MASTER SYLLABUS

REAL 703: Data Center Development

Credit Hours: 3 (Lecture)

Cross-Listed: No

Prerequisites:

Qualifying Requirements:

Admission to MRED program or Approval of MRED Program Director

Prerequisite Courses:

None.

Programs:

M.S. (Master's in Real Estate Development) - elective

University Catalog Description:

This course offers a comprehensive introduction to the fast-evolving world of data centers, focusing on the unique challenges and opportunities in data center real estate development. Students will gain an in-depth understanding of the infrastructure, equipment, facilities, and systems that support data centers, as well as the standards, terminology, and acronyms commonly used in the industry.

Syllabus Course Description:

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The course is designed for builders, developers and other professionals interested in entering the field of data center real estate development, providing them with the knowledge and skills necessary to navigate this complex and specialized market. The curriculum covers a wide range of topics, including site selection, power and cooling requirements, land use and other governmental regulation, security measures, redundancy, scalability, and the economic factors driving data center demand.

Through lectures, industry guest speakers, case studies, and site visits, students will develop a strong foundation in data center development, from initial planning and design to construction and operation. The course also examines the broader trends in data center real estate, including the impact of cloud computing, edge computing, and sustainability considerations.

Learning Objectives:

- **Understand Data Center Infrastructure:** Gain a detailed understanding of the key components and systems that support data centers, including power, cooling, networking, and security.
- **Learn Industry Standards and Terminology:** Familiarize yourself with the essential standards, terminology, and acronyms used in data center design and operation.
- **Analyze Site Selection Criteria:** Explore the critical factors involved in selecting sites for data center development, including location, local government oversight, power availability, and regulatory considerations.
- **Examine Data Center Design and Construction:** Study the principles of data center design, construction, and operation, with a focus on achieving reliability, efficiency, and scalability.
- **Assess Market Dynamics:** Understand the economic drivers of data center demand, including the growth of cloud computing, edge computing, and the increasing importance of data in the digital economy.
- **Explore Sustainability in Data Centers:** Investigate the challenges and strategies for achieving sustainability in data center development, including energy efficiency and renewable energy integration.

Approach to Learning:

No additional information at this time.

Core Course Topics:

- **Introduction to Data Centers:** Overview of the course and an introduction to the role of data centers in the digital economy.
    - Topics: Definition of data centers, types of data centers (enterprise, colocation, hyperscale), the importance of data centers in today's world.
- **Data Center Infrastructure and Components:** In-depth exploration of the key components and systems that support data centers.
    - Topics: Power supply and distribution, cooling systems, uninterruptible power supplies (UPS), generators, network infrastructure, and security systems.
- **Industry Standards and Terminology:** Introduction to the essential standards, terminology, and acronyms used in the data center industry.
    - Topics: Uptime Institute's Tier Standards, ANSI/TIA-942, ISO 27001, PUE (Power Usage Effectiveness), DCIM (Data Center Infrastructure Management).
- **Site Selection for Data Centers:** Examination of the critical factors in selecting sites for data center development.
    - Topics: Location and proximity to users, access to reliable power and water, connectivity and latency considerations, regulatory environment, and risk factors (natural disasters, geopolitical risks).
- **Designing and Building Data Centers:** Study of the principles and best practices in designing and constructing data centers.
    - Topics: Site layout, modular design, building envelope, critical systems integration, achieving redundancy, and scalability.

- **Power and Cooling Requirements:** Detailed analysis of power and cooling needs in data centers and how to meet them efficiently.
    - Topics: Energy demand forecasting, power supply architecture, cooling technologies (air, liquid), and energy efficiency strategies.
- **Security and Risk Management:** Focus on the security measures necessary to protect data centers from physical and cyber threats.
    - Topics: Physical security (access control, surveillance), cybersecurity, disaster recovery, and business continuity planning.
- **Market Dynamics and Economic Drivers:** Understanding the economic factors that drive the demand for data centers.
    - Topics: Growth of cloud computing, the rise of edge computing, data localization laws, and trends in data consumption.
- **Sustainability in Data Centers:** Exploration of the challenges and strategies for making data centers more sustainable.
    - Topics: Energy efficiency, renewable energy integration, water usage, carbon footprint reduction, and green data center certifications (LEED, Green Globes).
- **Regulatory and Legal Considerations:** Examination of the regulatory environment governing data center development and operation.
    - Topics: Compliance with local, national, and international regulations, data privacy laws, zoning, and environmental regulations.
- **Case Studies in Data Center Development:** Application of course concepts through real-world case studies of data center projects.
    - Topics: Analysis of successful data center developments, challenges faced, lessons learned, and best practices.
- **Future Trends in Data Center Development:** Exploration of emerging trends and technologies in data center development.
    - Topics: The impact of AI and automation, developments in cooling technology, the role of 5G in data centers, and future challenges

Representative Text and Learning Materials:

No additional information at this time.

Methods of Student Evaluation:

No additional information at this time.

REVISION HISTORY

Created: 10/3/2024

Last revised by:

Last approved date:

Brief description of the revision: