



## **Course Content Document**

### **Course Name**

**Application of Geo-Informatics and Space Technology in Public  
Administration and Logistics**

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**Bhaskaracharya National Institute for Space Applications and Geo-informatics (BISAG-N),  
Ministry of Electronics and Information Technology (MeitY),  
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## About BISAG-N

BISAG-N is an autonomous scientific society under the MeitY, Govt to provide 1) satellite communication-based education and training 2) geo-spatial solutions, software products and services to various government ministries, departments and agencies for supporting implementation of developmental programs and citizen centric services. Besides, BISAG-N also provides training, research and academic support to students, government employees and faculty for utilizing space, geo-spatial and various other emerging technologies at national and international level.

BISAG-N has evolved as an ISO 9001 (Quality Management), ISO 27001 (Information Security Management), ISO 19115 (Geo-spatial Metadata), ISO 19157 (Geo-spatial Data Quality) and CMMI Level 5 (Software Development Quality) certified institute and a centre of excellence wherein research and innovations are combined with the user requirements to emerge as a value-added products and services provider, a technology developer and as a facilitator/partner for providing direct benefits of space and geo spatial technology to the government functionaries.

BISAG-N main domain areas include satellite communication, geo-spatial solutions and technology development, geo-informatics applications development, standardization, academics & national/international co-operation.

BISAG-N provides specialized services and solutions in implementing map based Geographic Information and Decision Support Systems. This includes geospatial database design and development, map creation, updating and finishing, data migration; conversion and format translation, software development and customization, systems integration and technical consulting. BISAG-N also provides complete geospatial solutions, which bundle hardware, software and data with software development and operationalization.

The satellite communication facility is being extensively used for distance education, training, extension, awareness and empowerment by various central and states ministries as an extended arm for the government at the national and international level. The institute's contribution has been recognized multiple times for the applications in the field of satellite communication and geospatial technologies.



# Application of Geo-Informatics and Space Technology in Public Administration and Logistics

## Aim/Objectives:

The course intent to equip the participants with the knowledge, skills and use of geo-spatial, artificial intelligence and other emerging technologies-based decision support systems. The aim of course is to ensure that participants can perform analysis of relevant geo-spatial data of their respective countries and area of interest, as necessary for the use-cases of decisions regarding utilization of natural resources, urban and rural infrastructure development and disaster management as well as setting-up of industries, education institutes, health facilities as per the regulations and criteria. The course shall also make aware and guide the participants for adoption international standards related to data quality, metadata, data security & privacy, interoperability and symbology. Practical aspects of setting-up, configuration and operation of geo-spatial decision support system, such as integration of APIs, cloud hosting and good practices of software development in line with CMMI practices shall also be covered. Experience sharing of couple of organization who have utilized the capabilities of geo-spatial decision support systems shall be organized during the study tour to understand challenges and strategies adopted for overcoming the challenges during the implementation.

BISAG-N aims to transfer skills of utilizing satellite communication and geo-informatics for planning, development, monitoring and adoption of various governmental initiatives and schemes to the course participants of this course. As part of above objective BISAG-N also ensure that continuous support is available to the participants after the course to implement geo-spatial technology based public administration and logistics processes in their respective countries.

The course covers:

- **Introduction of geo-informatics and space technology:** To provide a solid foundation of geo-spatial technologies and their role in modern public administration and logistics.
- **Enhancement practical skills:** To equip participants with hands-on skills in data management, spatial analysis and visualization techniques.
- **Develop understanding of standards and interoperability:** To highlight the importance of standards and interoperability in successful Geo-informatics System (GIS) implementation.
- **Technology integration in public services and logistics:** To experience the adoption of the real-world applications related to urban planning, disaster management and logistics optimization.
- **Exposure to emerging technologies:** To inform use of cutting-edge innovations such as AI/ML, IoT and drones for spatial analysis and monitoring.
- **Provision of practical implementation tools:** Offer workshop-based, solution-oriented activities to design geo-spatial solutions for real-world issues using sample data of respected countries and area interest.

## Participant Profile:

- Mid-level and senior officials of government bodies from various countries, especially those working for:
  - Urban planning and infrastructure development
  - Disaster management and emergency services
  - e-Governance and public administration
  - Logistics, transportation and supply chain management
  - Environment and natural resources management
- Employees involved in public services and IT professionals of government departments, interested to transform public administration services using geo-Informatics solutions

## Evaluation Method:

- **Pre/Post Assessments:** Evaluation of participants' baseline knowledge and their understanding at the end of the course.
- **Hands-on Exercises:** Evaluate practical competence in spatial data management, analysis and visualization and decision support queries building.
- **Group Project:** Participants shall work on designing a geo-spatial solution for a real-world use case scenario, assessed by peers and instructors.
- **Field Visit Report:** Participants shall submit reports based on insights gained during the field visit to demonstrate their ability to link the knowledge to the practical implications.

## Course Coverage:

- **Foundational Knowledge:** Seminar-based sessions to explain the concepts and applications of geo-informatics and space technology.
- **Practical Sessions:** Scenario-based tutorials to build proficiency in spatial data management, visualization and analysis.
- **Case Studies & Demos:** In-depth exploration of GIS projects with focus on real-world applications in public administration and logistics.
- **Emerging Technologies:** Sessions on AI, IoT and drones for spatial data collection and analysis.
- **Interactive Workshops:** Group-based activities to design geo-spatial solutions, fostering collaboration and problem-solving.
- **Field Visit:** To observe practical adoption of geo-informatics and space technology for application in real-world environment.

