

INSTITUTE OF  
ENGINEERING PHYSICS

ONLINE COURSE  
**CATALOG**



July 2023

**Smart Building**

Find courses about Smart Building..

**Building Intelligence**

Manage resources efficiently.



# Contents

About Radial Spectra	03
Online Course Instructor	04
<b>General Courses</b>	
Course G01 Introduction to Building Automation System (Smart Buildings)	05
Course G02 Pollution-Controlled Smart Interiors for Healthy, Safe, and Sustainable Work and Living Spaces	07
Embracing the Future	09
Smart Building Certification Program	10
<b>Professional Courses</b>	
Course P01 Smart Infrastructure and Building Design Basics with IoT Integration	11
Course P02 Introduction to Building Intelligence	14

# ABOUT RADIAL SPECTRA

Our company is a leading provider of cutting-edge automation and robotics solutions. With a diverse range of products and services, we are revolutionizing industries and transforming businesses countrywide. From industrial automation to collaborative robots and intelligent systems, we offer innovative technologies designed to optimize productivity, enhance efficiency, and improve overall performance. Our team of experts combines expertise in robotics, artificial intelligence, and machine learning to develop tailored solutions that meet the unique needs of our clients. With a commitment to quality, reliability, and customer satisfaction, we are dedicated to empowering businesses with advanced automation solutions that drive success in today's rapidly evolving markets. Experience the future of automation with our comprehensive range of products and services.



03

Exploring Automation and Robotics for a Smarter Future.

# ONLINE COURSE INSTRUCTORS

04



Our team of instructors brings a diverse and specialized background to our contemporary online courses on smart building infrastructure solutions. With expertise in applied physics and electronics, medical physics, and biomedical engineering, our instructors possess a deep understanding of the scientific principles and technological advancements in these fields. Their extensive knowledge allows them to deliver comprehensive and practical training, equipping participants with the skills and insights necessary to navigate the complexities of smart building infrastructure. Our instructors' commitment to excellence ensures a dynamic learning experience, empowering individuals to contribute effectively to the future of smart building solutions



## Course G01 Introduction to Building Automation System (Smart Buildings)

Includes overview of Smart City and Pollution-Controlled Intelligent Interior.

### Course Overview:

This course aims to provide a comprehensive overview of smart building technology and its applications, with a focus on sustainability, occupant comfort, and safety. The course is suitable for architects, property owners, young scientists, and anyone interested in learning about the latest trends and technologies in smart building design and management. Furthermore, participants will have the opportunity to network and collaborate with professionals from various backgrounds, fostering valuable connections within the smart building industry.

### Course Objective:

- Understand the importance of smart buildings for a sustainable future.
- Learn about the basic technologies and systems used in smart buildings.
- Explore how automation, sensors, and control systems contribute to smart buildings.
- Discover how data analytics and machine learning can improve smart building performance.
- Understand how smart buildings enhance energy efficiency, occupant comfort, safety, and maintenance.
- Discuss upcoming trends and the exciting future of smart building technology.

### Course Outline

#### Module 1: Introduction to Smart Buildings

- Definition and overview of smart buildings
- Historical context and evolution of smart building technology
- Benefits and challenges of smart buildings
- Role of smart buildings in sustainable development

#### Module 2: Smart Building Technology

- Building automation systems: types, components, and operation
- Sensors and control systems: types, functions, and applications
- Networks and connectivity: types, protocols, and standards
- Data analytics and machine learning: applications in smart building technology

#### Module 3: Applications of Smart Buildings

- Energy efficiency and sustainability: technologies and strategies for energy-efficient building design and operation
- Occupant comfort and health: technologies and strategies for enhancing indoor air quality, lighting, and thermal comfort
- Safety and security: technologies and strategies for protecting buildings and occupants from hazards and threats



- Maintenance and operations: technologies and strategies for optimizing building performance and reducing maintenance costs

#### Module 4: Designing and Implementing Smart Buildings

- Planning and design considerations for smart buildings: building codes, standards, and regulations
- Integration of smart building technology into building systems: process, challenges, and best practices
- Implementation and operation: monitoring, maintenance, and troubleshooting
- Case studies of successful smart building projects: lessons learned and best practices

#### Module 5: Future of Smart Buildings

- Emerging trends and technologies in smart building design and management: Internet of Things, Artificial Intelligence, and Big Data
- Opportunities and challenges for the future of smart buildings: social, economic, and environmental implications
- Implications for the built environment and society as a whole: potential benefits and risks of smart building technology

