

**Department of Computer Science & Engineering (IOT)****Vision of the Department***To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.***Mission of the Department***To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.***Session 2025-2026****Vision:** Dream of where you want.**Mission:** Means to achieve Vision**Program Educational Objectives of the program (PEO):** (broad statements that describe the professional and career accomplishments)

PEO1	Preparation	P: Preparation	Pep-CL abbreviation pronounce as Pep-si-IL easy to recall
PEO2	Core Competence	E: Environment (Learning Environment)	
PEO3	Breadth	P: Professionalism	
PEO4	Professionalism	C: Core Competence	
PEO5	Learning Environment	L: Breadth (Learning in diverse areas)	

Program Outcomes (PO): (statements that describe what a student should be able to do and know by the end of a program)**Keywords of POs:**

Engineering knowledge, Problem analysis, Design/development of solutions, Conduct Investigations of Complex Problems, Engineering Tool Usage, The Engineer and The World, Ethics, Individual and Collaborative Team work, Communication, Project Management and Finance, Life-Long Learning

PSO Keywords: Cutting edge technologies, Research

“I am an engineer, and I know how to apply engineering knowledge to investigate, analyse and design solutions to complex problems using tools for entire world following all ethics in a collaborative way with proper management skills throughout my life.” to contribute to the development of cutting-edge technologies and Research.

Integrity: I will adhere to the Laboratory Code of Conduct and ethics in its entirety.**Name and Signature of Student and Date**

Bhushan Tayade

19-08-2025

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Session	2025-26 (ODD)	Course Name	PE-I - Geo-Intelligence for Smart IoT Devices Lab
Semester	5	Course Code	23IOT1523
Roll No	035	Name of Student	Bhushan V. Tayade

Practical Number	4
Course Outcome	Apply and demonstrate the use of proprietary and open-source GIS tools (e.g., QGIS) for creating, visualizing, and managing spatial datasets.
Aim	Produce a publication-quality map from vector layers, using Data View and Layout view.
Problem Definition	The task involves producing a publication-quality map from vector layers by using QGIS's Data View and Layout View to include appropriate cartographic elements such as legends, scale bars, and labels.
Theory (100 words)	<p>In QGIS, the process of creating a publication-quality map begins with preparing and styling the required vector layers in the Data View. At this stage, various symbology settings such as color schemes, line styles, labeling, and layer transparency are adjusted to ensure that the spatial data is visually clear and meaningful. Once the data visualization is finalized, the next step involves switching to the Layout View (previously known as Print Composer), where the final map composition is designed.</p> <p>Within the Layout interface, users can add and arrange essential cartographic elements—including a map title, legend, scale bar, north arrow, and grid lines—to enhance readability and provide geographic context. Additional components such as text boxes, logos, and coordinate labels can also be inserted to make the map presentation more informative and professional.</p> <p>The completed layout is carefully aligned and formatted to maintain balance, contrast, and clarity, resulting in a well-structured and visually appealing map. Finally, the map can be exported in multiple formats such as PDF, PNG, or JPEG, making it suitable for inclusion in academic</p>

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	reports, research papers, presentations, or professional documentation. Through this process, QGIS enables users to transform raw spatial data into a polished cartographic product ready for publication or display.
Procedure and Execution (100 Words)	<p>Implementation Steps:</p> <p>Steps to Create a Map and Plot Vector Layers in QGIS</p> <ol style="list-style-type: none">1. Launch QGIS and Load Spatial Data: Begin by opening the QGIS software and loading the required vector datasets, such as Shapefiles or GeoPackage layers. These datasets represent spatial features like roads, rivers, boundaries, or points of interest and will serve as the base data for map creation.2. Customize Layer Symbolology and Labels: Open the Layer Styling Panel to modify the appearance of each vector layer. Adjust parameters such as color, line thickness, fill style, and marker symbols to improve the visual distinction between layers. Additionally, enable labeling to display important attribute information, such as names or identifiers, directly on the map.3. Organize Layers for Clear Visualization: In the Layers Panel, arrange the sequence of layers logically so that the most relevant or smaller-scale features (like roads or buildings) appear above broader features (such as districts or terrain). Proper layer ordering ensures that the map remains visually clear and easily interpretable.4. Open the Print Layout for Map Composition: Once the map visualization is finalized, navigate to Project → New Print Layout. This opens the Layout View, which is used for designing the printable version of your map.5. Insert a Map Frame: In the Layout window, create a Map Frame to define the specific portion of the map that will be displayed. You can zoom, pan, or adjust the map extent to focus on the desired area.6. Add Cartographic Elements: Include essential map components such as a Title, Legend, Scale Bar, and North Arrow to make the map more informative and professional. These elements help communicate direction, distance, and the meaning of different symbols used in the map.

