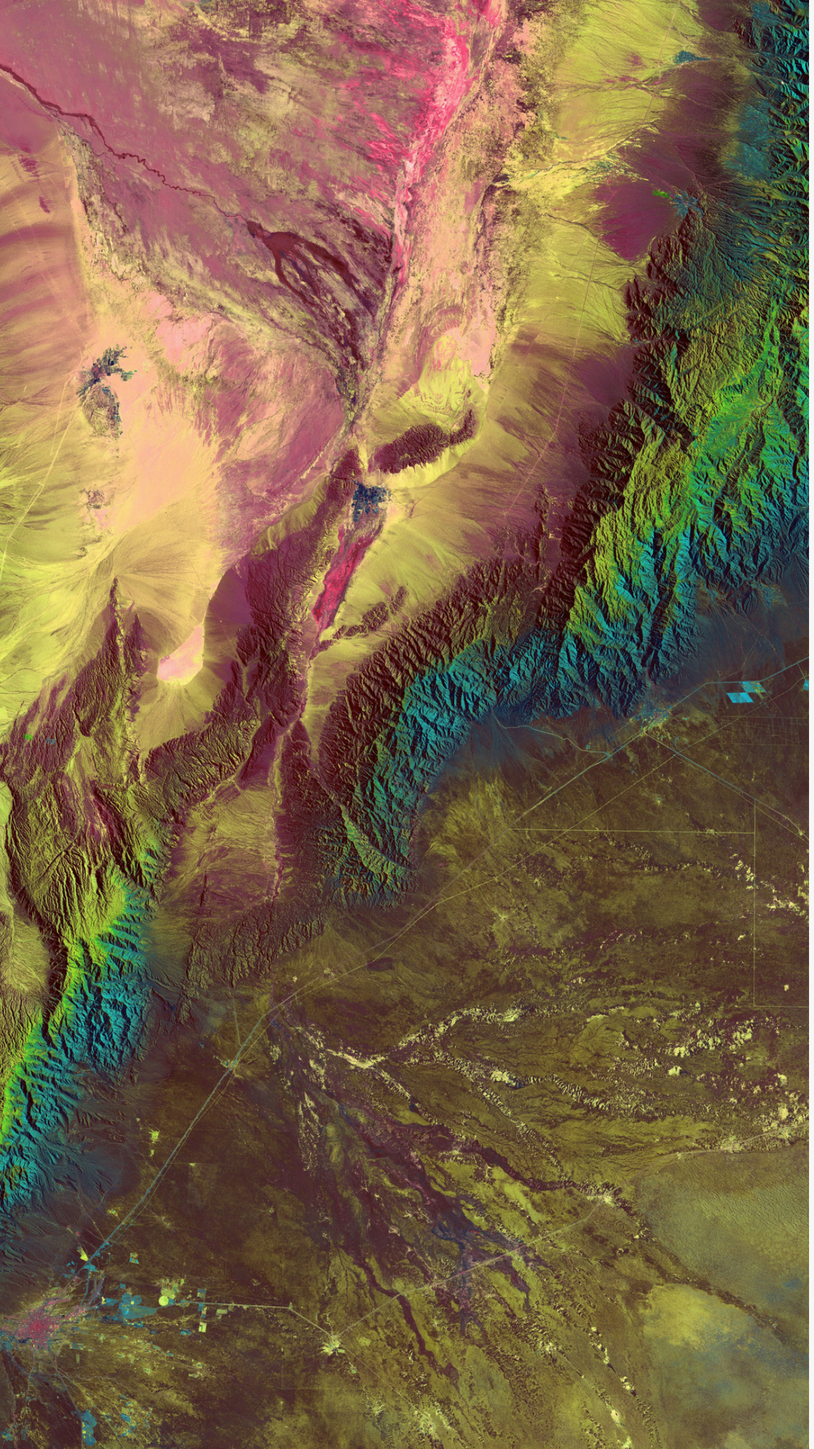
Topic 4: Vector Spatial Analysis & Proximity Modeling

- Buffer and distance analysis techniques
- Overlay analysis and spatial intersections
- Proximity-based suitability analysis
- Spatial joins and attribute transfer
- Network analysis conceptual framework
- Density surface generation
- Multi-criteria decision analysis
- Error propagation in vector analysis
- Geoprocessing workflow optimization
- Industry case studies of vector analytics



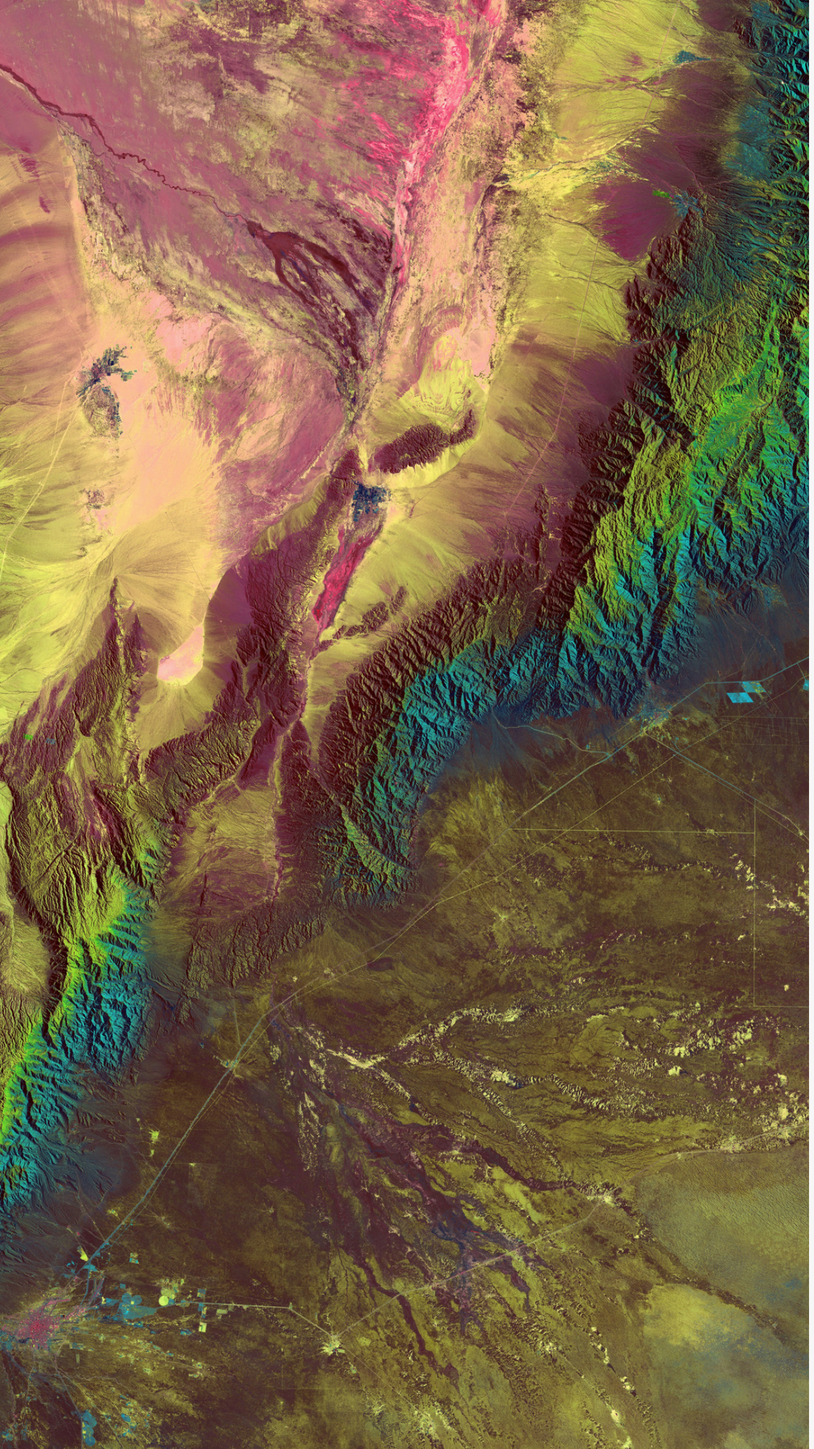
Topic 5: Spatial Databases, SQL Concepts & Enterprise GIS

- Role of databases in GIS architecture
- Spatial database components and storage
- Basic spatial SQL logic and queries
- Indexing and query performance
- Multi-user editing and access control
- Database backup and recovery concepts
- Integration with desktop GIS software
- Data security and permissions
- Enterprise GIS deployment models
- Industry use of spatial databases



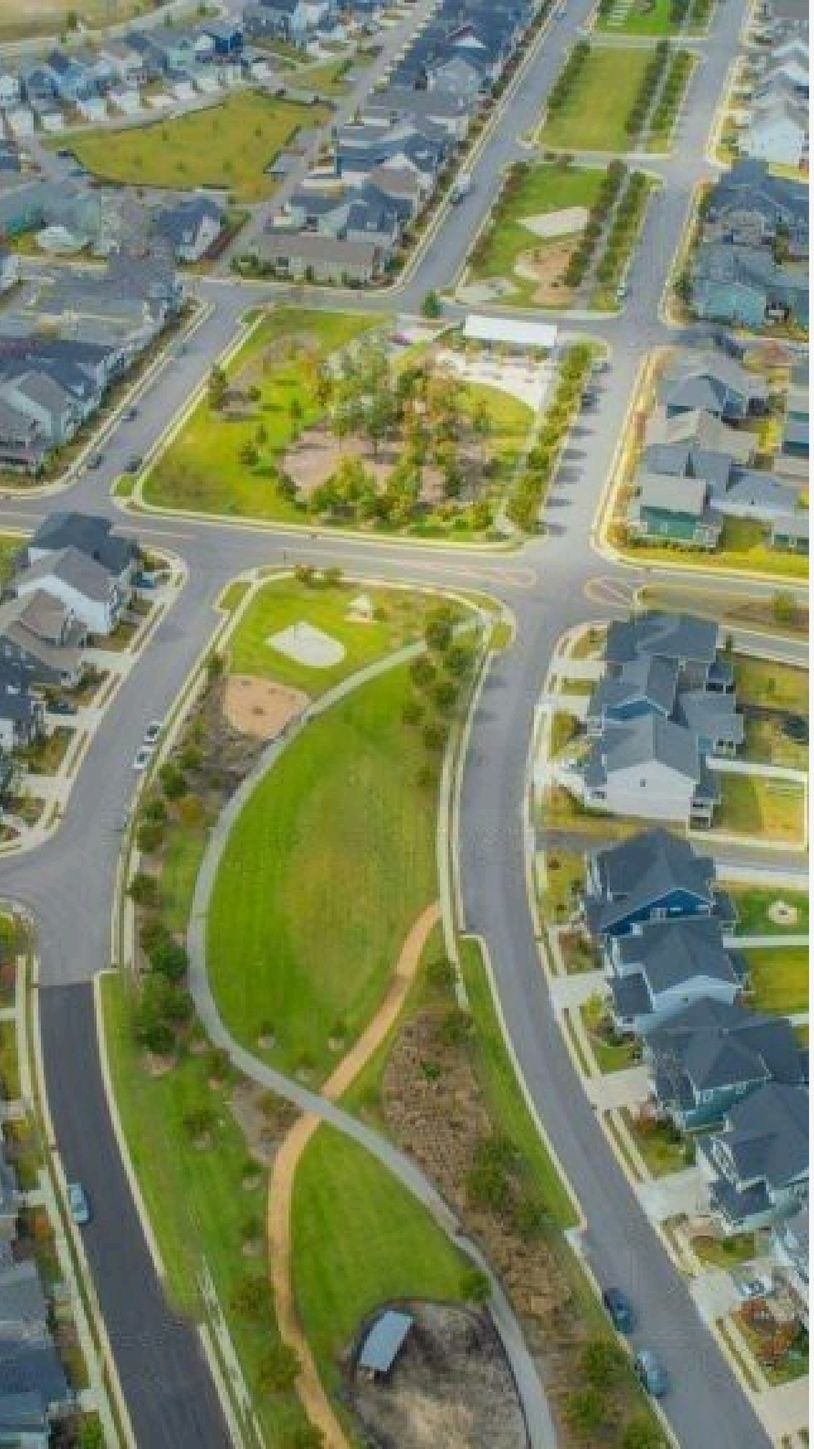
Topic 6: Coordinate Reference Systems, Projections & Geodetic Frameworks