#### Additional Module 1: Smart City

- Urban Infrastructure
- Internet of Things (IoT) and Connectivity
- Sustainable Energy Solutions
- Citizen Engagement and Participation

#### Additional Module 2: Pollution-Controlled Intelligent Interior

- Indoor Air Quality
- Smart HVAC Systems
- Intelligent Lighting Systems
- Green Interior and Enhanced Safety

**Duration** 12 Weeks (2 Days a Week)

**Fee** BDT 30,000

*Please note that both the course fee and the course content are subject to change without prior notice.*



## Course G02 Pollution-Controlled Smart Interiors for Healthy, Safe, and Sustainable Work and Living Spaces

### Course Overview

The course "Pollution-Controlled Smart Interiors for Healthy, Safe, and Sustainable Work and Living Spaces" is designed to equip participants with a comprehensive understanding of designing interiors that prioritize the well-being, safety, and sustainability of occupants. With a strong emphasis on pollution control measures and the integration of smart technologies, the course delves into the intricacies of creating intelligent work and living spaces. Participants will acquire knowledge about effective strategies, techniques, and best practices for designing interiors that promote optimal health, safety, and sustainability. Through practical examples and case studies, participants will develop the skills necessary to incorporate pollution control measures, leverage smart technologies, and create environments that foster well-being, safety, and environmental responsibility.

### Course Objectives

- Understand the importance of pollution control in work and living spaces for human health and well-being.
- Explore the concept of smart interiors and the integration of intelligent technologies.
- Learn about the latest pollution control measures and technologies for creating healthy and safe environments.
- Develop skills in incorporating smart technologies to optimize resource utilization and energy efficiency.
- Gain insights into sustainable design principles and practices for creating environmentally-friendly interiors.
- Understand the role of user comfort, safety, and well-being in designing smart and sustainable spaces.
- Explore case studies and real-world examples of successful pollution-controlled smart interior projects.
- Acquire knowledge on effective project planning, implementation, and evaluation for pollution-controlled smart interiors.

### Course Outline

#### Module 1: Introduction to Pollution-Controlled Smart Interiors

- Importance of pollution control in work and living spaces
- Overview of smart interiors and their benefits
- Key challenges and considerations in designing pollution-controlled smart interiors

#### Module 2: Indoor Pollution and Health Impacts

- Types and sources of indoor pollution
- Health effects of indoor pollution on occupants
- Importance of pollution control for creating healthy spaces



## Module 3: Pollution Control Measures and Technologies

- Ventilation systems and air filtration for improved indoor air quality
- Noise control and acoustics in interior design
- Strategies for reducing indoor pollutants and allergens

## Module 4: Integration of Smart Technologies

- Introduction to smart technologies for interiors
- Internet of Things (IoT) applications in pollution control
- Sensors, monitoring systems, and automation for smart interiors

## Module 5: Energy Efficiency and Resource Optimization

- Energy-efficient lighting and HVAC systems
- Integration of renewable energy sources
- Water conservation and sustainable material selection

## Module 6: Designing for User Comfort and Well-being

- Ergonomics and user-centered design principles
- Biophilic design and its benefits
- Creating spaces that promote occupant well-being

## Module 7: Case Studies of Successful Projects

- Examination of real-world pollution-controlled smart interior projects
- Analysis of design approaches, technologies, and outcomes
- Lessons learned and best practices from case studies

## Module 8: Project Planning and Implementation

- Preparing project plans for pollution-controlled smart interiors
- Strategies for effective implementation and project management
- Evaluation and post-implementation analysis of project outcomes

**Duration** 8 Weeks (2 Days a Week)

**Fee** BDT 30,000

*Please note that both the course fee and the course content are subject to change without prior notice.*



# EMBRACING THE FUTURE

In our future lifestyle, smart cities and smart buildings will revolutionize the way we live, offering a host of benefits and transforming our everyday experiences. These cutting-edge environments will be characterized by advanced technologies, interconnected systems, and data-driven solutions that enhance efficiency, sustainability, and overall quality of life.

Smart cities will feature a sophisticated network of sensors, cameras, and devices that gather data to monitor and manage various aspects of urban life. This data will be harnessed to optimize traffic flow, improve energy consumption, and enhance public safety. Intelligent transportation systems will provide seamless connectivity and offer efficient mobility options, reducing congestion and promoting sustainable modes of transportation such as electric vehicles and bike-sharing programs.

Smart buildings will be designed with energy efficiency and occupant comfort in mind. Automated systems will regulate lighting, temperature, and ventilation based on occupancy and environmental conditions, maximizing energy savings and creating personalized experiences. Innovative technologies like smart grids and renewable energy sources will be integrated into the infrastructure, reducing carbon footprints and promoting sustainable living.

