



**SMARTBUILDINGS**  
TECHNOLOGY EXPERTS. INNOVATIVE SOLUTIONS

23526 Highway 71 W, Ste 103 | Spicewood, TX 78669 | 512.215.4701 (Office)

**Integrated Building System and IT Design • Division 25 • Facility and System Survey • Business Cases • Pilot Projects • System Integration and Energy Management Product Specification • Concept & Planning • Schematic Design • Design Development • Tender Document • Contract Administration**

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## Introduction

Smart Buildings is an engineering consulting firm specializing in the design of building, energy management and technology systems.

We do not sell product or provide implementation services. We work with the building owner to design systems that compliment the use of the building, sustainability and energy management goals and provide operational efficiencies among various systems.

We provide integrated design of any system within the building. This may include building systems, IT systems, and energy and building management systems such as: structured cabling, metering, wireless systems, lighting control systems, HVAC, BMS/BAS, telephone systems, data communications networks, video communications and distribution, audio/video presentation systems, video surveillance systems, access control systems, intrusion systems, and other smart building systems.

What sets us apart from others is our years of experience, our knowledge of products and vendors, and our ability to remain neutral and provide a solution that is right for the building and occupants. We design a solution to address the needs not fit the building into a manufacturers product.

[www.smart-buildings.com](http://www.smart-buildings.com)

We started a 501(c)(3), The Smart Buildings Institute, to certify that buildings are built as efficiently as intended. [www.smartbuildingsinstitute.org](http://www.smartbuildingsinstitute.org).

## GSA Schedule Information

<b>Contract Number</b>	<b>GS-21F-0102V</b>
<b>Contract Expiration</b>	June 5, 2014
<b>Schedule</b>	03FAC Facilities Management & Maintenance (871 Professional Services under consideration)
<b>SINs</b>	811 006 --- Facilities Maintenance and Management Consulting 871 299 --- Introduction of New Services 871 202 --- Energy Management Planning and Strategies 871 203 --- Training on Energy Management 871 205 --- Energy Program Support Services 871 208 --- Resource Efficiency Management (REM) 871 209 --- Innovations in Energy 541 099 --- Introduction of New Services
<b>DUNS</b>	829784045
<b>CAGE</b>	5CEH5
<b>Business size</b>	Small business
<b>Maximum Order</b>	\$1,000,000
<b>Minimum Order</b>	\$100
<b>Geographic Coverage</b>	Worldwide
<b>Points of Production</b>	N/A

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<b>Price Discount</b>	15% to 32%
<b>Quantity Discounts</b>	Not applicable
<b>Prompt Payment Terms</b>	Net 30
<b>Prompt Payment Discount</b>	Not applicable
<b>Government Purchase cards</b>	Accepted but not below micro-purchase threshold
<b>Foreign Items</b>	Not applicable
<b>Time of delivery</b>	Contact contract administrator
<b>NAICS</b>	517911, 541330, 541340, 541350, 541512, 541611, 541618, 541620, 541690, 541990

## Contact Information

	<b>Contract Administrator</b>	<b>Ordering</b>	<b>Payment</b>
<b>Name</b>	Gina Elliott	Gina Elliott	Jim Sinopoli
<b>Address</b>	13609 Aldenbrook Drive, Huntersville, NC 28078	13609 Aldenbrook Drive, Huntersville, NC 28078	19516 Sandcastle Drive, Spicewood, TX 78669
<b>Phone</b>	619.819.5589	619.819.5589	512.293.2843
<b>E-mail</b>	gelliott@smart-buildings.com	gelliott@smart-buildings.com	jsinopoli@smart-buildings.com

## Consulting Services

### ***SIN 811 006 - Facilities Maintenance and Management Consulting:***

Smart Buildings assists clients to achieve improved operations and sustainability initiatives among new, existing and renovated buildings. We work as part of the project team alongside owners, architects, and general contractors to **design integrated systems (Division 25)**. We follow the traditional construction phases of conceptualization, schematic design, design development, tendering and contract administration. We utilize the *Smart Buildings Integration Matrix*© to ensure each project meets the requirements established by the Smart Buildings Institute. Our guidelines are stringent and must met the following:

1. Providing actionable information on the energy and operational performance of the building systems and the facilities
2. Proactively monitoring and detecting errors or deficiencies in the building systems that impact energy and associated facility costs
3. Integration of operational information to business level systems for reporting and executive management utilization.
4. A scalable energy and facility management system

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*See Appendix A for a Project Reference List.*

***SIN 871 202 - Energy Management Planning and Strategies:***

Comprehensive Energy Management Solutions for energy and sustainability projects. Projects may include, but are not limited to:

