



A) Course Details:

- **Course Title:** Smart City & Building (SCB) - Innovation, Technology & Design
- **Duration:** 6 months
- **Level:** Advanced Certificate
- **Credits:** The number of credits per module will be provided in the module details below.

B) Module Overview:

Module Code	Module Name	Study Hours	Credits
SCB101	Introduction to Smart Cities and Buildings	40 hours	5 credits
SCB102	Urban Innovation and Design Principles	50 hours	6 credits
SCB103	Technologies Enabling Smart Infrastructure	60 hours	7 credits
SCB104	Sustainable Building Practices	45 hours	5 credits
SCB105	Data Analytics for Urban Planning	55 hours	6 credits
SCB106	IoT Integration in Smart Environments	50 hours	6 credits
SCB107	Human-Centric Design in Smart Cities	40 hours	5 credits
SCB108	Energy Management in Smart Buildings	60 hours	7 credits
SCB109	Policy and Governance in Smart Urban Development	45 hours	5 credits
SCB110	Capstone Project: Smart City & Building Design	70 hours	8 credits

C) Main Aims and Objectives:

1. Develop a comprehensive understanding of smart city and building concepts.
2. Cultivate innovative thinking and design principles for urban development.
3. Master the technological foundations enabling smart infrastructure.
4. Promote sustainable practices in building design and urban planning.
5. Acquire skills in data analytics for effective urban decision-making.
6. Integrate IoT solutions into smart environments.
7. Emphasize human-centric design for user-friendly smart cities.
8. Explore energy-efficient management practices in smart buildings.
9. Understand the policy and governance frameworks in smart urban development.
10. Apply knowledge and skills through a practical capstone project.

D) Outline of The Syllabus Per Module:

1. **Module SCB101: Introduction to Smart Cities and Buildings**
 - Understanding the Concept of Smart Cities and Buildings
 - Historical Evolution of Smart Urban Development
 - Key Components and Characteristics of Smart Cities
 - Role of Technology in Building Smart Environments
 - Case Studies: Successful Smart City Implementations
 - Challenges and Opportunities in Smart Urban Planning
 - Field Trip: Visit to a Model Smart City

2. **Module SCB102: Urban Innovation and Design Principles**
 - Principles of Urban Design and Innovation
 - Design Thinking Methodologies for Smart Cities
 - Inclusive Design for Diverse Urban Populations
 - Innovation in Public Spaces and Infrastructure
 - Case Studies: Innovative Urban Design Projects
 - Workshop: Practical Application of Design Thinking

3. **Module SCB103: Technologies Enabling Smart Infrastructure**
 - Overview of Smart Infrastructure Technologies
 - IoT (Internet of Things) and Its Applications
 - Sensor Networks and Data Collection in Urban Environments
 - Cloud Computing for Smart Infrastructure
 - Security and Privacy Concerns in Smart Technologies
 - Hands-on Lab: Setting up IoT Devices

4. **Module SCB104: Sustainable Building Practices**
 - Principles of Sustainable Building Design
 - Green Building Certification Systems
 - Renewable Energy Integration in Buildings
 - Waste Management and Recycling in Smart Buildings
 - Case Studies: Successful Sustainable Building Projects
 - Project: Design a Sustainable Building

5. **Module SCB105: Data Analytics for Urban Planning**
 - Introduction to Urban Data Analytics
 - Data Collection Methods in Urban Environments
 - Data Processing and Visualization Techniques
 - Predictive Analytics for Urban Planning
 - Ethical Considerations in Urban Data Usage
 - Workshop: Analyzing Urban Data Sets

6. **Module SCB106: IoT Integration in Smart Environments**
 - IoT Architecture and Protocols
 - Sensor Networks and Communication Protocols
 - Integrating IoT in Smart Homes and Cities
 - IoT Security and Privacy Considerations
 - Project: Implementing IoT in a Simulated Smart Environment
 - Troubleshooting IoT Systems

7. **Module SCB107: Human-Centric Design in Smart Cities**
 - Importance of Human-Centric Design
 - User Experience (UX) Design Principles
 - Inclusive Design for All Ages and Abilities
 - Case Studies: Successful Human-Centric Design Projects
 - Design Project: Creating a User-Friendly Smart City Feature
 - Usability Testing and Feedback

8. **Module SCB108: Energy Management in Smart Buildings**
 - Energy Efficiency in Building Design
 - Smart Building Automation Systems
 - Monitoring and Controlling Energy Consumption
 - Renewable Energy Integration and Management
 - Energy Audit: Assessing and Improving Building Energy Performance.