## Course Schedule:

Day	Topic/Details	Learning Outcome/ Key Takeaway
Week-1 Day-1	<b>Introduction to Geo-Informatics and Space Technology</b> <ul style="list-style-type: none"><li>• Overview of geo-informatics—definition, components and evolution</li><li>• Introduction to space technology and its integration with GIS</li><li>• Role in public administration and logistics, with emphasis on strategic decision-making processes</li><li>• Demonstration of a typical GIS portal</li><li>• Teams formation and project selection</li><li>• Pre-course evaluation</li></ul>	Build a solid foundational understanding of geospatial technologies and their strategic importance.
Day-2	<b>Data Management, Analysis and Visualization</b> <ul style="list-style-type: none"><li>• Fundamentals of spatial data management, analysis techniques and visualization tools</li><li>• Practical session/demo on creating maps and dashboard.</li><li>• Maps creation by project teams</li><li>• Discussion, evaluation and feedback</li></ul>	Develop proficiency in managing, analyzing and visualizing spatial data effectively.
Day-3	<b>Standards and Interoperability in Geo-Informatics</b> <ul style="list-style-type: none"><li>• Importance of standards for data quality, metadata and seamless interoperability</li><li>• Examination of key standards (ISO, OGC and national frameworks) and challenges in multi-agency projects</li><li>• Demo of metadata feature of typical applications</li><li>• Metadata creation by project teams</li><li>• Discussion, evaluation and feedback</li></ul>	Recognize the critical role of standardization and interoperability in building robust GIS applications.
Day-4	<b>Geo-Informatics in Public Administration: Urban Planning and Management</b> <ul style="list-style-type: none"><li>• Urban planning applications and smart-city initiatives with GIS</li><li>• Overview of tools and software with case studies and demos</li></ul>	Learn how geospatial tools enhance urban planning and public policy deployment.

Day	Topic/Details	Learning Outcome/ Key Takeaway
	<ul style="list-style-type: none"> <li>• Operation of GIS portal/tools for infrastructure development decision by project teams</li> <li>• Discussion, evaluation and feedback</li> </ul>	
Day-5	<b>Space Technology in Public Administration: Disaster Management and Environment</b> <ul style="list-style-type: none"> <li>• Applications of space technology for disaster management and environmental monitoring</li> <li>• Review of satellite programs and practical applications</li> <li>• Visit to SATCOM facilities</li> <li>• Development of plans for SATCOM usage by project teams</li> <li>• Discussion, evaluation and feedback</li> </ul>	Understand how space technology supports effective disaster response and environmental stewardship.
Day-6	<b>Field visit</b> <ul style="list-style-type: none"> <li>• Visit to a government office which implemented GIS-based decision support system</li> <li>• Demos by the client office</li> <li>• Discussions and preparation of field visit report</li> <li>• Cultural visit</li> </ul>	Learning form the institutes regarding challenges and solutions for successful adoption GIS-based decision support systems.
Day-7	<b>Cultural Visit (optional)</b>	
Week-2 Day-1	<b>Geo-Informatics in Logistics: Supply Chain and Transportation</b> <ul style="list-style-type: none"> <li>• Techniques for logistics optimization and supply chain decisions using geospatial data</li> <li>• Technologies and case studies illustrating practical applications</li> <li>• Logistics use-case identifications by project teams</li> <li>• Discussion, evaluation and feedback</li> </ul>	Enhance operational efficiency through data-driven logistics and transportation planning.
Day-2	<b>Integrated Decision Support Systems for Infrastructure and Logistics</b> <ul style="list-style-type: none"> <li>• Detailed overview and demo of multi-modal connectivity initiatives</li> <li>• Analysis of key features, impact and future prospects in planning and logistics</li> <li>• Operation of logistics gap identification tools by project teams</li> <li>• Discussion, evaluation and feedback</li> </ul>	Assess the strategic impact of integrated decision support systems for infrastructure and logistics development.
Day-3	<b>Advanced Applications: AI, IoT and Drones</b> <ul style="list-style-type: none"> <li>• Application of AI/ML for spatial analysis and predictive modeling</li> <li>• Integration of IoT for real-time data and use of drones for surveying and monitoring</li> </ul>	Harness emerging technologies to innovate geospatial applications across various domains.
Day-4	<b>Challenges in Implementing Geo-Informatics Projects</b> <ul style="list-style-type: none"> <li>• Overview of data-related, technical, operational, human and ethical challenges</li> <li>• Discussion of case-studies and best practices to overcome these challenges</li> </ul>	Identify and address critical challenges to ensure successful project implementation.
Day-5	<b>Evaluation and course certificates</b> <ul style="list-style-type: none"> <li>• Post course evaluation exam</li> <li>• Presentation by project teams</li> <li>• Feedback and discussion</li> <li>• Certificate distribution</li> </ul>	Knowledge and skill necessary for initiative GIS-based governance and logistics initiatives for respected countries.
Day-6	<b>Cultural Visit (optional)/Return Journey</b>	

## Course Learning Outcomes:

- **Knowledge enhancement:** Understanding the components, applications and strategic role of Geo-Informatics and Space Technology.
- **Practical skills:** Proficiency in data management, spatial analysis and map visualization tools.
- **Standards awareness:** Understanding the significance of data quality standards and interoperability.
- **Problem-solving ability:** Applying knowledge to design geo-spatial solutions to public issues.
- **Technological integration:** Knowledge of integrating AI, IoT and drones into geo-spatial solutions for real-time data and monitoring.
- **Implementation of GIS:** Ability to implement GIS-based developmental planning, monitoring and decision support systems in respected countries.
- **Networking opportunities:** Exposure to peers from other countries fosters international collaboration and knowledge sharing.

## Reference:

- ISO 19115 (Geo-spatial Metadata standard)
- ISO 19157 (Geo-spatial Data Quality standard)
- ISO 19117 (Portrayal standard)