- Consulting for Energy and Sustainability Management Solutions - The strategic planning, concept, feasibility (**business case**) and development (**executing of site audits**) and **energy and sustainability management solutions** including **pilot projects**.
- Concept Development and Requirements Analysis - The analysis of the audit results and outlined requirements to design a detailed energy and sustainability management plan. Assessments and evaluation of various components of the buildings systems that impact energy including but not limited to: **HVAC Systems, Building Management/Automation Systems, Lighting Control Systems (LCS), Electrical Power Management Systems (PMS), Utility Management System (UMS), AFDD, alerts/alarms and Sensors and Meters**.
- Implementation and Change Management - The implementation and integration planning of more operationally efficient facility practices such as **establish building profile, benchmarking of existing energy costs, defining user concept, needs and vision, determine gaps and overlaps in systems, integration and communications, identify market solutions and concept and design** of a holistic building management plan that encompasses facility systems and technologies.

*See Appendix A for a Project Reference List.*

***SIN 871 203 - Training on Energy Management:***

Smart Buildings provides **training to IT and facility personnel** to assist them in understanding the relationship between the various integrated systems and how to utilize those systems to ensure efficient performance.

*See course outline in Appendix B.*

***SIN 871 205 - Energy Program Support Services:***

Smart Buildings assists agencies in developing specifications and requirements for energy and buildings management solutions. This service takes a holistic approach with assistance given to develop the design specifications, product and vendor selection and award and managing the implementation process.

- Analysis and development of **requirements and specifications** to include the preparation of a detailed solution design based on project requirements. The specifications will comply with currently established technology and building system standards with consideration for future technologies and applications to assist in managing energy and sustainability initiatives.
- **Preparation of Proposals** for a Building and Energy Management Solution
- Management of the Contractor Proposal Process that includes **conducting bidder conferences, evaluation of proposals and fees and recommendations**.
- **Project manage and contract administration** of the implementation of the building and energy management solution.

*See Appendix A for a Project Reference List.*

***SIN 871 208 – Resource Efficiency Management (REM):***

Smart Buildings will evaluate the existing building, site or campus topology for solutions that will enable owner to implement successful efficiency strategies and solutions. This may include a **site survey** of all impacted buildings/sites, a thorough review of the interaction between systems associated with energy and operational inefficiencies, the **feasibility** of a potential solution, **concept and planning** for implementation of a solution and design of system topology that will enable owner to select the best solution to meet their goals and needs.

*See Appendix A for a Project Reference List.*

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***SIN 871 209 - Innovations in Energy:***

Smart Buildings' value is its ability to find solutions to meet the needs of the owner and occupant **unencumbered by manufacturers and vendors**. Approaches and solutions will differ based on the size, use, and need of the building. We assist in the development of unique solutions. Our approach is the integration of any and all systems for better management and insight into use and uses. This may include **integrating HVAC with Lighting to meters and sensors, develop energy operations centers, and or solutions that provide demand response, curtailment strategies or wholesale aggregations**. These are only examples but Smart Buildings' knowledge of the market and its capabilities is instrumental in assisting owners to develop a unique and sometimes unorthodox approach to meet their initiatives. This is a "pioneer" approach.

*See Appendix A for a Project Reference List.*

***SIN 871-299/ SIN 541-099 - Introduction to New Services:***

Smart Buildings' performs independent qualification and evaluation, feasibility and gap analysis of your requirements. This may include developing requirements for energy and building systems, assessment and evaluation of systems and operations that impact operations and sustainability, recommendations for improvements in the building environment, and/or utilizing the latest advances in products, services and design to reduce operations and management costs and add to the whole life performance of the building. Smart Buildings can develop an **Enterprise Management System (EMS), Integrated Building Management System (IBMS), Building Control Center (BCC), Energy Operations Center (EOC)**.

*See Appendix A for a Project Reference List.*



## Appendix A: Project Reference

### ***Project 1: International Software Manufacturer***

This project focuses on energy management at Project 1's main campus. The main objective of the work is to implement an energy management tool that will provide actionable information regarding the building energy systems and visibility into the energy performance of the facilities and eventually to the main campus and other enterprise facilities. The goal of the project is to develop an EMS that will provide actionable information on the energy performance of the building systems and the facilities, proactively monitoring and detecting errors or deficiencies in the energy building systems, integrate energy information to business level systems for reporting and executive management utilization, and design an energy management system that could scale beyond the campus to other Project 1 facilities.