9. **Module SCB109: Policy and Governance in Smart Urban Development**
 - Understanding Urban Policy and Governance
 - Legal and Regulatory Frameworks for Smart Cities
 - Stakeholder Engagement in Urban Development
 - Case Studies: Governance Models in Smart Urban Projects
 - Analysis: Policy Implications on Urban Development
 - Simulation: Developing a Smart Urban Policy

10. **Module SCB110: Capstone Project: Smart City & Building Design**
 - Project Planning and Proposal Development
 - Implementation of Smart City Concepts in a Practical Setting
 - Integration of Technologies and Sustainable Practices
 - Data Analysis and Decision-Making for Project Optimization
 - Final Presentation and Evaluation
 - Peer Review and Feedback

This detailed outline ensures that each module covers a comprehensive range of topics, providing students with both theoretical knowledge and practical skills for the successful development and implementation of smart city and building concepts.

E) Practicals:

Module Code	Practical Details
SCB101	Field trip to a smart city
SCB102	Design thinking workshop
SCB103	Hands-on experience with smart infrastructure
SCB104	Sustainable building design project
SCB105	Data analytics using real urban data sets
SCB106	IoT implementation in a simulated smart environment
SCB107	User experience (UX) design project
SCB108	Energy audit of a smart building
SCB109	Policy analysis and case study
SCB110	Capstone project presentation

F) Industrial Internship Duties (8 weeks):

1. Assist in implementing smart technologies in real-world projects.
2. Contribute to sustainable practices in urban development.
3. Analyze and propose improvements for existing smart systems.
4. Collaborate with professionals to understand policy and governance in practice.
5. Engage in data collection and analysis for decision-making.
6. Participate in energy management initiatives within a smart building.
7. Apply human-centric design principles in practical settings.
8. Contribute to IoT integration and troubleshooting.
9. Gain hands-on experience in urban planning projects.
10. Present findings and recommendations to the host organization.

G) Country Benefits:

1. Improved urban planning and resource management.
2. Enhanced infrastructure and technological innovation.
3. Increased sustainability in building practices.
4. Skilled workforce contributing to national development.
5. Strengthened policy and governance frameworks.
6. Fostered innovation ecosystems for smart solutions.
7. Energy-efficient practices leading to environmental benefits.
8. Data-driven decision-making for efficient urban development.
9. Positive impact on local economies through smart projects.
10. Global recognition for leading in smart city initiatives.

H) Students' Entrepreneurship Benefits:

1. Ability to develop innovative smart city solutions.
2. Entrepreneurial opportunities in sustainable building practices.
3. Knowledge and skills to start IoT-focused ventures.
4. Expertise in designing user-centric smart environments.
5. Opportunities in energy management consulting.
6. Understanding of policy for entrepreneurial ventures in urban development.
7. Data analytics skills for entrepreneurial decision-making.
8. Networking opportunities with industry professionals.
9. Access to potential investors interested in smart city projects.
10. Capability to lead and manage smart technology startups.

I) Recommended Books and Materials:

Details will depend on the specific content and textbooks used by the course provider. The following are general categories:

- "Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia" by Anthony M. Townsend
- "The Smart Enough City: Putting Technology in Its Place to Reclaim Our Urban Future" by Ben Green
- "Designing Connected Products: UX for the Consumer Internet of Things" by Claire Rowland
- "Building Performance Simulation for Design and Operation" by Jan L. M. Hensen and Roberto Lamberts
- Relevant academic papers, case studies, and industry reports.

J) Admission:

- Open to all individuals.