



School Building Design and 3D Modelling Project

Institution: IIT Kharagpur

Software Used: Autodesk Revit, AutoCAD

Duration: [September 2024 to November 2024]

Team Size: 5

Course Instructor: Professor Nirjhar Dhang

Role: 3D Model Developer

Project Overview:

This project aimed to design a comprehensive and scalable 10+2 school building layout integrating academic, administrative, and recreational spaces in a sustainable and functional manner. Our objective was to create a smartly planned, G+2 level educational campus using Building Information Modelling (BIM) principles to optimize spatial usage, ensure user safety, and incorporate natural lighting and ventilation. The final deliverables included detailed 2D plans, realistic 3D architectural modelling, and a presentation video highlighting key features.

Key Goals:

- Efficient spatial utilization with a focus on smooth student and staff movement.
- Inclusion of essential educational, administrative, and extracurricular facilities.
- Adherence to safety norms, including fire exits, accessibility for all abilities, and natural ventilation.
- Scalability to accommodate future growth and developments.
- Integration of sustainable features such as green spaces, natural lighting, and garden zones.



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My Contributions:

1. 3D Architectural Modelling:

- Collaborated on the complete 3D structural modelling of the school campus using **Autodesk Revit**, following precise architectural dimensions.
- Converted detailed 2D sketches and floor plans into a 3D model incorporating walls, rooms, doors, and recreational zones.
- Contributed to developing and visualizing realistic representations of:
 - Classrooms (49–50 m² each)
 - Laboratories (Biology, Chemistry, Physics, Computer)
 - Library, Principal's Office, Teachers' Offices
 - Examination, Sports, Art and Multipurpose Rooms
 - External elements like cricket stadium (80,000 mm diameter), football and basketball courts, garden areas, and pathways.

Software Proficiency Demonstrated:

- **Autodesk Revit:**
 - Building Information Modeling (BIM) integration for structural and architectural detailing.
 - Collaboration and multi-user environment handling.
 - Real-time updates and automatic synchronization between floor plans, 3D views, and sections.



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Technical Specifications:

Building Layout Highlights:

- **Structure:** Ground + 2 floors
- **Corridors:** Doubly loaded for movement optimization
- **Room Sizes:**
 - Classrooms: 7218 mm × 6960 mm
 - Laboratories, Library, and Admin Rooms: Ranged from ~6750 mm × 14000 mm to ~27968 mm × 7218 mm
- **Outdoor Infrastructure:**
 - Football Ground: 99,000 mm × 68,000 mm
 - Basketball Court: 26,000 mm × 14,000 mm
 - 3 Badminton Courts, Cricket Stadium, Garden Areas
 - 3 Cycle Stands and multiple pedestrian walkways

Special Facilities Incorporated:

- Bio Lab, Chemistry Lab, Computer Lab, Physics Lab
- Library, Art Room, Music Room
- Multipurpose Room, Examination Office
- Principal's Office, Teachers' Room, Admin Office
- Storage Rooms, Sports Room



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Sustainability and Safety Features:

- **Natural Lighting and Ventilation:** Optimized orientation of rooms and corridors.
 - **Green Areas:** Garden and plantation zones included in layout for ecological balance and aesthetic appeal.
 - **Emergency Measures:** Fire exits on each floor; ramp and elevator access for inclusive mobility.
 - **Scalability:** Space and structure planned for future student intake and infrastructural upgrades.
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Team Collaboration & Documentation:

- Participated in team meetings for layout discussions, design reviews, and progress tracking.
 - Coordinated with other members working on manual sketching, PPT documentation, and animation.
 - Integrated 3D modelling and animation into final project presentation to highlight key features visually.
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Learning Outcomes & Skills Gained:

- Gained hands-on experience with Revit and AutoCAD for BIM-based architectural design.
- Developed 3D visualization skills, precision modelling, and digital presentation abilities.
- Enhanced teamwork and communication skills through close collaboration across a multidisciplinary team.



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- Understood architectural considerations in educational infrastructure such as accessibility, ergonomics, and safety.