- Geodetic foundations of spatial referencing
- Geographic coordinate systems and ellipsoids
- Projected coordinate systems and map projections
- Datum transformations and accuracy considerations
- National and regional coordinate reference systems
- Vertical datums and elevation referencing
- Distortion types and spatial measurement errors
- On-the-fly reprojection workflows
- CRS standardization in multi-source datasets
- Industry best practices for CRS management



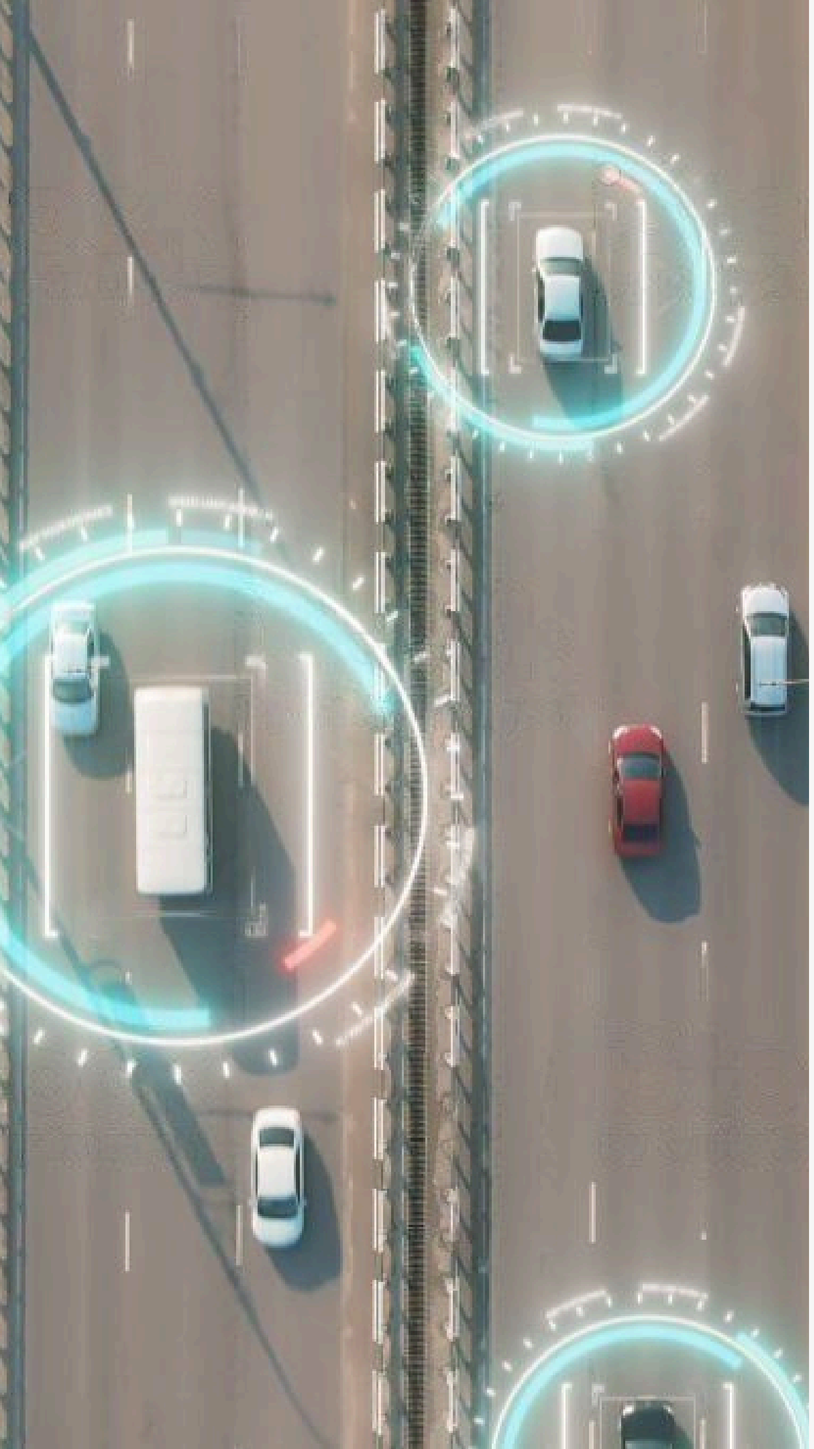
Topic 7:Advanced Cartography, Geovisualization & Map Communication

- Principles of spatial communication and cartographic clarity
- Thematic map design for analytical outputs
- Color theory and perceptual mapping techniques
- Typography and annotation for professional maps
- Scale-dependent rendering and generalization
- Multi-layer visualization strategies
- Map layout automation and templates
- Export standards for print and digital products
- Cartographic QA/QC and peer review
- Client-oriented map presentation techniques



Topic 8: Spatial Data Acquisition & GNSS Integration Workflows

- Primary and secondary geospatial data sources
- GNSS system architecture and positioning principles
- Accuracy classes and spatial precision metrics
- RTK and differential positioning concepts
- Mobile GIS workflows and field data collection
- Attribute validation and domain enforcement
- Data synchronization and cloud integration
- Field data quality assurance procedures
- Survey data integration into GIS
- Industry workflows for spatial data capture

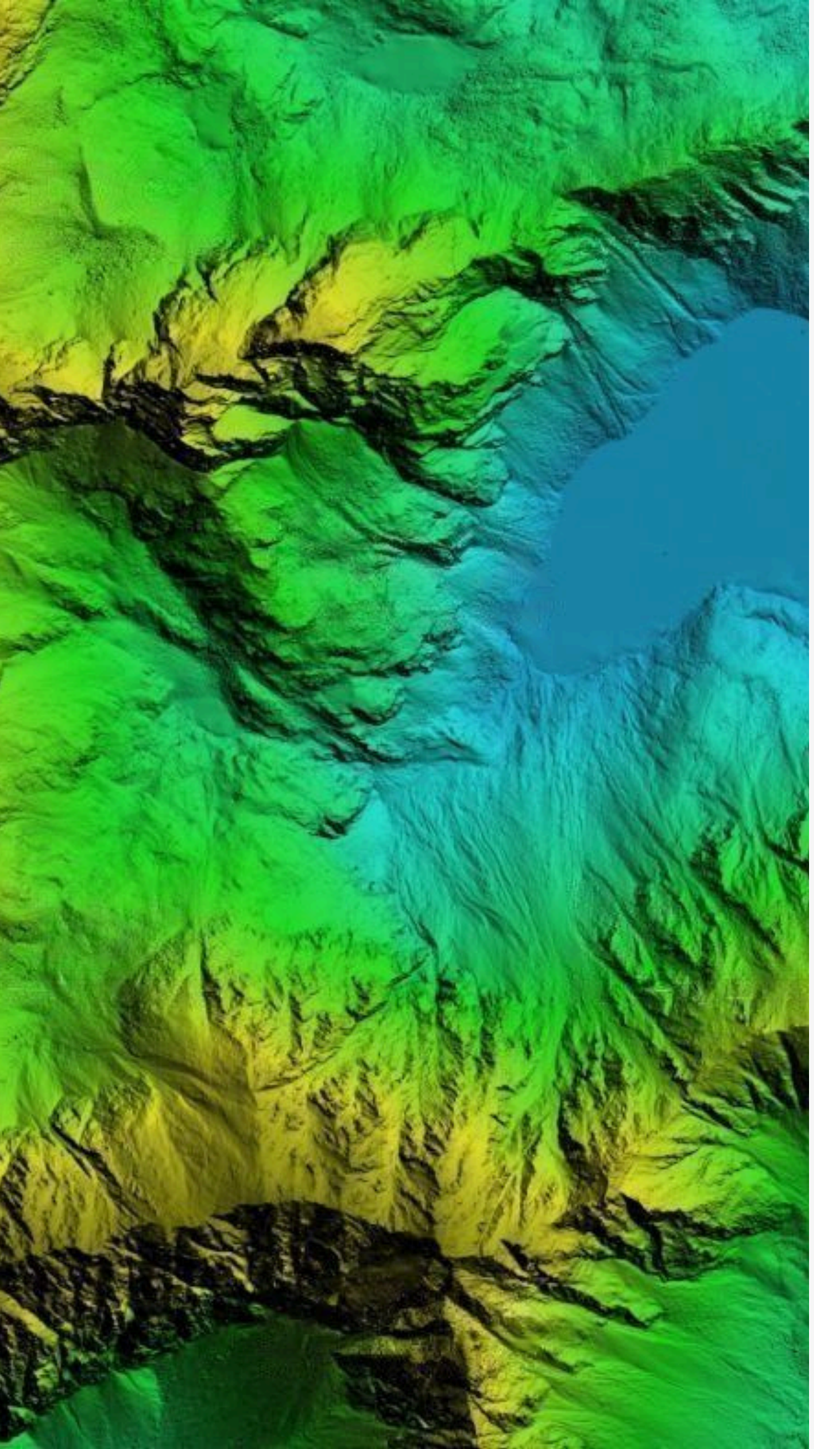


Topic 9: Raster Data Architecture & Multispectral Imagery

- Raster data properties and spatial resolution
- Spectral bands and electromagnetic spectrum relevance
- Multispectral vs hyperspectral imagery concepts
- Bit depth and radiometric resolution
- Raster data compression and storage formats
- Image mosaicking and seamless raster creation
- Raster reprojection and resampling methods
- Pixel-based data analysis principles
- Raster visualization optimization techniques
- Industry applications of raster datasets

Topic 10:Earth Observation Satellites & Sensor Technologies

- Optical satellite sensor principles
- Thermal infrared and microwave sensing
- Passive vs active remote sensing systems
- Spatial, spectral, temporal resolution
- Public satellite missions (Landsat, Sentinel)
- Commercial high-resolution satellite imagery
- Sensor calibration and radiometric consistency
- Data acquisition planning considerations
- Satellite tasking and revisit cycles
- Selecting sensors based on project needs