These advancements will transform the way we interact with our surroundings. Residents will enjoy a range of benefits, including improved accessibility, optimized resource management, and enhanced safety. Connectivity will be seamless, enabling residents to remotely control their homes, access public services, and engage in a vibrant digital ecosystem.

Our future lifestyle will be characterized by convenience, sustainability, and a harmonious coexistence between technology and the environment. Smart cities and smart buildings will play a crucial role in creating vibrant, livable, and future-ready communities that adapt to our evolving needs and aspirations.

# CERTIFICATION PROGRAM



Introducing our new course catalog: PLANET-SMART, HONG KONG Certified! We are proud to partner with Planet-Smart System, a rapidly emerging organisation in the field of smart building infrastructure based in Hong Kong. Our certification program has been meticulously designed to validate the skills and knowledge of individuals across various areas of smart building infrastructure.

With this certification, individuals can demonstrate their proficiency in the latest technologies and practices related to smart building infrastructure. Our comprehensive curriculum covers key topics such as advanced sensors and IoT integration, energy-efficient systems, automated controls, and intelligent security solutions.

By enrolling in our courses, participants will gain a deep understanding of cutting-edge concepts and practical techniques required to thrive in the dynamic field of smart building infrastructure. Whether you are an aspiring professional or an industry expert seeking to expand your skillset, our program offers the perfect opportunity to enhance your expertise and stay ahead in this rapidly evolving industry.

Join us and become PLANET-SMART, HONG KONG Certified, unlocking a world of exciting opportunities in the realm of smart building infrastructure

<http://www.planet-smart.earth>

10

# Course P01 Smart Infrastructure and Building Design Basics with IoT Integration

(Explore the latest innovation and intelligent systems utilised in smart buildings)

## Course Overview

The course "Smart Infrastructure and Building Design Basics with IoT Integration" is meticulously crafted to equip architects with a thorough grasp of the principles and methodologies associated with designing cutting-edge smart buildings. With a holistic approach, the course encompasses a broad spectrum of topics, ranging from fundamental concepts to emerging technologies and effective strategies. Architects will gain in-depth knowledge of how to develop intelligent and sustainable structures that seamlessly integrate IoT solutions. Emphasizing the optimization of energy efficiency, occupant comfort, and operational performance, the course delves into the intricate details of sensor technologies, data analytics, connectivity protocols, building automation systems, predictive analytics, occupant-centric design considerations, and advanced building management systems. By understanding the potential of AI in the context of smart infrastructure, architects will be equipped to harness its transformative capabilities and incorporate AI-driven solutions into their designs, further advancing the efficiency, adaptability, and sustainability of smart buildings.

## Course Objectives

- Develop a foundational understanding of smart buildings and their impact on the built environment.
- Explore the latest technologies and systems utilized in smart buildings.
- Learn the key design principles for integrating smart features seamlessly into building architecture.
- Understand the role of data analytics and building automation in optimizing energy consumption and occupant comfort.
- Gain insights into sustainable building practices and how they align with smart building design.
- Acquire knowledge of regulatory standards and certifications relevant to smart building design as well as Privacy and data security in smart building systems
- Enhance problem-solving skills to overcome challenges associated with designing smart buildings.
- Foster creativity and innovation in incorporating smart building elements into architectural designs.

## Course Outline

### Module 1: Introduction to Smart Buildings

- Definition and significance of smart buildings
- Key components and technologies in smart building design
- Benefits and challenges of designing smart buildings
- Market trends and drivers for smart buildings
- Regulatory and policy considerations for smart buildings

### Module 2: Energy Management Systems in Smart Buildings

- Energy efficiency and sustainable design principles
- Building energy management systems (BEMS)
- Demand response and load management strategies
- Renewable energy integration in smart buildings
- Energy monitoring and optimization techniques



### Module 3: Automation and Control Systems

- Building automation systems (BAS) and their functions
- Centralized control and monitoring of building systems
- Integration of automation systems for optimized performance
- Adaptive and responsive building automation strategies
- Building commissioning and system performance verification

### Module 4: Sensor Technologies in Smart Buildings

- Introduction to sensor technologies in buildings
- Types of sensors used in smart buildings (occupancy, temperature, lighting, etc.)
- Data acquisition and utilization for building optimization
- Sensor networks and wireless connectivity in smart buildings
- Data privacy and security considerations for sensor data

### Module 5: Design Considerations for Smart Buildings

- User-centric design and occupant comfort
- Integration of smart technologies during building design and construction
- Adaptive and flexible spaces for future-proofing
- Smart building interface and user experience design
- Designing for accessibility and inclusivity in smart buildings