The current building systems at the Project 1 campus have a wide variety of capabilities and attributes. The systems have different communications protocols, different data formats and use technologies from different time periods spanning decades. Services provided include assessment of buildings systems, benchmark, and developing assessment methodology and technology solution recommendation.

- HVAC Systems
- Building Systems General
- Building Management Systems
- Lighting Control Systems (LCS)
- Electrical Power Management Systems
- Utility Management System (UMS)
- Access Control System (Lenel Badging)

### ***Project 2: US Based Healthcare (Hospital)***

Project 2 is a world renowned medical facility. For 15 years in a row, it has been ranked as the number one hospital for cardiac care, and is in the top five hospitals in America for complex and demanding situations. Project 2 has over 180 buildings, primarily in northeast Ohio, many in Florida, but a presence across the US and internationally. In 2008, they described their building systems and management systems as "a mixed bag of ineffective building automation systems, but nothing that is tied together in a manner that benefits" the organization. Smart Buildings is currently engaged in the Technical Assessment, design and implementation of an Integrated Building Management Systems (IBMS) for the main Campus in Cleveland. The main campus has approximately 12 million sq. ft. of space with another 5 million sq. ft. of parking. Once the IBMS is deployed and commissioned at the main campus, the IBMS will then be installed on the enterprise level, bringing the other Project 2 facilities into the fold. The Work by Smart Buildings includes the following tasks:

- Data Gathering on Building Systems and Market Research
- Inspections and observations of current systems and facilities.
- Market Data – Request for Information
- Analysis and Development of Requirements and Specifications
- Preparation of a RFP for an Integrated Building Management System
- Management of the Vendor Proposal Process
- Implementation Management

### ***Project 3: International Critical Care Hospital***

Project 3 is scheduled to be completed in the fourth quarter of 2012. The hospital has 2 million sq. ft. of space with 1 million sq. ft. of parking with a construction budget of approximately \$2 billion. The facility will offer the most advanced tertiary medical services in the Gulf region. The hospital is being designed to offer state-of-the-art diagnostic and treatment capabilities and utilize advanced technologies in surgery, imaging, telemedicine and electronic medical records. Smart Buildings provided Technical Assessment advisory services addressing the integration of systems for facility, which include 67 medical, clinical, building, security and IT systems.



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#### ***Project 4: Private University***

Project 4 is situated on about 1,000 acres, with the initial building phase consisting of 650,000 sq. ft. of facilities, serving nearly 500 students and 200 faculty and staff. Installed in the first phase of the construction of the university were twenty-three integrated building technology systems. The project has been referred to as a “clear landmark in the area of intelligent building management” by Frost and Sullivan and has won global awards for best use of automation, the 2007 Digi Award.

Smart Buildings was the engineer and consulting company responsible for the design, procurement and contract administration of all 23 systems, including all IT, security and life safety and building automation systems. Smart Buildings performed programming, schematic design, design development, prepared construction documents, assisted in award of bid and conducted all contract administration. The essential technical foundations for the specification of the building technology systems were several fold: utilize industry standards, open architecture, maximize the use of a common structured cabling infrastructure, minimize communications protocols (TCP/IP and Lonworks), and full featured administration and management systems.

The cost savings related to the Project 4 deployment were significant: the university saved from the facility and IT combined budgets, saved cabling, and continuously reduced energy use and costs.

#### ***Project 5: Multiple Use Real Estate***

Project 5 is a Real Estate Developer in Central America. Smart Buildings is involved with their complete portfolio in Costa Rica and El Salvador consisting of multiple commercial office, hospitality, retail and mixed-use effectively installed and centrally maintained, while providing additional functionality and occupant amenities. Smart Buildings has performed site and systems assessment and evaluation of design for electrical controls, security systems, and building automation systems. Smart Buildings has also developed procurement documents, assisted with the tender process, evaluated design and bid documents and performed system commissioning.

#### ***Project 6: Mixed Use***

Project 6 is mixed-use building with ground floor retail space, office space, apartment lofts and live/work units. The mixed-use portion of the project will consist of 2 footprints, joined by a bridge over the main entrance and driveway. The land size for the entire project is located adjacent to the Sacramento Regional Transit Broadway Light-Rail Station.

The owner’s intent is to demonstrate a foundation and best practice to remotely operate a portfolio of LEED Certified connected real estate projects and maximize the use of technology by sharing data between the building systems. The collecting of data will be monitored by a central command center with the capability to control the operation of the building anywhere in the world which will lower the carbon foot print for the building as well as the property management to operate one building.