Topic 11: Image Pre-Processing & Radiometric Normalization

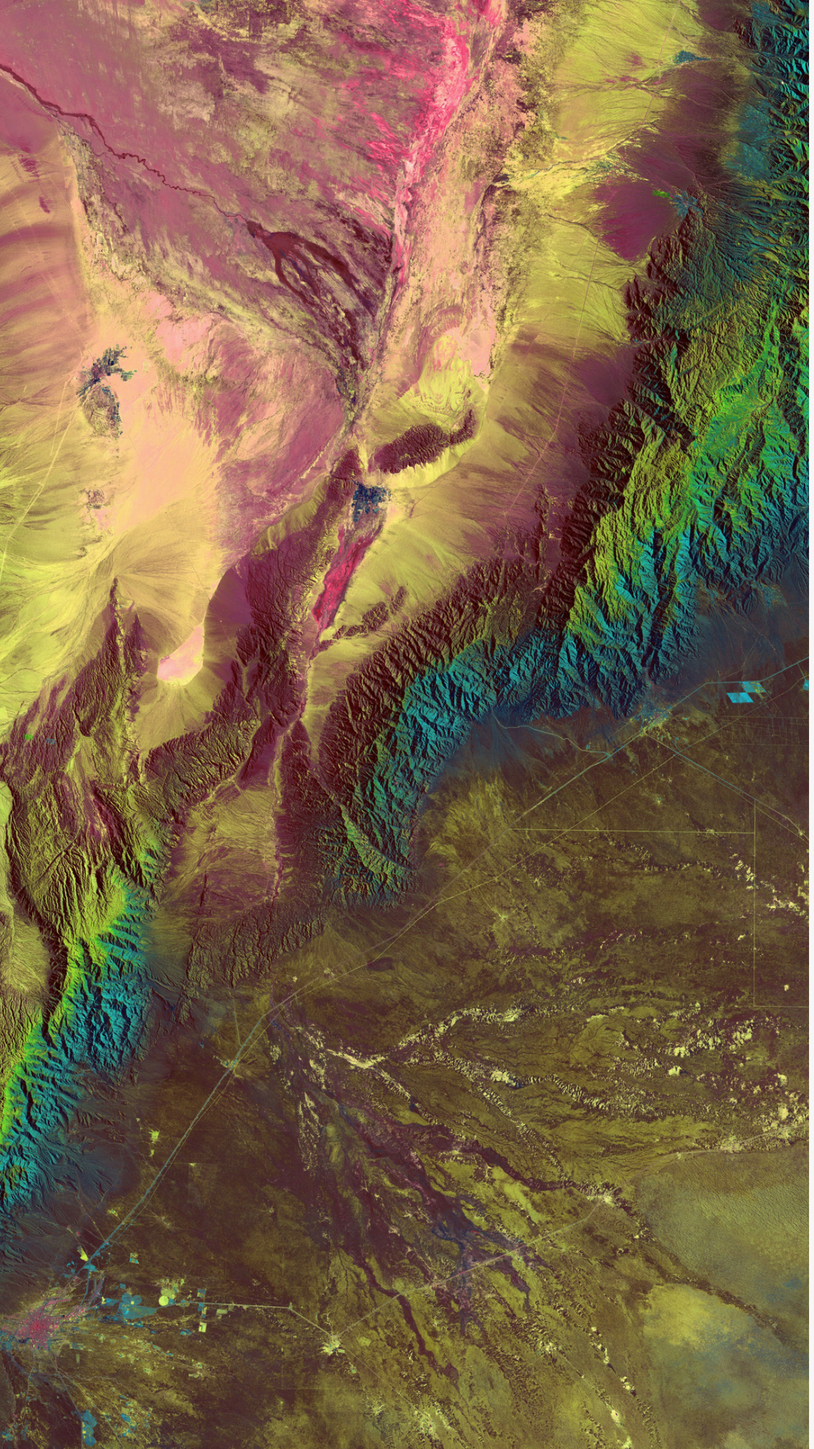
- Atmospheric effects on satellite imagery
- Radiometric calibration to surface reflectance
- Image noise and artifact correction
- Cloud, haze and shadow masking techniques
- Geometric correction and orthorectification
- Image normalization for temporal studies
- Mosaicking and seamline optimization
- Quality assessment of pre-processed imagery
- Pre-processing automation concepts
- Industry workflows for image readiness

Topic 12: Spectral Indices & Biophysical Parameter Analysis

- Vegetation index theory and interpretation
- Water detection and moisture indices
- Urban and built-up area indices
- Thermal indices and surface temperature logic
- Index threshold selection methodologies
- Seasonal variability analysis
- Index limitations and uncertainty
- Combining multiple indices for interpretation
- Visualization of index outputs
- Industry applications of spectral indices

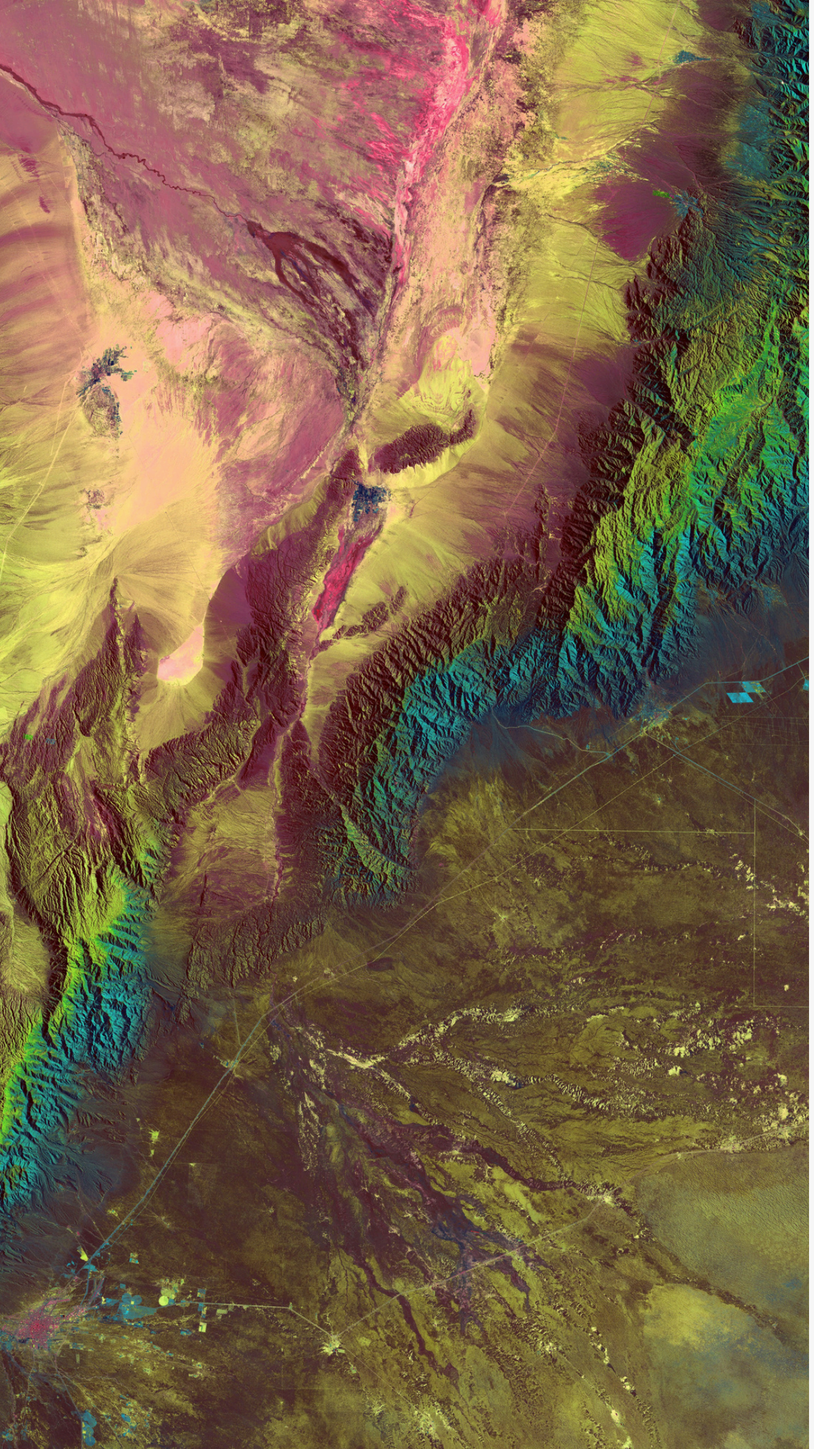
Topic 13:Multi-Resolution Satellite-Derived Land Use / Land Cover (LULC) Classification & Spatial Analytics

- LULC classification systems and legends
- Visual interpretation vs digital classification
- Training sample design principles
- Pixel-based classification logic
- Object-based image analysis concepts
- Post-classification smoothing techniques
- Accuracy assessment methodologies
- Change detection between LULC datasets
- LULC mapping for planning and policy
- Industry reporting standards for LULC



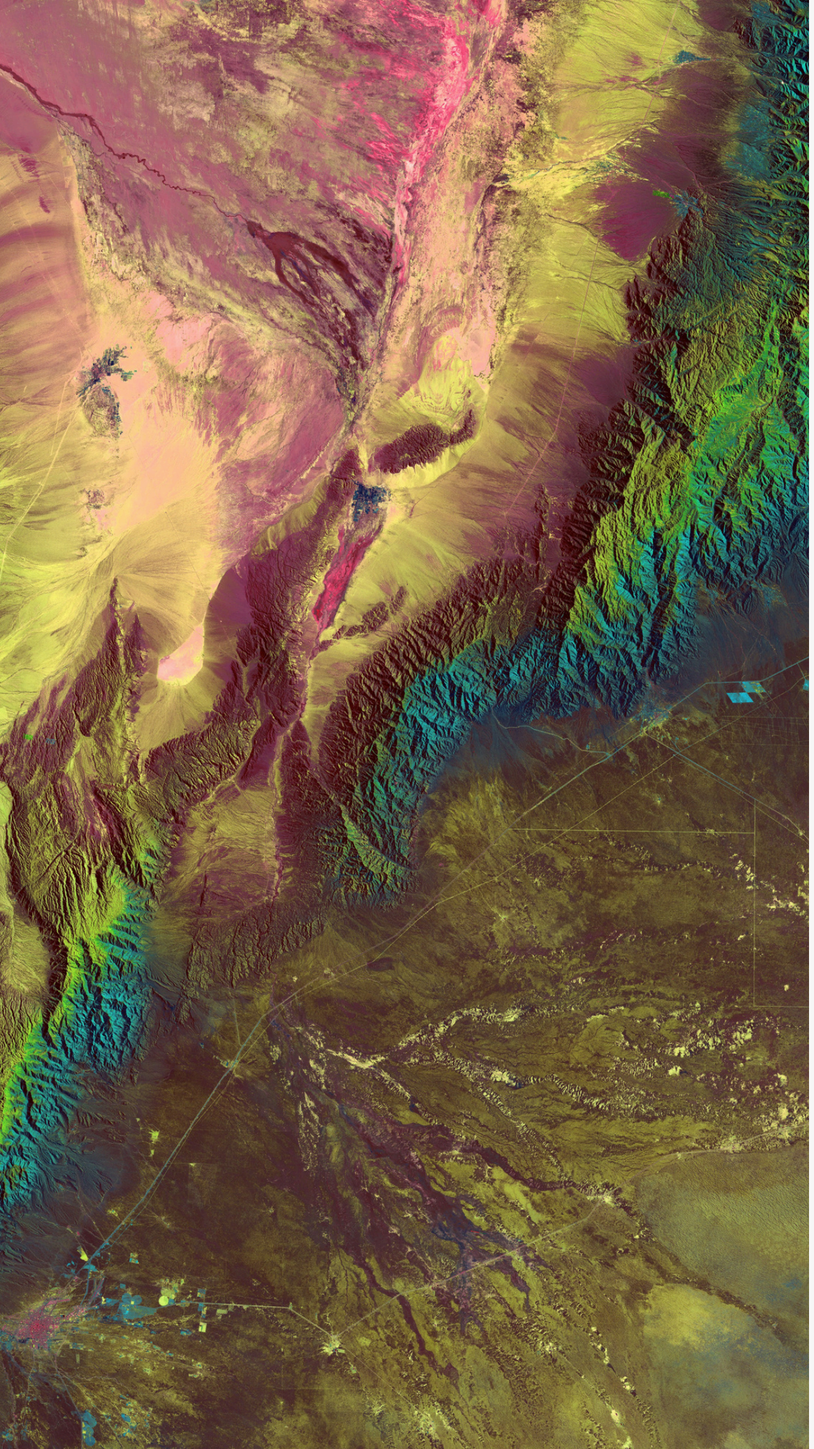
Topic 14:Spatial Accuracy Assessment, Validation Protocols & Uncertainty Quantification in Geospatial Analysis

- Importance of spatial accuracy
- Sampling design for validation
- Confusion matrix interpretation
- Positional accuracy assessment
- Field verification techniques
- Error propagation concepts
- Reporting uncertainty to clients
- Accuracy standards and benchmarks
- QA/QC compliance documentation
- Industry audit requirements



