

Engineering East

Promoting Sustainability

LEED® Platinum Certified

What is a Green Building?

A green building is a structure that uses environmentally responsible and resource-efficient design and construction practices that meet specified standards. Green buildings are designed to reduce the overall impact of the built environment on human health and the natural environment by efficiently using water, energy and other resources, by creating a healthy environment for its occupants and by reducing waste, pollution and environmental degradation.

What is LEED®?

The LEED® or Leadership in Energy and Environmental Design green building certification program is a voluntary, consensus-based national rating system for buildings designed, constructed and operated for improved environmental and human health performance. LEED addresses all building types and emphasizes state-of-the-art strategies in five areas:

1. Sustainable site development
2. Water savings
3. Energy efficiency
4. Materials and resources selection
5. Indoor environmental quality.

Points are attempted in each of these five areas in order to achieve a certified, silver, gold, or platinum level of certification based on the type of project.

A building project follows the LEED point system from the year in which the project is started and can take up to a year to become certified after the project is complete.

Engineering East

The Florida Atlantic University (FAU), College of Engineering and Computer Science promotes a culture of sustainability through teaching and research. In 2004 an idea was formed to build a new engineering building for the College that would serve students, faculty and staff in an environment that would showcase the best practices of the time and be a healthy, innovative environment .

Engineering East building 96 on the FAU Boca Raton campus was registered under the 2007 point system for a new construction project. Forty-three million dollars was allocated by the State of Florida from the Public Education Construction Outlay funds, as well as a \$50,000 planning grant for sustainable design from The Kresge Foundation Green Building Initiative so that by 2011 the building became a reality. At the time, a minimum of 52 points were required to achieve platinum level certification. Engineering East achieved 57 total points.

The U.S. Green Building Council (USGBC) awarded the LEED® Platinum certification to the College on July 14, 2011. Designed by international architecture, planning, engineering, interior design and program management firm LEO A DALY, FAU's facility is the first academic building in southeast Florida to achieve this status. The efficiency of the energy performance is the highest level possible for LEED points. Which means that it is 42% more efficient than a new building not built to LEED energy standards.

The five-story facility houses the university's computer science, electrical and computer engineering programs, and consists of virtual desktop based computer labs, electrical instrumentation labs, computer build/circuitry labs, 5G technologies, specialized research labs and a private cloud computing infrastructure. Some of the unique engineering and cutting edge technologies the building showcases include:

- **Chilled Beam Technology** - Chilled beam technology, which has been used in Europe and Australia but has been seldom used in the United States until recently, substantially reduces the energy used by mechanical systems. Using this technology coupled with photovoltaic systems, heat exchangers and other additional strategies reduce the energy usage by almost 35 percent compared to an ASHRAE benchmark building.

- **Temperature Control Systems** - At FAU, geothermal wells capture heat from groundwater that has a year-round stable temperature of 78 degrees, to reheat the fresh air in the dedicated outside air unit. Additionally, heat exchangers capture heat gain from the data center computer servers and the UPS.
- **Building Orientation** - The FAU building's orientation provides day lighting within 90 percent of the buildings occupied rooms, views from 75 percent of the occupied rooms, shading of the building's exterior to control heat gain and glare, and orientation to the wind.
- **Solar Energy** - A solar hot water system captures heat from the sun to supply the hot water in the building.
- **Art in Public Spaces** – E-waste from FAU's campuses is incorporated into the facilities' artwork within the project.
- **Information** - Educational Signage in the facility teaches visitors about the LEED strategies and systems used within the building.
- **Lighting Control Systems** - Controllability of Systems with regards to lighting is an important LEED point that the College was able to achieve by installing motion sensors throughout the building. When motion is sensed in the rooms of the building the lights automatically turn on.
- **Waste Disposal** –Near the elevators are three garbage containers strategically placed to encourage people to dispose of waste in the proper containers for recycling. The signs above each container have a sustainability fact which allows the point for LEED/Sustainability Education to be achieved.

Other sustainable elements include reducing the water consumption by 40 percent compared to the typical facility through features such as high-efficiency restroom fixtures and occupant sensors; utilizing Florida native and adaptive vegetation to restore natural plant and animal habitat for the building premises; diverting more than 80 percent of the construction waste from landfills; and using local materials.