The Project 6 projects has planned that digital, utility grade utility meters will feed information in near real-time to the tenant so that they might adjust HVAC and/or lighting levels, or make other adjustments such as employing shade control to lower energy consumption. This information will be made available via in-unit wired/wireless remote control units and/or web-based web browsers where other control function will be readily available to the tenant. Both of these systems will be integrated together and controlled from a central command center located within the project.

Each of the above systems will be fully integrated such that maximum interoperability will be accomplished to achieve the highest level of energy performance. It is expected that the project will serve as a model by which it is possible to demonstrate viable long-term sustainability of lowest energy consumption levels using an innovative smart building design approach.

#### ***Project 7: Public Utility***

The Integrated Building Systems (IBS) is the primary Graphical User Interface (GUI) and Human Machine Interface (HMI) for monitoring and management of the building systems for the entire building. The IBS is a browser based software platform incorporating an Enterprise Management System (EMS) and an Integrated

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Systems Database (ISD). The building sub-systems and enterprise software systems exchange data with the IBS.

The primary function of the IBS is to provide the Information Management Software platform for daily operations of the building and all sub-systems. This includes but is not limited to the reporting of alarm and event functions, real time energy usage, historical operational and energy related information, and overall monitoring and management of the building systems.

Project scope consists of creating the Division 25 specification documents, review and advise the MEP firms on what changes are needed to their specifications, participate in the 75% bid and review process and participate 100% design development. Elements of the integrated design include:

- Sub-system integration, data normalization and exchange
- Middleware
- Network Architecture
- System Operating Software
- Software Functionality
- Graphical Displays
- Energy Management Applications
- Other Software Applications
- Integration of DDC
- Access Control and Alarm
- Lighting Control System (LCS)
- Power Monitoring Systems (PMS)
- Sun and Window Shade Control
- Seismic Monitoring
- Waste water and water harvesting systems
- Exterior Building Maintenance System
- Vertical Transport Integration
- Integrated Sequences of Operation

**Project 8: State University**

Project 8 is a new residential facility that will include an integrated building systems design and LEED Silver certification. The integrated design and LEED certification will assist the owners in achieving energy and operational efficiency as well as provide an environment conducive to the productivity and well-being of its occupants.

With an integrated approach to building design, Smart Buildings is directly involved in the construction process, assisting the architect and developer in design, commissioning and testing of the building and technology systems.

The team assists in recommending alternatives and closing gaps in the existing design, preparing design and bid documents, commissioning and testing. Systems in this project include;

- 1) Building automation
- 2) Lighting control
- 3) Electric power management
- 4) audio/visual systems
- 5) Physical security including video surveillance
- 6) Access control
- 7) Data network
- 8) Telecommunications
- 9) Fire alarm
- 10) Mass notification
- 11) Video conferencing
- 12) Online learning
- 13) Digital signage
- 14) Elevators
- 15) RFID and asset tracking
- 16) Digital media

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## Appendix B: Smart Building Course Outline

### ***SB01: Infrastructure***

**Program Summary:** A major tenet of a smart building is to consolidate the infrastructure of building sub-systems. That is cable, cable pathways, equipment space, etc. This course will cover both cable and wireless infrastructure for building systems. The authoritative standard for cable infrastructure for telecommunications systems within buildings is the ANSI/TIA/EIA-568 A and B Commercial Building Telecommunications Cabling Standard, and for building automation systems, ANSI/TIA/EIA-862 Building Automation Systems Cabling Standard for Commercial Buildings. Wireless connectivity, including Wi-Fi and Zigbee, will be addressed as well.

#### Learning Objectives:

1. Participants will be able to identify the components for standardizing cable infrastructure for building systems.
2. Participants will examine the use of wireless connectivity.
3. Participants will examine through a case study, how the infrastructure is designed and deployed.

Course Hours: 4

Method: Online; Class

### ***SB02: Communications Protocols***

**Program Summary:** One of the major foundations of integrating building systems is the use of open communications protocols. This course reviews the use of the IP protocol, and also particular Bacnet, Lonworks and Modbus communication protocols that can be routed via the IP protocol. The course will also address how products are certified or laboratory test to be compliance with protocol standards.

#### Learning Objectives:

1. Participants will be able to identify major communications protocols for building systems.
2. Participants will examine applications using multiple protocols.
3. Participants will be able to identify the potential integration of the building systems based on the communications protocols.
4. Participants will learn how to avoid the use of an open protocol in a proprietary way.

Course Hours: 4

Method: Online; Class

### ***SB03: Data Network***

**Program Summary:** Data networks are particularly important for smart buildings. This is because the basic infrastructures of data networks (standard cable infrastructure and network protocols) are proliferating and are being adopted by other building systems. These basic data networking technologies are the technical core of a smart building. This course addresses the components of a data network, switches, servers, industry standard operating systems, network and client software applications, peripheral devices, and user devices. Local and wide area network are also covered.