Topic 15:Multi-Date Satellite Image Change Detection, Temporal Analytics & Spatio-Temporal Modeling

- Temporal resolution and revisit cycles
- Image differencing techniques
- Post-classification comparison methods
- Trend analysis of land changes
- Urban expansion monitoring
- Environmental degradation studies
- Visualization of temporal changes
- Uncertainty in temporal analysis
- Data management for time-series
- Industry applications of change detection

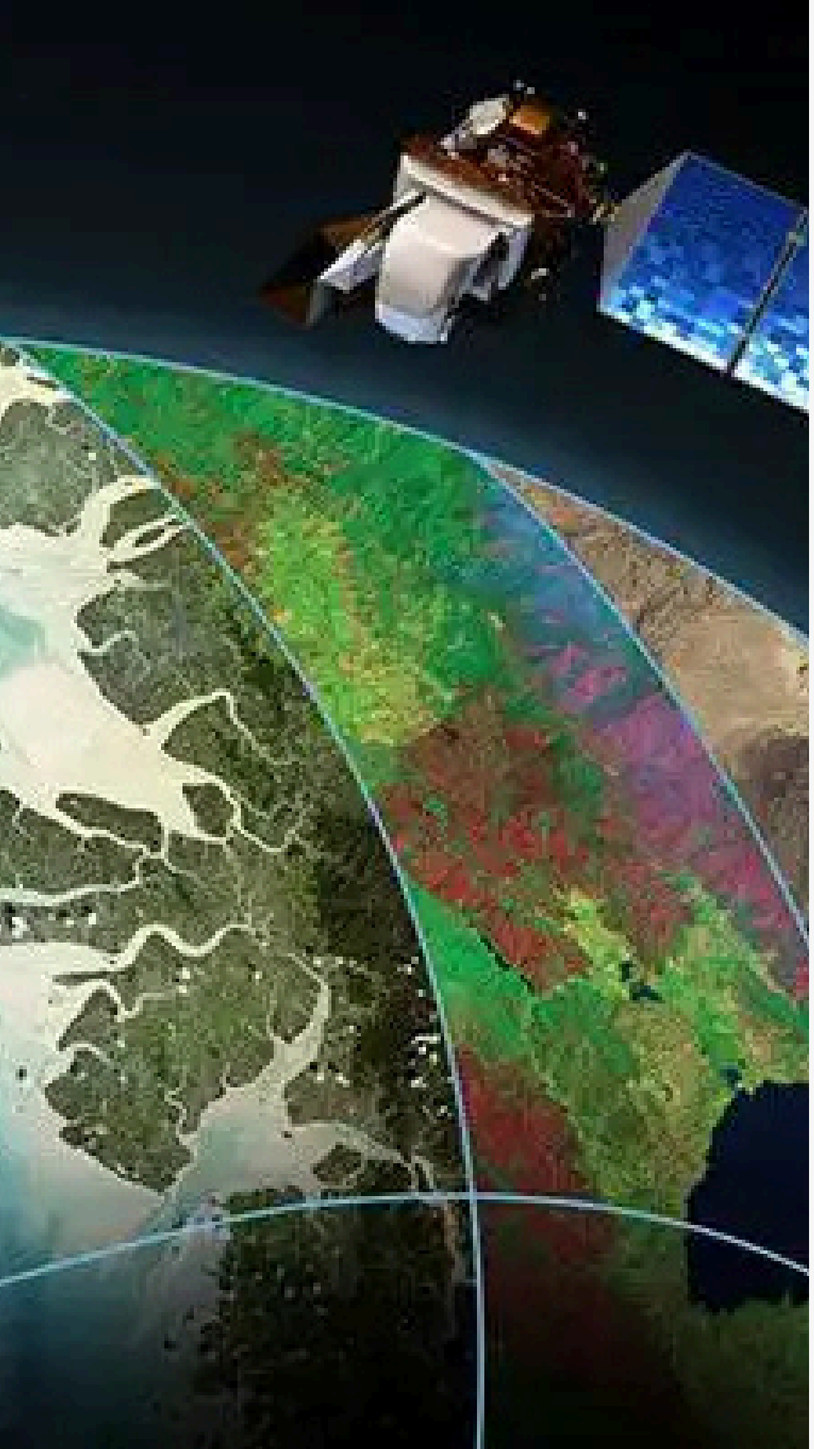


Topic 16:Spatio-Temporal Land Use / Land Cover Change Prediction Using Spatial Transition & Simulation Models

- Concept of predictive spatial modeling in land use and land cover studies
- Drivers of LULC change: socio-economic, environmental, infrastructural, and policy factors
- Historical LULC dataset preparation for modeling inputs
- Transition probability analysis and change matrices
- Cellular automata concepts for spatial growth simulation
- Markov chain modeling for temporal LULC prediction
- Suitability surface generation using weighted spatial factors
- Constraint mapping for restricted and protected zones
- Model calibration and validation using historical data
- Scenario-based LULC prediction for planning and decision support

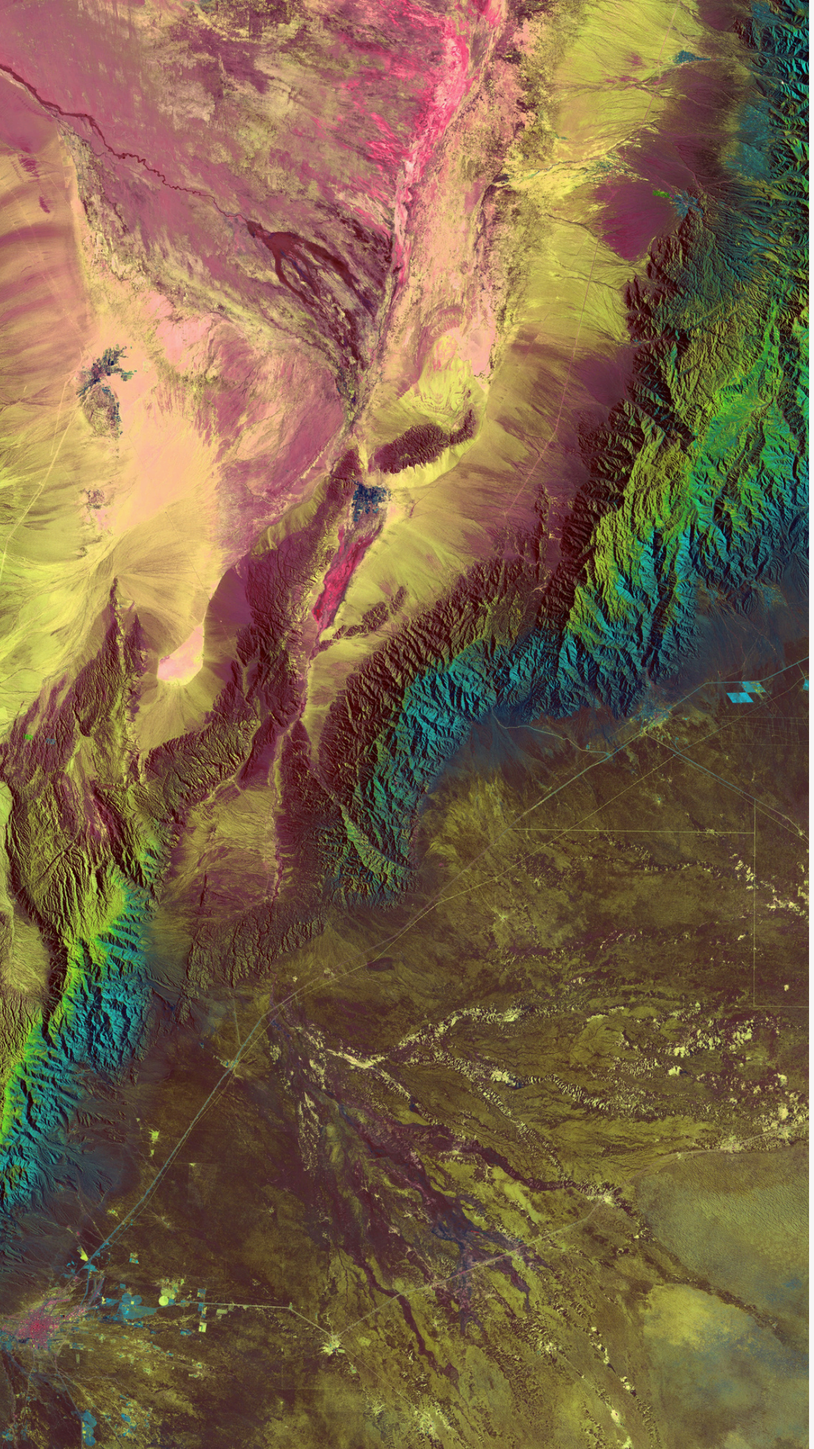
Topic 17: Elevation Surface Modeling, Terrain Derivative Extraction & Topographic Analytics

- DEM generation methods and data sources
- Elevation accuracy and resolution considerations
- Slope, aspect and curvature derivation
- Hillshade and relief visualization
- Contour generation workflows
- Terrain profiling and cross-section analysis
- DEM conditioning techniques
- Terrain influence on spatial processes
- Integration of DEM with vector data
- Engineering and planning applications



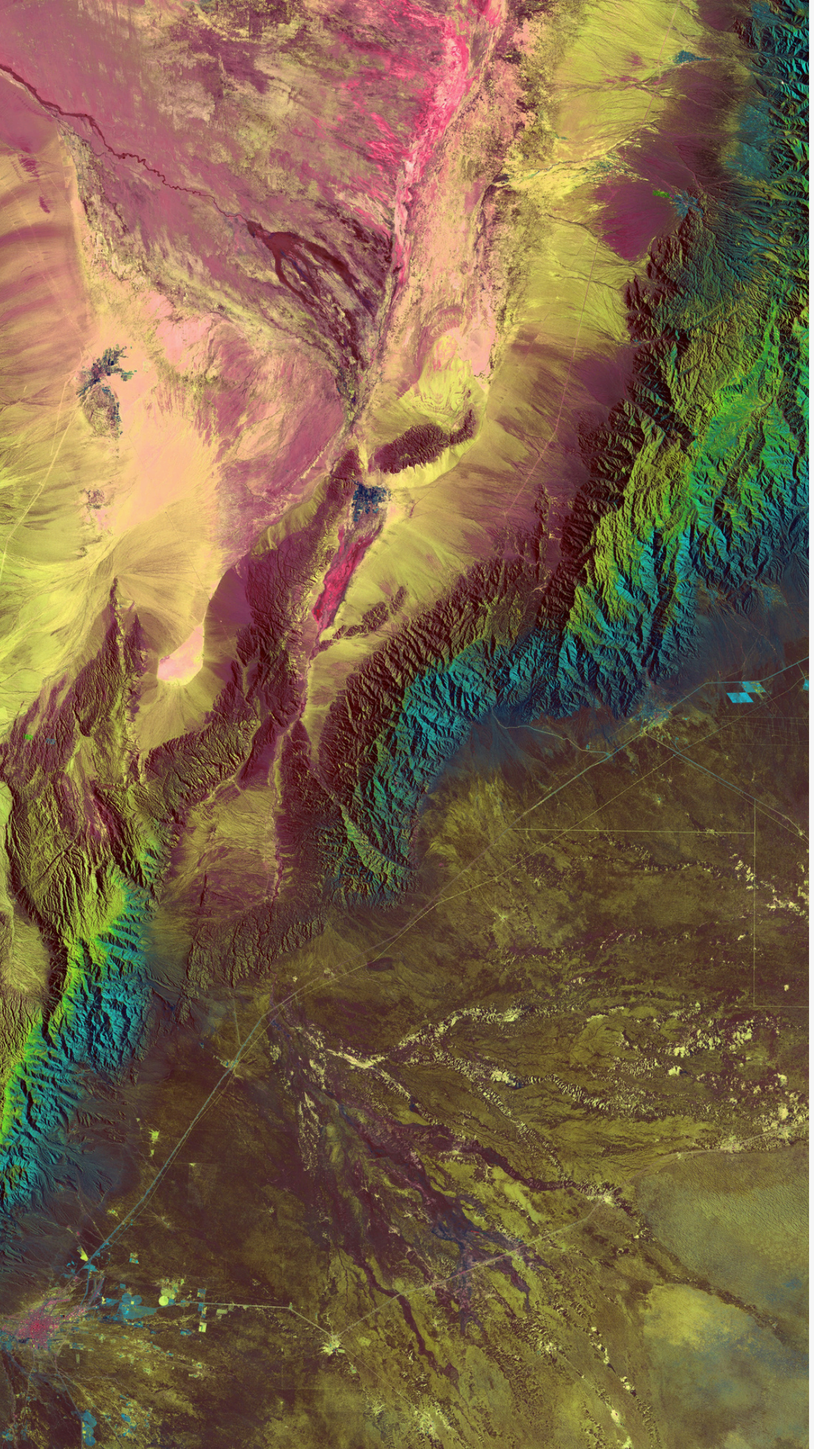
Topic 18: Spatial Hydrological Process Modeling, Catchment Delineation & Flow Dynamics Analysis