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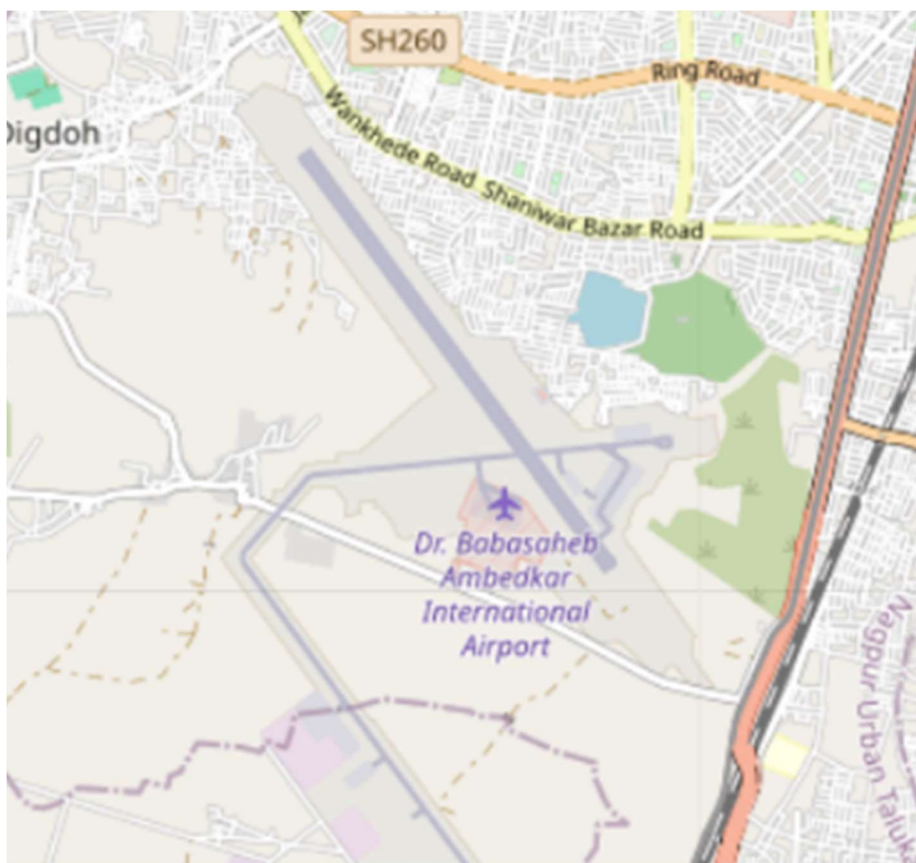
7. Refine Layout and Design:

Adjust the position, alignment, and size of all map elements to achieve visual balance. Ensure that the map is not overcrowded and that all elements are legible. You may also add a border, grid lines, or institutional logo if required.

8. Export or Print the Final Map:

After reviewing the final layout, export the map in the desired format such as PDF, PNG, or JPEG. The completed map can then be used for academic reports, project documentation, or presentations, ensuring a professional and publication-ready output.

Stepwise Screenshots with steps:



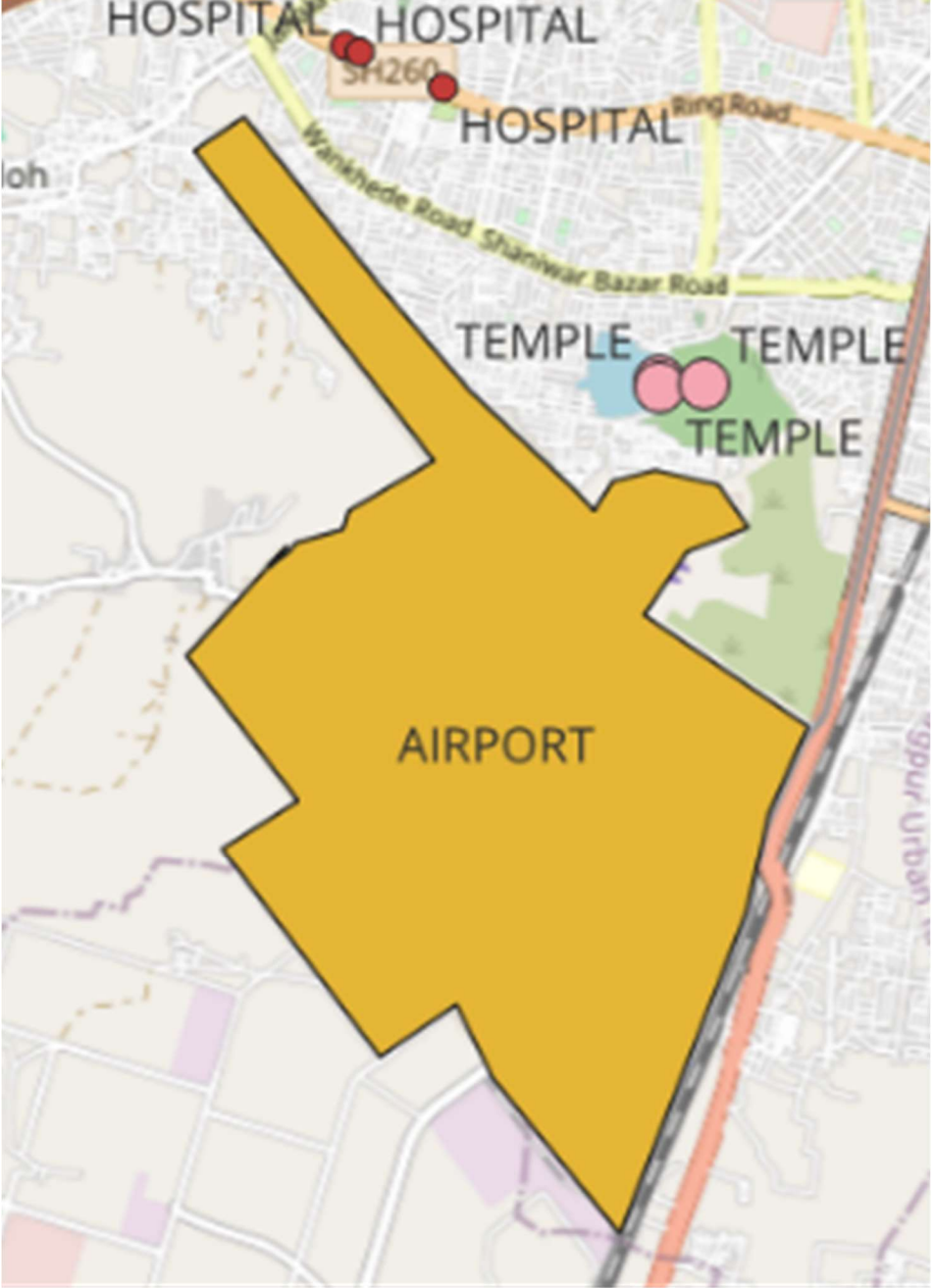
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Output Analysis	<p>The practical was successfully completed using QGIS, where various vector layers were imported, styled, and systematically organized within the Data View to ensure a clear and meaningful spatial representation. Each layer was customized with appropriate symbology, color schemes, and labeling, enhancing both the readability and the aesthetic appeal of the map.</p>

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	<p>After achieving the desired visualization, the map composition was finalized in the Layout View, where essential cartographic elements such as a title, legend, scale bar, north arrow, and coordinate grid were added. Proper alignment and balance were maintained to achieve a professional layout design. The completed layout was then exported in a high-quality format suitable for printing, presentations, and publication.</p> <p>The final output demonstrated the practical capability of QGIS as an effective tool for cartographic design, combining spatial data visualization with layout customization to produce a publication-quality thematic map.</p>
Link of student GitHub profile where lab assignment has been uploaded	<p>“https://github.com/Bhushan-Tayade/YCCN-23071391.git”</p>
Conclusion	<p>The task of creating a publication-quality map using QGIS was successfully accomplished. By effectively utilizing both the Data View and Layout View, vector layers were styled, organized, and transformed into a well-designed cartographic output. The inclusion of essential map elements such as the title, legend, scale bar, and north arrow contributed to the clarity and professional appearance</p>
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