#### Learning Objectives:

1. Participants will be able to identify data network components and their interrelationships in a complete network.
2. Participants will examine why a building's backbone data network is critical to the deployment of a smart building.
3. Participants will examine through a case study, how the data network is deployed.
4. Participants will be able to identify the potential integration of the building systems onto the backbone data network.



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Course Hours: 3

Method: Online; Class

***SB04: Access Control***

Program Summary: An access control system is important for security and life safety. This course will cover the components of access control systems and how they integrated into other systems. The basic components of an access control system that will be addressed include a host server, control panels or system controllers connected to the host computer, card readers, door contact, sirens and sensors connected to the control panels and door locks. Access control also integrates with other sub-systems as well as integration with business systems. The course will covers the integration of access control with the fire alarm system, video surveillance, HVAC, and others, as well as share data with business systems, such as human resources and time and attendance.

Learning Objectives:

1. Participators will be able to identify the access control system components and their interrelationships in a system
2. Participators will examine through a case study, how the access control system is designed, deployed, monitored and managed.
3. Participants will be able to identify the potential integration of the access control system into other building systems.

Course Hours: 2

Method: Online; Class

***SB05: HVAC Control Systems***

Program Summary: The program provides simple, straight forward information on HVAC Control Systems. The major components of an HVAC System are covered including boilers, chillers, air handling units (AHUs), air terminal units (ATUs), and variable air volume equipment (VAV). The program addresses the basic design foundations and management systems associated with a HVAC control system. A case study will be used to illustrate how the HVAC system operates, how it is controlled and how it integrates with other building systems to create a smart building. Strategies for improving the system efficiency and an explanation the sequence of operation will be covered as well.

Learning Objectives:

1. Participators will be able to identify the HVAC system components and their interrelationships in a system
2. Participators will examine the impact of the HVAC system on energy efficiency and a smart building.
3. Participators will examine through a case study, how the control system works.
4. Participants will be able to identify the potential integration of the HVAC control system into other building systems.

Course Hours: 3

Method: Online; Class

***SB06: Lighting Control***

Program Summary: The program provides simple, straight forward information on Lighting Control Systems. The major components of a Lighting System are covered including daylight, dimmers, scheduling, window coatings and occupancy sensors. The program addresses the basic design foundations and management systems associated with a lighting control system. A case study will be used to illustrate how the lighting system operates, how it is controlled and how it integrates with other building systems to create a smart building. Strategies for improving the system efficiency will be covered as well.

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Learning Objectives:

1. Participators will be able to identify the lighting system components and their interrelationships in a system
2. Participators will examine the impact of the lighting system on energy efficiency and a smart building.
3. Participators will examine through a case study, how the lighting control system works.
4. Participants will be able to identify the potential integration of the lighting control system into other building systems.

Course Hours: 3

Method: Online; Class

***SB07: Fire Alarms***

Program Summary: Fire alarm systems are a primary life safety system for every building, reducing the probability of injury or loss of life and limiting damage due to fire, smoke, heat and other factors. This course provides an overview the components of a fire alarm system, initiating and how fire alarm systems operate. The program also addresses how the fire alarm system is integrated with other building systems and initiates operations for other building automation systems to facilitate evacuation from the building and containment of the fire.

Learning Objectives:

5. Participators will be able to identify fire alarm system components and their interrelationships in a complete network.
6. Participators will examine how the fire alarm system initiates the operation of other building systems.
7. Participators will examine through a case study, how the fire alarm system is deployed and how it operates.

Course Hours: 2

Method: Online; Class

***SB08: Power Management Systems***

Program Summary: The program provides simple, straight forward information on Power Management Systems. The major components of a typical system that will be monitored are addressed in the course, including the power service entrance of a building or campus, switchgear, generators, network protectors, switchboards, panelboards, uninterruptible power supplies (UPS), and emergency power generation. The program addresses the basic design foundations and management systems associated with a power management system. A case study will be used to illustrate how the power management system operates, how it is controlled and how it integrates with other building systems to create a smart building. Strategies for improving the system efficiency will be covered as well.

Learning Objectives:

1. Participators will be able to identify the power management system components and their interrelationships in a system
2. Participators will examine the impact of the power management system on energy efficiency and a smart building.
3. Participators will examine through a case study, how the power management system works.
4. Participants will be able to identify the potential integration of the power management system into other building systems.