- Hydrological concepts in GIS analysis
- Flow direction and accumulation algorithms
- Stream network extraction techniques
- Watershed and sub-basin delineation
- Floodplain and inundation modeling concepts
- Surface runoff analysis
- DEM-based hydrological corrections
- Integration of rainfall datasets
- Watershed prioritization methods
- Applications in water resource management



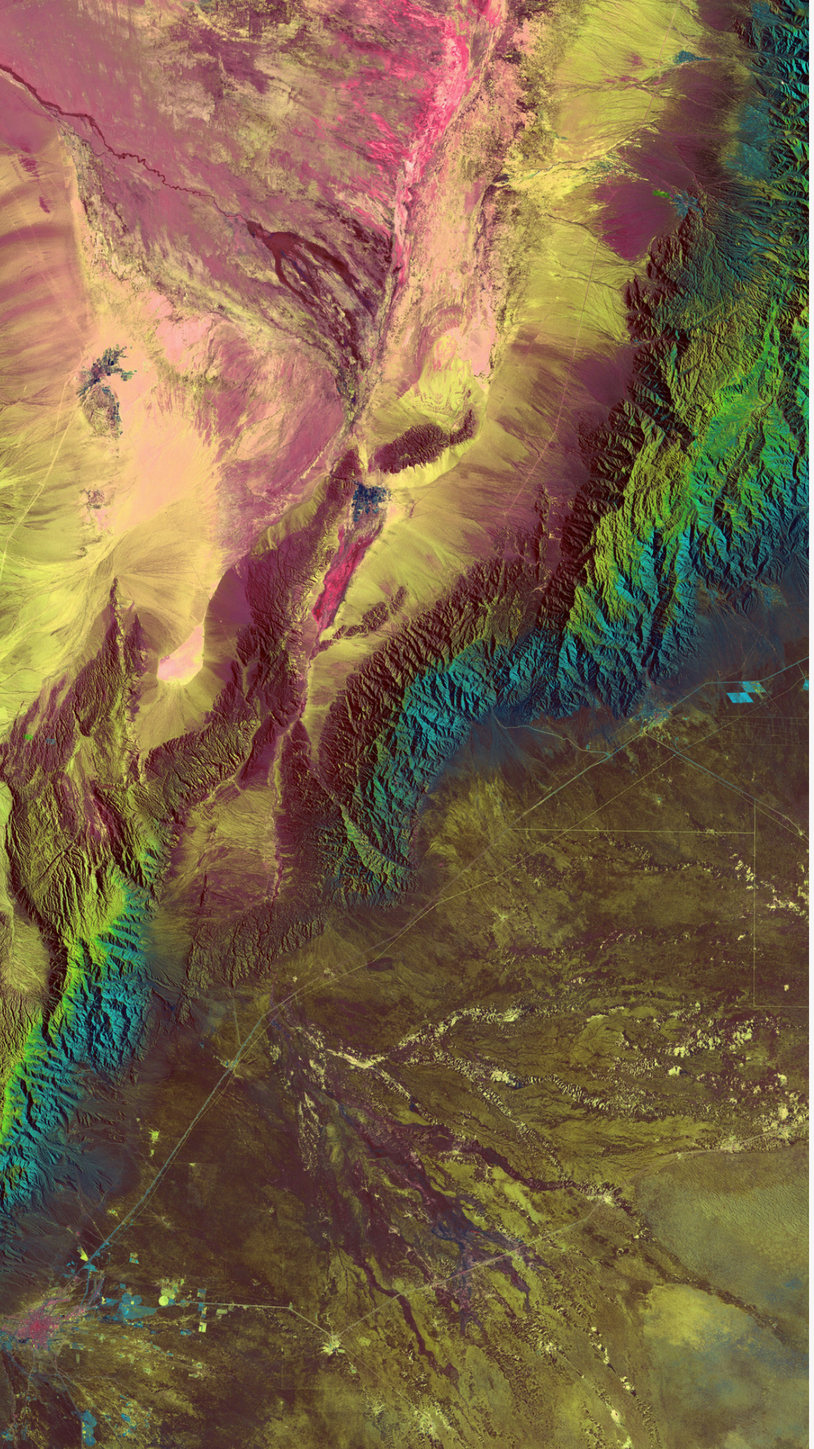
Topic 19: LiDAR Fundamentals & Point Cloud Analytics

- LiDAR system components and principles
- Point cloud data structure and attributes
- Ground and non-ground classification
- Generation of DTM, DSM and CHM
- Vertical accuracy assessment
- Point cloud visualization techniques
- Feature extraction from LiDAR
- Integration of LiDAR with GIS layers
- Applications in urban and forestry studies
- Industry workflows for LiDAR processing



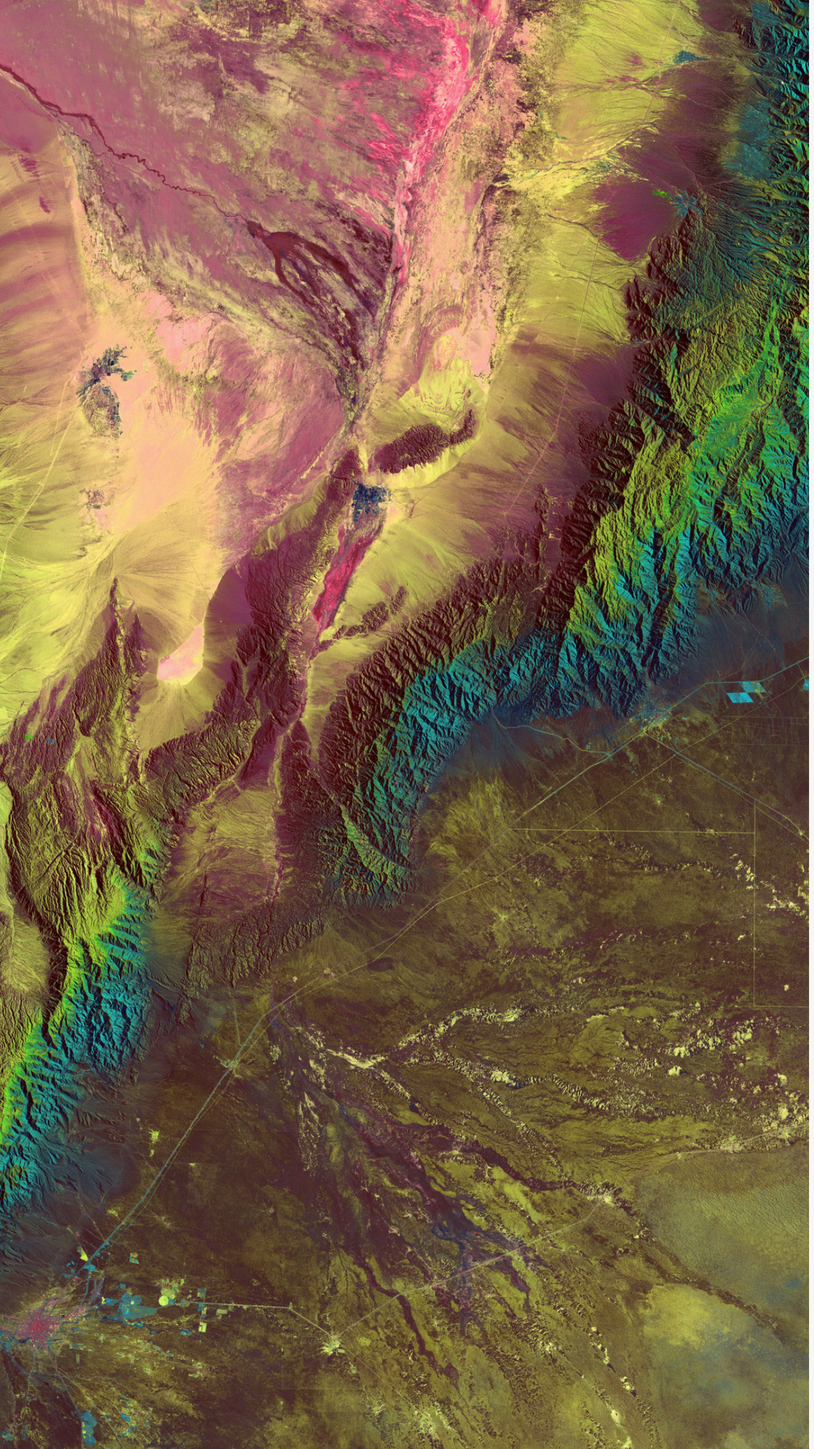
Topic 20:UAV-Based Remote Sensing, Digital Photogrammetry & High-Resolution Spatial Data Generation

- UAV platform types and payload sensors
- Flight planning and mission parameters
- Ground control points and accuracy
- Photogrammetric processing pipeline
- Orthomosaic and surface model outputs
- Quality assessment of UAV products
- Regulatory and safety considerations
- UAV data storage and management
- Integration of UAV outputs into GIS
- Industry applications of drone mapping