### Module 6: Data Analytics and Decision-making in Smart Buildings

- Data-driven insights for building optimization
- Analyzing and interpreting building performance data
- Predictive maintenance and fault detection using data analytics
- Building analytics platforms and tools
- Machine learning and AI applications for smart building data analysis



### Module 7: Connectivity and IoT in Smart Buildings

- Internet of Things (IoT) in the context of smart buildings
- Wireless connectivity and network infrastructure
- Interoperability and standardization in smart building systems
- Data integration and management in IoT-enabled buildings
- Cybersecurity and privacy considerations in connected buildings



### Module 8: Sustainable Design Principles in Smart Buildings

- Energy-efficient building envelope design
- Passive design strategies for thermal comfort and daylighting
- Water conservation and efficient resource management
- Sustainable materials and life-cycle assessment in smart building design
- Indoor environmental quality and occupant well-being in sustainable buildings



## Module 9: Case Studies and Real-world Applications

- Examples of successful smart building projects
- Innovative technologies and design approaches in practice
- Lessons learned and best practices from real-world implementations
- Economic and financial considerations for smart building investments
- Social and environmental impacts of smart buildings

## Module 10: Challenges and Future Trends

- Evolving technologies and their impact on smart building design
- Regulatory and policy considerations for advancing smart buildings
- Resilience and disaster preparedness in smart building design
- Human-centered design and occupant engagement in smart buildings
- Emerging trends in sustainable and intelligent building design

**Duration** 24 Weeks (2 Days a Week)

**Fee** BDT 1,00,000

*Please note that both the course fee and the course content are subject to change without prior notice.*



## Course P02 Introduction to Building Intelligence

### Course Overview

The course "Introduction to Building Intelligence" offers a thorough introduction to the core concepts and principles underlying building intelligence. Students will acquire a comprehensive understanding of how advanced technologies, data-driven systems, and artificial intelligence (AI) are integrated within buildings to maximize performance, enhance energy efficiency, and improve occupant comfort. The curriculum covers a wide range of topics, including data collection methods, data analytics techniques, automation and control systems, practical applications of AI, and the overall advantages and considerations associated with building intelligence. By the end of the course, students will possess the knowledge and insights necessary to appreciate the transformative potential of building intelligence and effectively leverage it to create smarter, more sustainable environments.

### Course Objectives

- Understand the concept and importance of building intelligence in modern architecture.
- Gain knowledge of the technologies and systems used for data collection in buildings.
- Learn the fundamentals of data analytics and its applications in optimizing building performance.
- Explore building automation and control systems and their role in building intelligence.
- Familiarize with artificial intelligence techniques used for building optimization and decision-making.
- Understand the integration and connectivity aspects of building intelligence.
- Discuss the impact of building intelligence on user experience and occupant comfort.
- Examine the ethical and sustainability considerations related to building intelligence.

### Course Outline

#### Module 1: Introduction to Building Intelligence

- Definition and significance of building intelligence
- Key components and technologies in building intelligence
- Benefits and challenges of implementing building intelligence



#### Module 2: Data Collection in Building Intelligence

- Sensors and devices for data collection in buildings
- Types of data collected (occupancy, temperature, energy usage, etc.)
- Data acquisition systems and protocols



#### Module 3: Data Analytics in Building Intelligence

- Introduction to data analytics techniques
- Data preprocessing and cleaning for building data
- Analyzing and interpreting building performance data



#### Module 4: Automation and Control Systems

- Building automation systems (BAS) and their functions
- Centralized control and monitoring of building systems
- Implementing automation strategies for energy optimization



## Module 5: Artificial Intelligence in Building Intelligence

- Overview of artificial intelligence and its applications in buildings
- Machine learning algorithms for building optimization
- Predictive maintenance and fault detection using AI

## Module 6: Integration and Connectivity in Building Intelligence

- Connecting building systems and devices for seamless communication
- Internet of Things (IoT) in building intelligence
- Data integration and interoperability challenges

## Module 7: User Experience and Occupant Comfort

- Personalization of building environments based on occupant preferences
- Adaptive lighting, temperature, and ventilation control
- Interactive interfaces for occupant engagement

## Module 8: Ethical and Sustainability Considerations

- Privacy and security implications in building intelligence
- Energy efficiency and sustainability in intelligent buildings
- Responsible AI use and social impact considerations

**Duration** 12 Weeks (2 Days a Week)

**Fee** BDT 40,000

*Please note that both the course fee and the course content are subject to change without prior notice.*