Course Hours: 2

Method: Online; Class

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### ***SB09: Video Surveillance***

**Program Summary:** This course addresses video surveillance systems, also known as closed-circuit television systems (CCTV), which are one part of a facility's security plan and deployment. The components of a video surveillance systems will be addressed including cameras, lenses, housings, video transmission, video processing, recording, networked DVRs and video servers. A case study will be used to illustrate how the video surveillance is designed, deployed and monitored, and how the video surveillance system integrates with other building systems, such as access control to create a smart building.

#### **Learning Objectives:**

1. Participators will be able to identify the video surveillance system components and their interrelationships in a system
2. Participators will examine through a case study, how the video surveillance system is designed, deployed, monitored and managed.
3. Participants will be able to identify the potential integration of the video surveillance system into other building systems.

**Course Hours:** 2

**Method:** Online; Class

### ***SB10: Video Distribution***

**Program Summary:** An emerging use of video distribution in buildings is digital signage, where the video distribution system is conveying information or advertisements through text, video and sound. This course covers the components of a video distribution systems and the programming content for the systems. This will include providing real-time information, such as energy usage, or pre-determined delivery of previously stored data. In addition, the program will cover application such as media retrieval, video conferencing, distance learning and distribution of live feeds.

#### **Learning Objectives:**

1. Participators will be able to identify video distribution network components and their interrelationships in a complete network.
2. Participators will examine applications on a digital signage network.
3. Participators will examine through a case study, how a digital signage network is deployed.
4. Participants will be able to identify the potential integration of the digital signage network with other building systems, including energy usage information.

**Course Hours:** 2

**Method:** Online; Class

### ***SB11: Telephony***

**Program Summary:** This course covers how telephone systems have evolved to Voice-Over IP (VoIP) technology and essentially have become an application on a data network. In particular the program will address the use of VoIP telephone instruments as a tool to allow users to control some of the building systems, such as HVAC and lighting. Finally the course will review the effects of the convergence of voice and data networks and what it means for the integration of other building systems regarding management, administration, maintenance resources and applications.

#### **Learning Objectives:**

1. Participators will be able to identify VoIP telephone network components and their interrelationships in a complete network.
2. Participators will examine applications on VoIP telephone instruments that allow users to control building systems.
3. Participators will examine through a case study, how the telephone network is deployed.
4. Participants will be able to identify the potential integration of the telephone and data networks.

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Course Hours: 2

Method: Online; Class

***SB12: Commissioning***

Program Summary: This course will cover the two basic types of commissioning, total project commissioning and systems and equipment commissioning. Total project commissioning begins during project conception and continues through facility management and use. System and equipment commissioning includes detailed operational testing, adjusting, and training of specific systems or equipment to ensure their readiness for use in the facility. The course will examine the role of an independent commissioning agent and the facility manager in ensuring that the facility performs in accordance with the contract documents.

Learning Objectives:

1. Participants will be able to identify the total project and system and equipment commissioning.
2. Participants will identify examine the role of independent commissioning agents and facility managers in building turnover.
3. Participants will examine through a case study, how smart building systems are commissioned.

HSW Credits: The course qualifies for HSW credits. The program's content relates to building design, interior design, mechanical and electrical systems, site design, and specification writing.

Course Hours: 3

Method: Online; Class

***SB13: Facility Management***

Program Summary: This course involves the roles and responsibilities of facility management, focusing on the facility manager's role in project closeout. Topics include operations and maintenance data, demonstrations and training, project record documents, project manual, record drawings, record submittals, startup logs, spare parts and extra stock materials, and post-occupancy evaluation.

Learning Objectives:

1. Participants will be able to identify the role of facility management and operations in the design and construction of a building.
2. Participants will examine the transition process from construction to building operation.
3. Participants will be able to identify the role of smart building systems and the proper data and information management in the building's performance and operation.

Course Hours: 3

Method: Online; Class

***SB14: The Design and Construction Process***

Program Summary: The process of how buildings are designed, constructed and operated is important to the deployment and use of smart building systems. This course will cover the process of building design, the different delivery methods for constructing a building, and the main operational activities for building management. It will also cover the roles of the design team, the building owner, the contractors and suppliers. Topics include project conception, project delivery, design, schematic design, design development, construction documents, bidding/negotiating/purchasing and construction.

Learning Objectives:

1. Participants will be able to identify the process for designing and constructing a building.
2. Participants will identify examine the role of smart buildings systems in the process of design and deployment.
3. Participants will examine through a case study, how smart building systems are coordinated with other project members.