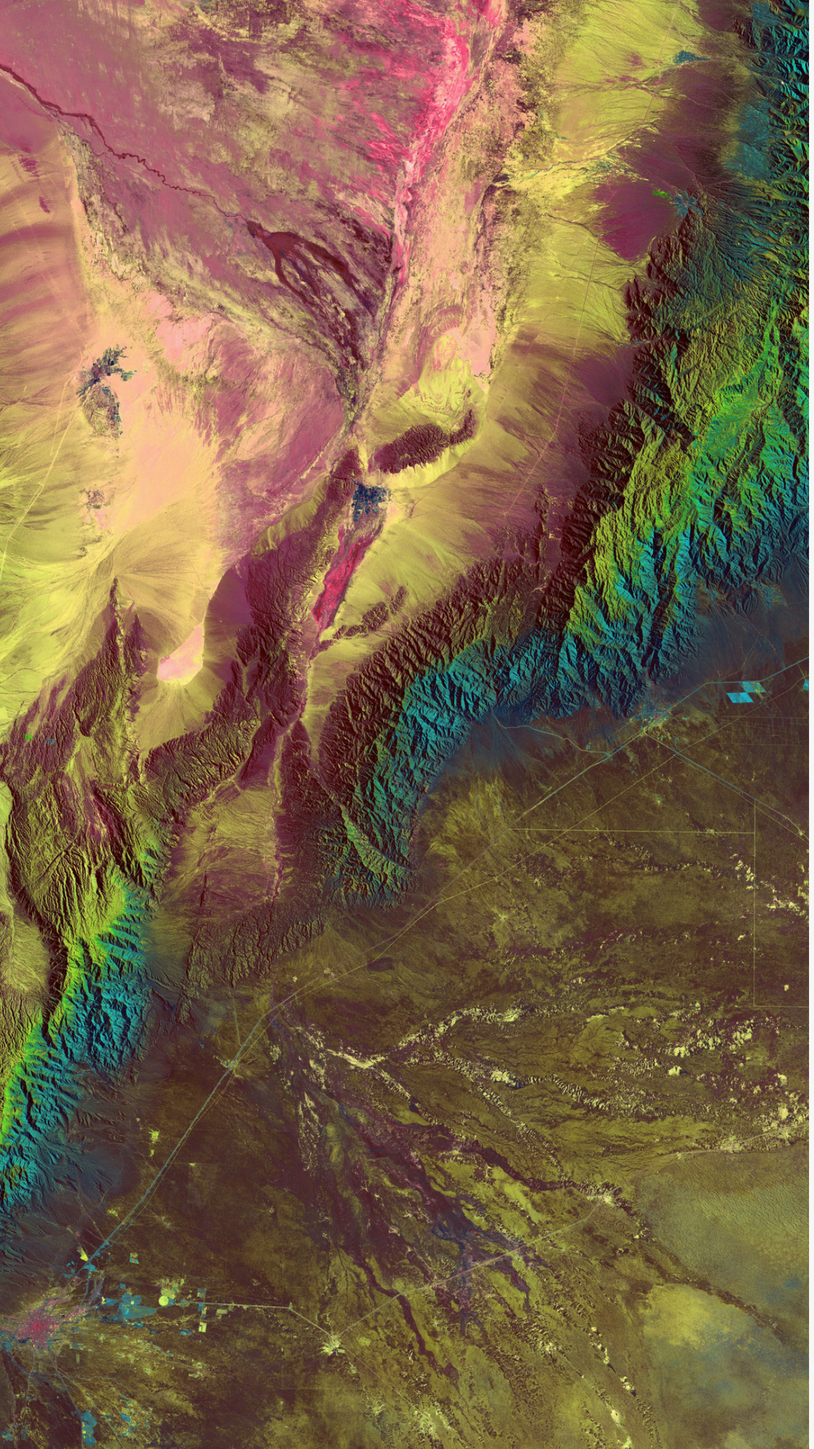
Topic 21:Urban GIS, Infrastructure & Smart City Systems

- Spatial planning and zoning analysis
- Urban growth and sprawl modeling
- Transportation and mobility mapping
- Utility network mapping concepts
- Asset management using GIS
- Urban risk and vulnerability analysis
- Integration of real-time spatial data
- Smart city spatial dashboards
- Decision-support for urban governance
- Municipal GIS case studies



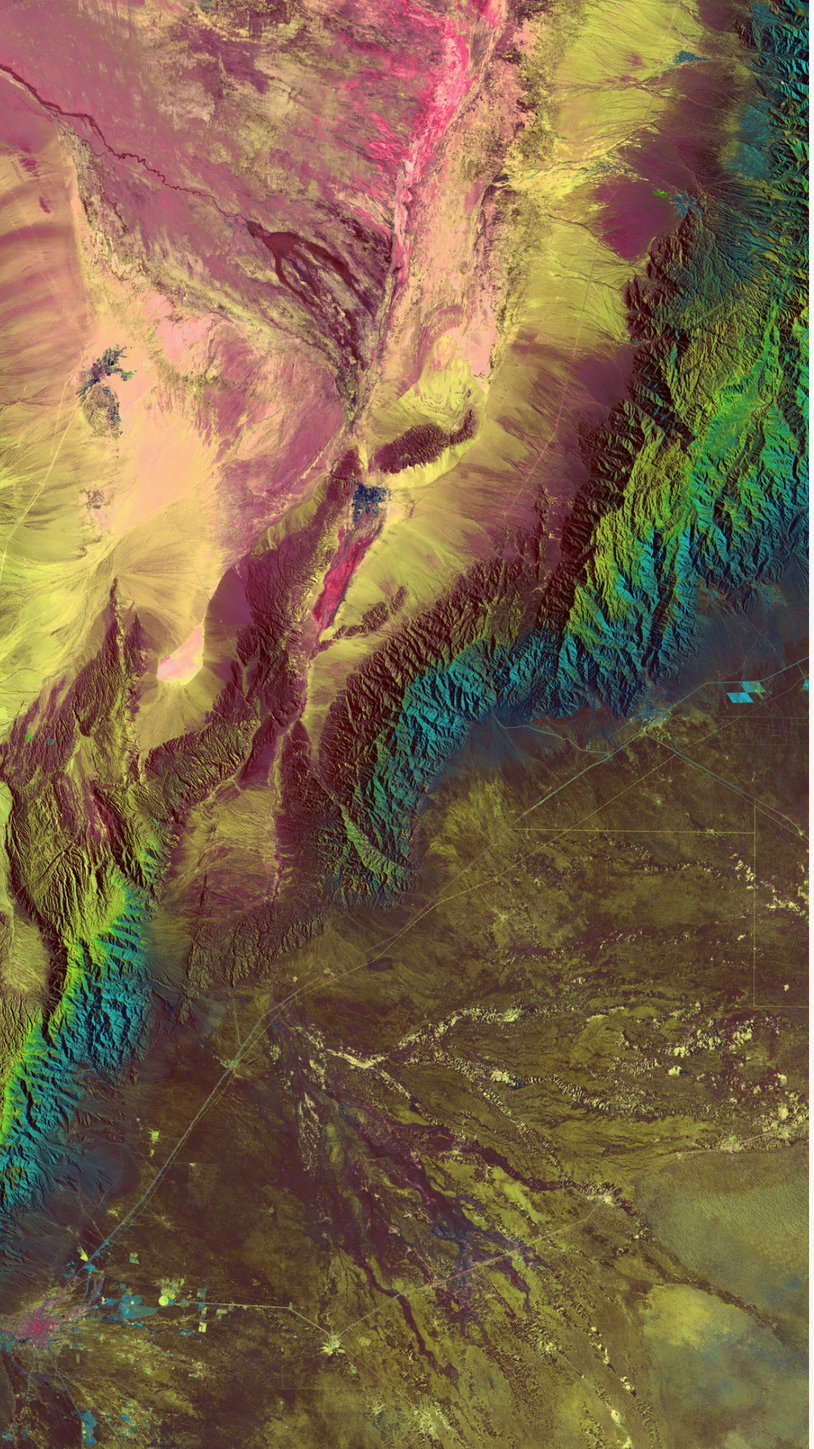
Topic 22:Environmental GIS & Climate Applications

- Environmental impact assessment workflows
- Habitat and ecosystem mapping
- Climate datasets and indicators
- Disaster risk and hazard mapping
- Environmental change monitoring
- Conservation planning and prioritization
- Integration of multi-temporal datasets
- Spatial modeling for sustainability
- Environmental reporting standards
- Policy support using GIS outputs



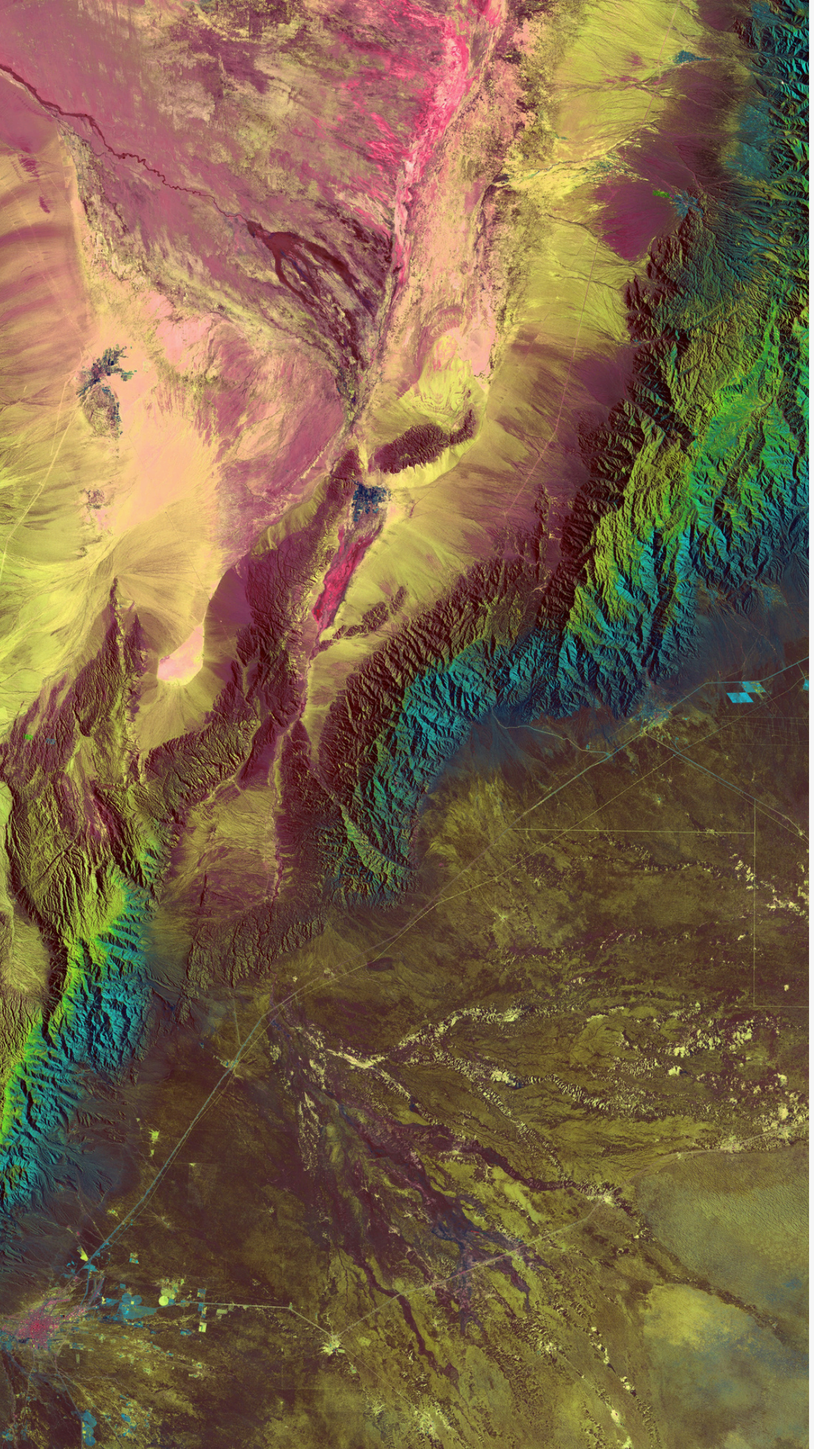
Topic 23:Geological, Mining & Resource GIS

- Geological data representation in GIS
- Lithology and structural mapping
- Mineral exploration datasets
- Mining lease and boundary management
- Terrain analysis for mining operations
- Environmental compliance mapping
- Volume estimation concepts
- Remote sensing for mineral indicators
- Safety and risk mapping
- Industry mining GIS workflows



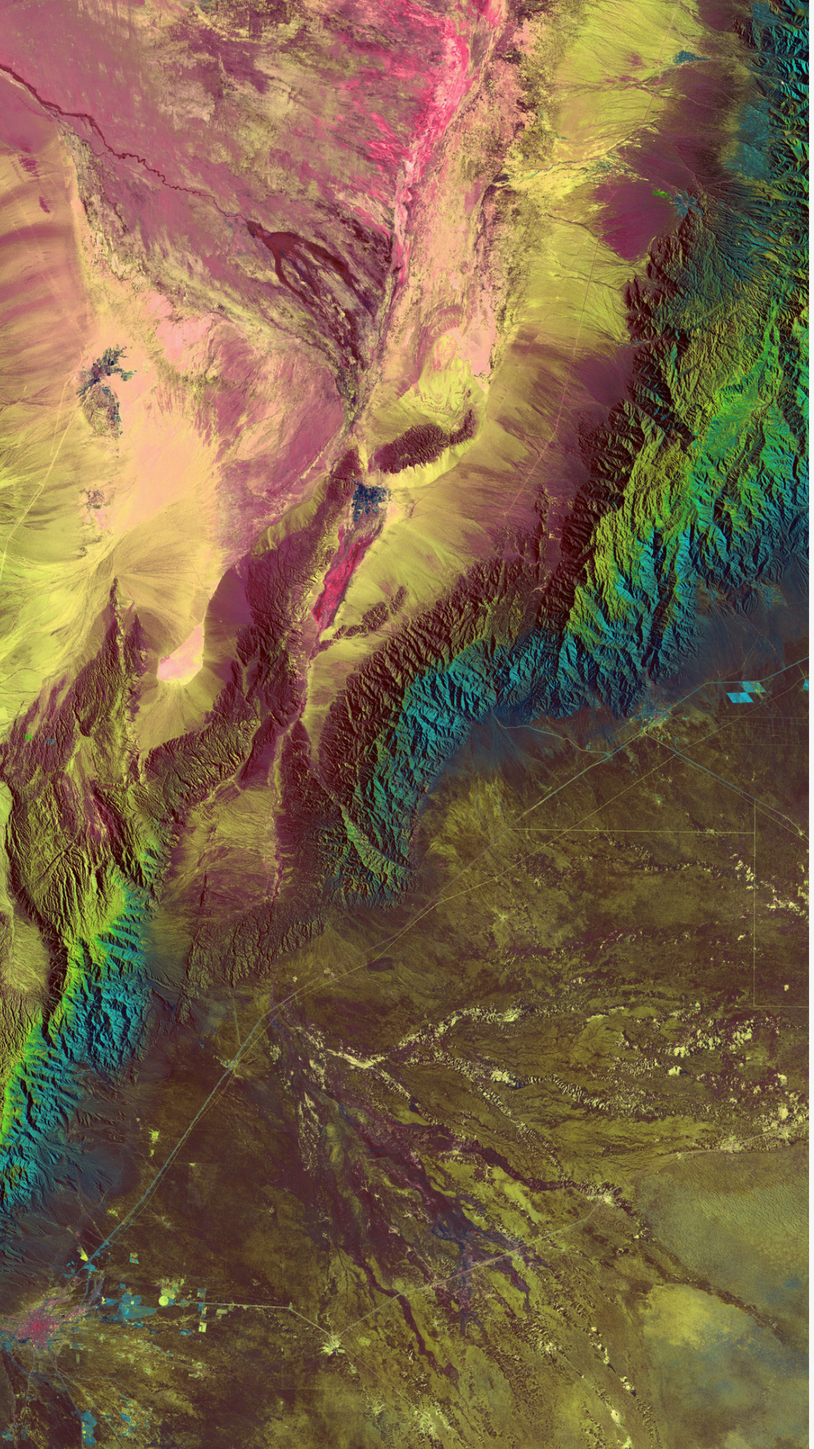
Topic 24:Utility, Energy & Linear Infrastructure GIS

- Linear asset data modeling
- Network connectivity and flow logic
- Maintenance planning using GIS
- Spatial risk analysis for utilities
- Integration with enterprise asset systems
- Mobile GIS for field crews
- Data synchronization strategies
- Outage and fault mapping concepts
- Infrastructure lifecycle management
- Industry best practices in utility GIS



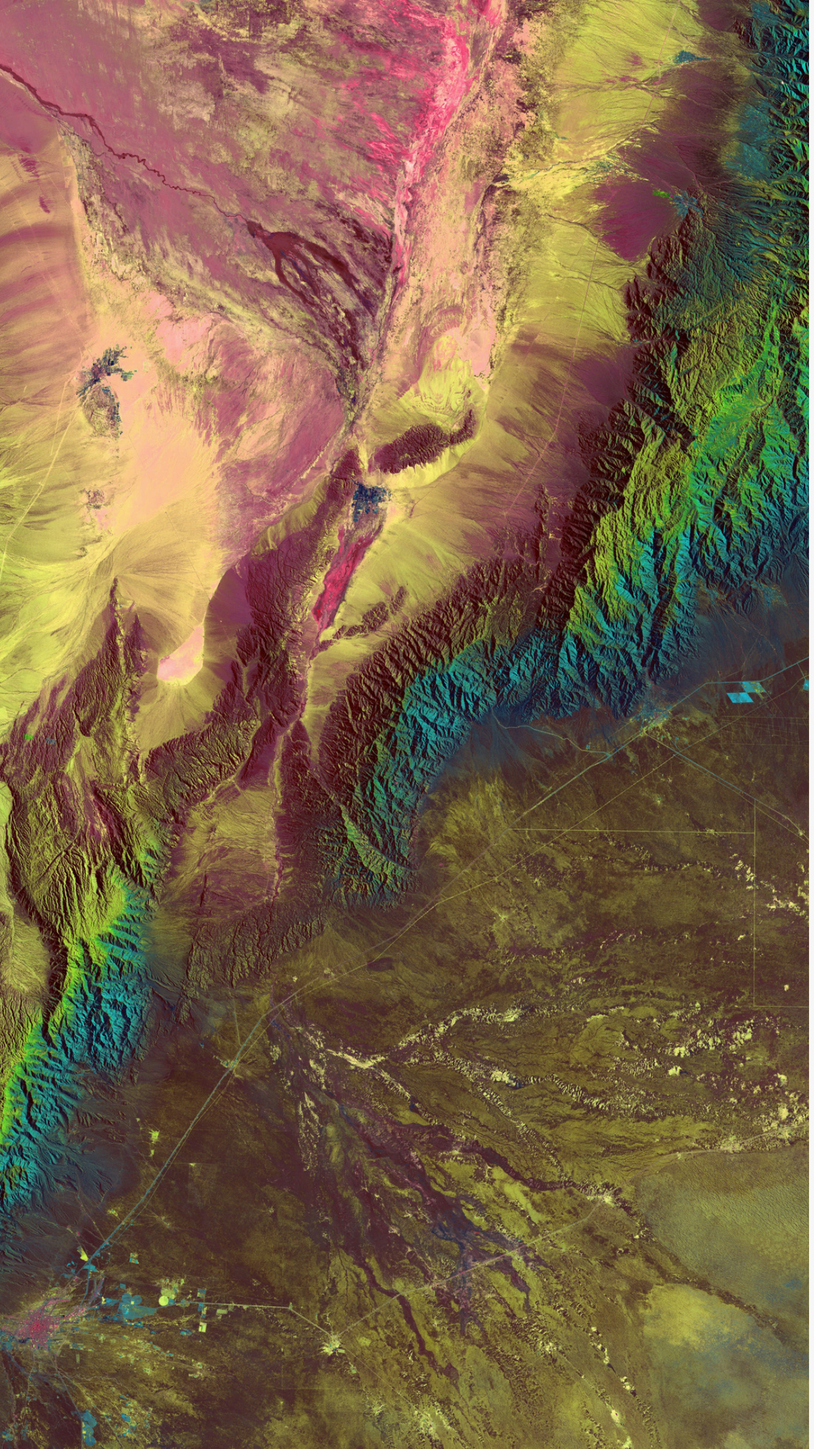
Topic 25: Integrated GIS–MCDA Framework for Suitability and Site Selection Analysis

- Introduction to spatial decision support systems (SDSS) and multi-criteria decision analysis (MCDA) in GIS
- Concept of suitability analysis and application areas
- Multi-criteria evaluation (MCE) workflow in GIS
- Analytic Hierarchy Process (AHP): principles, pairwise comparison
- Defining criteria and sub-criteria for suitability
- Standardization and weighting of raster/vector criteria layers
- Pairwise comparison matrix creation and deriving weights
- Weighted overlay analysis in ArcGIS Pro & QGIS (GUI-based workflows)
- Validation & sensitivity analysis of suitability maps
- Exporting and presenting results: maps, reports, and decision support outputs



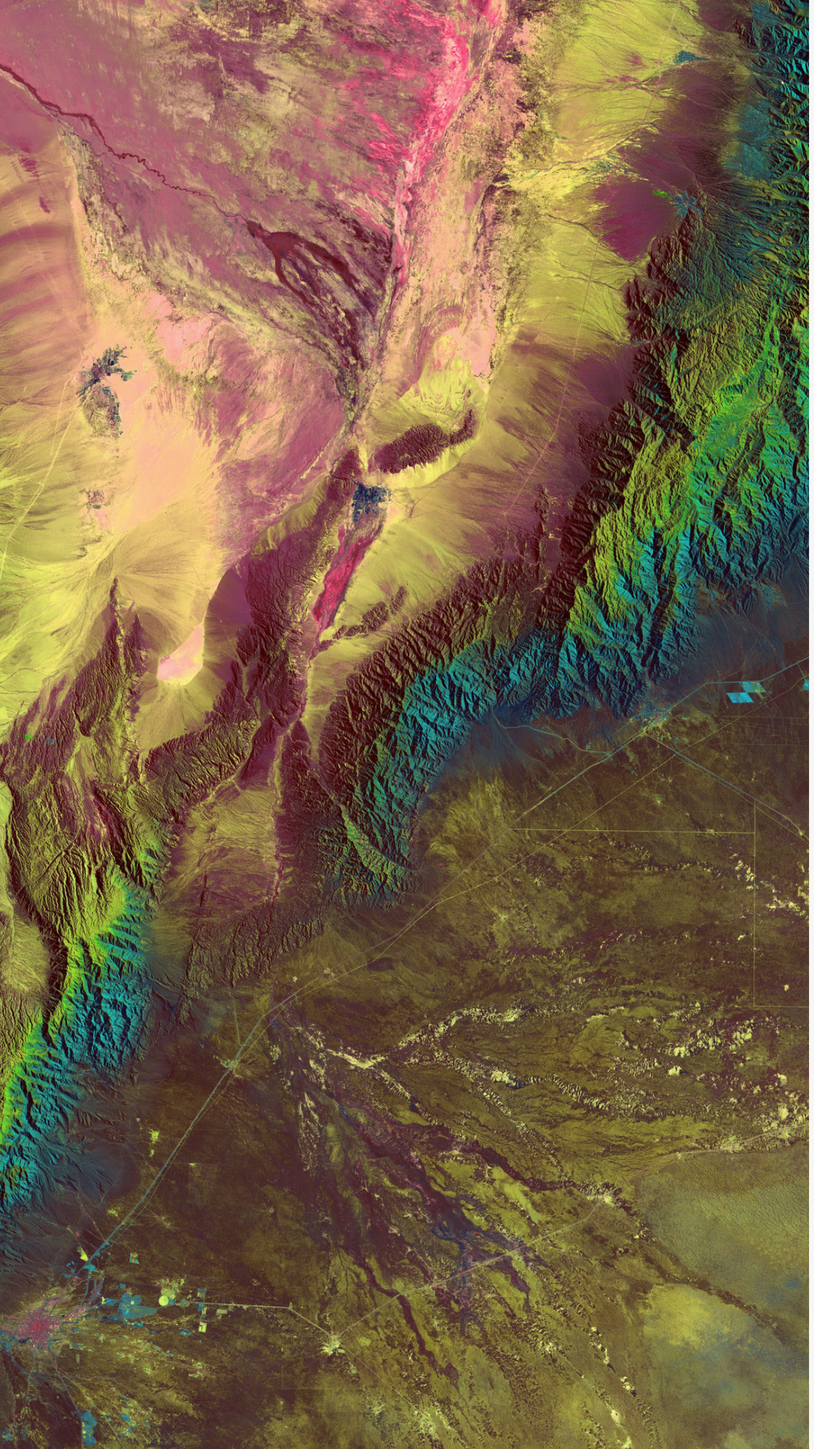
Topic 26:Network Topology, Impedance Modelling & Accessibility Mapping in GIS