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Course Hours: 3

Method: Online; Class

***SB15: Information Management***

Program Summary: The largest obstacle to properly managing the performance of a building is the lack of data. Therefore generating needed data from building systems and presenting that data as actionable information is critical. This course addresses the types of systems that can be integrated at the building level and at the business level, and the typical data can be integrated from each system and sub-system including physical devices and points, virtual values and calculated values. It will also cover system and sub-system communications structures and limitations of baud rates and bus scans. A case study of system integration is utilized as an instructive tool.

Learning Objectives:

1. Participators will be able to understand the importance of identifying the requirements of data and information management among the sub-systems, and vertically between the sub-systems, facility management system and business level systems.
2. Participators will examine the potential data of the building systems and the communication structures of that data.
3. Participators will examine through a case study, the management of building system data.
4. Participants will understand the potential role of middleware in normalizing and standardizing the data of building systems.

Course Hours: 4

Method: Online; Class

***Impact of Smart Controls on Building Design; Sustainable Elements of Smart Buildings***

( AIASB162011 and GBCISB16\_2011 ). 1.5 hours AIA LU/HSW/SD and 1.5 hours GBCI CEUs

While many architects and design professionals find the concept of smart buildings persuasive and intuitive, they struggle with moving from concept to design. This course provides a practical overview of the design components of smart controls and addresses the relationship between high performance buildings, energy and sustainability.

Smart controls are embodied in the Integration Automation specification division of building design. They impact building performance, including energy efficiency, security and occupant satisfaction. This session presents straight forward information on designing integrated building control systems for improvement of building performance, the efficient installation and operation of the building systems and the increased functionality from the interaction of the systems.

Learning Objectives:

1. Identify and describe the basic design foundations, technology systems and management systems associated with smart controls
2. Develop a basic knowledge of the design and installation issues related to the infrastructure of a smart building including innovative energy and sustainable systems.
3. Collect, organize, display and interpret the relationship, commonalities and differences of smart and green buildings
4. Demonstrate and communicate the sustainable value of a smart building design to the building owner/operator, and cost justify the smart building approach



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## Appendix C: Fee Matrix

SERVICE PROPOSED (e.g. Job Title/Task)	Responsibility	EDUCATION/ CERTIFICATION LEVEL	YEARS OF EXPERIENCE	Per Hour PRICE OFFERED TO GSA (excluding IFF)		Per hour PRICE OFFERED TO GSA (including IFF)	
				Price	Location	Price	Location
Project Director	Single point of authority for project matters including cost, scheduling, and performance issues; negotiates and makes decisions on behalf of the company; allocates company resources, defines project approach, methods, tools, and staffing requirements.	BA/BS, PE, LEED AP, other industry certifications, or combo	10+	\$170	Offsite	\$171.28	Offsite
				\$187	On Site	\$188.41	On Site
Project Manager	Plans, manages, supervises and directs complex or multiple projects involving design development, analysis, review, and specifications; analytic or scientific studies, conceptual, developmental, and planning functions; construction documents; budgets, estimates, ROI modeling; investigative research and reporting; strategic planning including definition of project objectives, project execution, recommendation development, and solution delivery planning; business information planning, client problem solving	BA/BS, other industry certifications, education, or 5 years experience	10+	\$153	Offsite	\$154.16	Offsite
				\$170	On Site	\$171.28	On Site
Senior Engineer	Works independently on and may manage specific tasks involving design, analysis, review, and specifications; conceptual, developmental, and planning functions; construction documents; and sourcing and fulfillment. Writes reports, assessments, and design solutions. Typically supervises team on a project. Has some latitude for unsupervised	BA/BS, other industry certifications, education, or 5 years experience	8+	\$155	Offsite	\$155.97	Offsite
				\$169	On Site	\$170.48	On Site

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	decision and action. Knowledgeable of professional practices including design, contract documents, design codes, construction materials, cost estimating, and construction technology.						
Engineer	Works independently on, and may manage, specific tasks under minimum supervision on projects involving design development, analysis, review, and specifications; conceptual, developmental, and planning functions; construction documents; and sourcing and fulfillment. Must be knowledgeable of professional practices including design, contract documents, design codes, construction materials, and construction technology. Responsible for advising the project team and/or client in specialized areas of information systems design, implementation, training and support.	BA/BS, other industry certifications, education, or 3 years experience	5+	\$140	Offsite	\$141.46	Offsite
				\$151	On Site	\$152.34	On Site
Senior Consultant	Responsible for the coordination of total construction and management of supplies, and resources; responsible for planning, organizing, directing, and executing the project from client negotiation to project close-out; manages and coordinates all contractual obligations of the firm dealing with the client on a day-to-day basis and interpreting and transmitting information from the client to the project team for disposition; is directly responsible for the administration, quality and is responsible for contract's scope of work and technical provisions.	BA/BS, other industry certifications, education, or experience	5+	\$148	Offsite	\$149.12	Offsite
				\$160	On Site	\$161.21	On Site