- Definition of spatial networks and graph theory concepts (nodes, edges, impedance)
- Real-world applications: transportation, utilities, logistics, emergency services
- Geometric networks vs network datasets
- Linear referencing systems (LRS) overview
- Edge connectivity, junctions, turns and connectivity rules
- Shortest Path & Route Optimization
- Service Area Analysis
- Closest Facility Analysis
- Location–Allocation Analysis



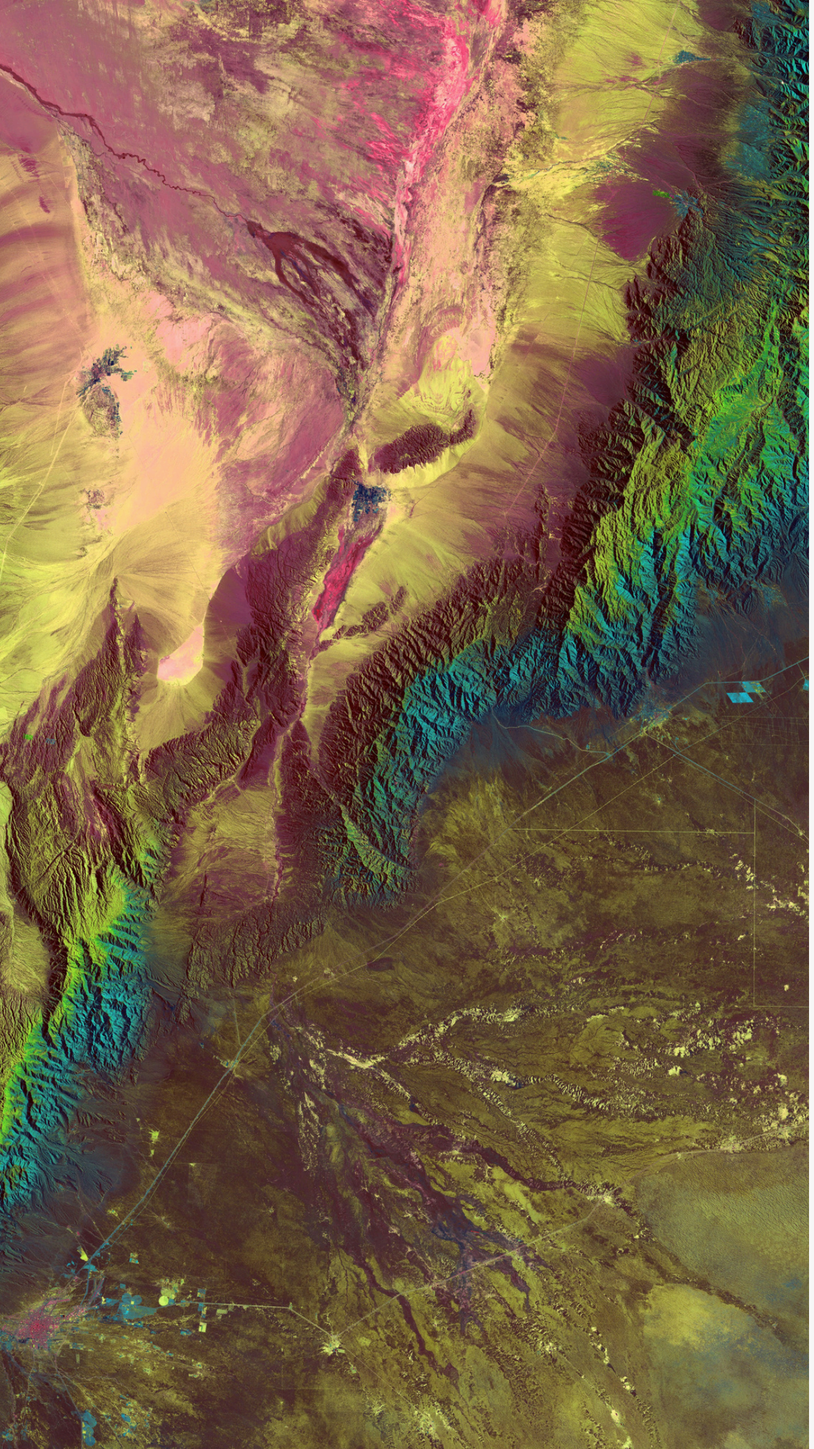
Topic 27:Web GIS, Map Services & Spatial Data Publishing

- Web GIS architecture and components
- Map, feature and tile services
- Data publishing from desktop GIS
- Performance optimization for web layers
- Interactive map design principles
- User access and sharing controls
- Dashboard and story map concepts
- Mobile-friendly web GIS design
- Hosting and deployment options
- Industry use cases of web GIS



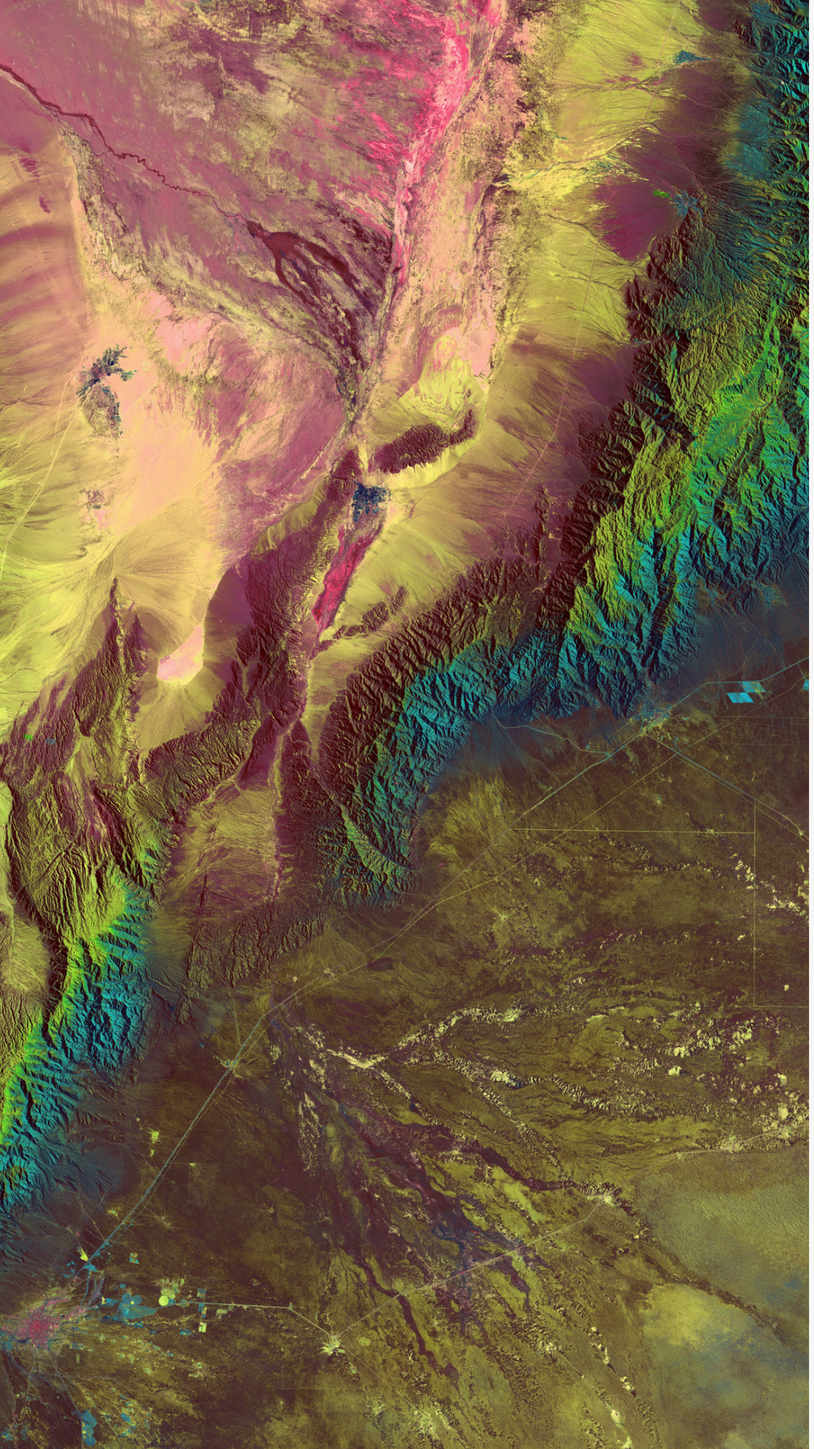
Topic 28:Google Earth Engine Fundamentals (Conceptual & Workflow-Based)

- Cloud-based geospatial processing concepts
- Overview of GEE platform architecture
- GEE data catalog and datasets
- Image collections and filtering logic
- Visualization of satellite imagery
- Index computation workflows
- Time-series analysis concepts
- Advantages of cloud-scale processing
- Limitations and best practices of GEE



Topic 29:GIS Project Planning, Workflow Design

- Project requirement analysis
- Workflow design and optimization
- Standard operating procedures
- Resource and timeline management
- Risk identification and mitigation
- Client communication strategies
- Deliverable structuring
- Workflow documentation methods
- Project monitoring and control
- Case studies of GIS projects



Topic 30:GIS Career Development, Portfolio Building & Future Trends

- GIS job roles and industry expectations
- Skill mapping and specialization paths
- Portfolio creation using real projects
- Resume and LinkedIn optimization
- Interview preparation strategies
- Ethical responsibilities of GIS professionals
- Emerging trends in geospatial technology
- Lifelong learning pathways in GIS

Course Objectives

Objective 1:Learn the Language of Location

Build a solid foundation in GIS concepts and spatial thinking to understand, create, and interpret geospatial data confidently.

Objective 2: Turn Data into Decisions

Apply spatial analysis, mapping, and visualization techniques to solve real-world problems using industry-standard GIS tools.

Objective 3: Become Industry-Ready

Gain hands-on project experience, practical workflows, and professional exposure aligned with current geospatial industry demands.

Why This GIS Course Stands Apart ?

Built for Industry

What the industry uses is what you learn

Tools That Employers Expect

Train on tools trusted by professionals

Mentorship from Working Professionals 10+ years of Experience

Learn from people who apply GIS every day.

Limited Batches for Better Attention

“Quality over quantity—always.”
Over 95% of course duration are dedicated to hands-on labs and real datasets

Course Policies

Enrollment Policy

- Enrolment is confirmed only after successful registration and fee payment.
- Seats are limited and allotted on a first-come, first-served basis.
- Course access credentials will be shared prior to the commencement date

Attendance Policy

- A minimum of 75% attendance is required to be eligible for course completion certification.
- Missed sessions may be compensated through recorded content.

Certification Policy

- Meeting minimum attendance requirements
- Successful completion of assessments and project

Course Policies

Code of Conduct

- Learners are expected to maintain professional behaviour during sessions and interactions.
- Any form of misconduct, plagiarism, or misuse of training materials may lead to termination of course access without refund.
- Respectful communication with instructors and peers is mandatory.

Recording & Content Usage Policy

- Course materials, recordings, datasets, and documentation are proprietary.
- Redistribution, recording, or commercial use of training content is strictly prohibited without written permission.

Refund & Cancellation Policy

- Fees once paid are non-refundable and non-transferable.
- Course rescheduling or cancellation by the organisation will be communicated in advance, with suitable alternatives offered.

Technical Requirements Policy

- Learners must ensure access to a compatible computer, stable internet connection, and basic technical readiness.
- Technical support will be limited to course-related software guidance only.
- Any significant requiremwnt will be communicated in advance.

Contact Us

Scan the QR code for the Admission

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Email Address

info@gisvisionindia.com

Consultation Hours

2 PM to 4 PM, Monday to Friday