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Consultant	Responsible for advising the project team and/or client in specialized areas of information systems design, implementation, training and support; works independently on and may manage specific tasks under minimum supervision on projects involving design development, analysis, review, and specifications; conceptual, developmental, and planning functions. Must be knowledgeable of professional practices including: design, contract documents, design codes, construction materials, cost estimating, and construction technology.	BA/BS, other industry certifications, education, or 2 years experience	3+	\$140	Offsite	\$141.06	Offsite
				\$152	On Site	\$153.15	On Site
CAD	Provides assistance in specialized areas of knowledge in design and implementation of network, infrastructure or building systems. Produces CAD reports consistent with project team design and specifications.	BA/BS, other industry certifications, education, or 2 years experience	3+	\$47	Offsite	\$47.10	Offsite
Administration	Responsibilities include writing appropriate specification sections for the related projects that provide performance details, research as assigned and other administrative tasks as defined by Project team	BA/BS	2+	\$32	Offsite	\$32.54	Offsite
				\$43	On Site	\$42.82	On Site

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**Smart Building Professional Development & Certification**

\*\*\*Contact Contract Administrator for information on course summary, learning objectives and professional certifications.\*\*\*

Course No.	Web-based Courses	Course Description	Course Length (HRS)	Minimum Participants	Maximum Participants	Web-based classes		Onsite classes	
						PRICE OFFERED TO GSA (excluding IFF)	PRICE OFFERED TO GSA (including IFF)	PRICE OFFERED TO GSA (excluding IFF)	PRICE OFFERED TO GSA (including IFF)
SB01	Infrastructure	Overview of Structured Cabling and IP, and infrastructure	4	5	20	\$323.00	\$325.44	\$6,460.00	\$6,508.82
SB02	Communication Protocols	BacNET, LonWORKS, Open Standards, IP, Middleware	4	5	20	\$323.00	\$325.44	\$6,460.00	\$6,508.82
SB03	Data Networks	LAN/WAN, PoE, Network Security, Bandwidth requirements	3	5	20	\$242.25	\$244.08	\$4,845.00	\$4,881.61
SB04	Access Control	basic components of an access control system that will be addressed include a host server, control panels or system controllers connected to the host computer, card	2	5	20	\$161.50	\$162.72	\$3,230.00	\$3,254.41

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		readers, door contact, sirens and sensors connected to the control panels and door lock							
SB05	HVAC	Foundations of HVAC, commissioning, meeting ASHRAE standards. Best practices for Integrated design, how HVAC impacts other systems such as Alarms, Lifts, and IAQ	3	5	20	\$242.25	\$244.08	\$4,845.00	\$4,881.61
SB06	Lighting Controls	Scheduling, sensors, daylighting, system control, panels,	3	5	20	\$242.25	\$244.08	\$4,845.00	\$4,881.61
SB07	Fire/Safety	overview the components of a fire alarm system, initiating and how fire alarm systems operate	2	5	20	\$161.50	\$162.72	\$3,230.00	\$3,254.41
SB08	Power Management	major components of a typical system that will be monitored are addressed	2	5	20	\$161.50	\$162.72	\$3,230.00	\$3,254.41

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SB09	Video Surveillance	components of a video surveillance systems will be addressed including cameras, lenses, housings, video transmission, video processing, recording, networked DVRs and video server	2	5	20	\$161.50	\$162.72	\$3,230.00	\$3,254.41
SB10	Video distribution	components of a video distribution systems and the programming content for the systems	2	5	20	\$161.50	\$162.72	\$3,230.00	\$3,254.41
SB11	Telephony	how telephone systems have evolved to Voice-Over IP (VoIP) technology and essentially have become an application on a data network	2	5	20	\$161.50	\$162.72	\$3,230.00	\$3,254.41
SB12	Commissioning	total project commissioning and systems and equipment commissioning	3	5	20	\$242.25	\$244.08	\$4,845.00	\$4,881.61

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SB13	Facility Management Systems	Components, networking, standards, including integrated dashboards and databases	3	5	20	\$242.25	\$244.08	\$4,845.00	\$4,881.61
SB14	Design and Construction	The Design and Construction Process, Understanding Construction documents	3	5	20	\$242.25	\$244.08	\$4,845.00	\$4,881.61
SB15	Information Management	the typical data can be integrated from each system and sub-system	4	5	20	\$323.00	\$325.44	\$6,460.00	\$6,508.82

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