In addition to the LEED certification, there are training and educational achievements within the building including state-of-the-art classrooms and labs, as well as a virtualized cloud computing infrastructure, enabling the use of information technology resources on demand. The College's goal is to have this building be a living learning laboratory for all faculty, staff, students and visitors. From the numerous innovative technologies currently installed to the ones not yet invented, the College intends to provide an environment for students to learn, study, teach, and innovate to limits beyond anyone's imagination.

First Floor

- The **e-waste wall** in the lobby was completed by the artist Jefre'. Public State buildings are required to have "art in public places". All of the pieces on the wall were provided to the artist by the College of Engineering and Computer Science from their surplus technology equipment.
- Suite 101, called "**The Cube**" is a student study suite with over 7,000 square feet of seating for students. The area includes 5 study rooms for collaborative projects, use of the College provided thin-client computers and access to the internet via wireless technology. A mural painted on the rear wall of The Cube was completed by FAU alumnus, Douglas A. Bolly, '94. The painting reflects some of the areas of research FAU students, faculty, staff and alumni are involved in. The paints used for the mural contained no volatile organic compounds (VOCs) .
- A clear pipe to the right of the elevators shows **rainwater runoff** from the roof. The water is fed directly back into the ground to replenish the Florida aquifer which allows the College to achieve a LEED point for Innovative Wastewater Technologies.

- Room 108 is the College **IT Server room**. Over \$1 million dollars was spent to upgrade the IT infrastructure of the College with 10GB (Ten Gigabit) Blade Servers and over 200 TB of storage to support cloud computing, and a computer cabinet system that extracts the heat generated from the servers to warm the water in the chilled beam cooling system throughout the building. The temperature of the water in the chilled beams must be at a specific temperature or condensation can result so the warm water assists in maintaining the correct temperature range. A chilled beam is a component of an HVAC system and induces air movement over the coil by natural convection in the way that it discharges fresh air into the room. This allows for both fresh air and cooling to be taken care of at the same time. The chilled beam system is more energy efficient and quieter than traditional air conditioning systems.
- The **restrooms** on the first floor have private shower facilities. These are provided in order to meet the alternative transportation, bicycle storage and changing rooms LEED certification point.
- The **dining areas** – the Atrium, room 111 and the Davinci Room, room 112 – were designed to meet the USGBC LEED Platinum level interior design certification. In addition, the Atrium uses only Energy Star appliances along with serving platters and utensils that break down quickly in a landfill rather than the usual 100-year breakdown process.

Second Floor

- The **Faculty and Staff Club**, room 215 was designed to meet the USGBC LEED Platinum level interior design certification. The roof of the Faculty and Staff club is white to reduce the “heat island” effect. This is another LEED point the College was able to obtain.
- A LEED point can be achieved when 90% of spaces have **daylight** and **natural views**. As a result, all the labs and classrooms on the second floor meet this requirement which provides a challenge when compared to traditional classrooms that use a projector to display class materials. In this building, 75” high definition 3D ready displays are used that consume less energy and emit less heat.

Third Floor

- Room 303C, the floor of the Dean’s Conference room is laid with **wood reused** from the FAU Arena. In 2005, Hurricane Wilma tore the roof off of the arena, and while the floor was not severely damaged, FAU was required to replace it. At that time, the wood was stored to be used several years later for this building. While the material from the FAU Arena was reused, it was not enough of the total building to meet the 5% minimum to gain the LEED point.
- Suite 308, the Dean’s office suite provides the best view of the **solar shades** that are installed on the south and east sides of the building. The holes in these shades are sized in proportion to the wavelengths of the thermal part of the sunlight spectrum. They allow over 90% of the natural light into the building while blocking over 85% of the heat from hitting the windows.

Fourth Floor

- Room 413, the **Tecore Wireless Lab** was named by FAU Engineering alumnus and Tecore Networks president and CEO, Jay Salkini, ’85, ’90. The Tecore lab includes a live mobile network operating for demonstration and testing purposes on the most prevalent standards including GSM and CDMA, enabling students, faculty and representatives of major cellular carriers to collaborate on education, research and development of innovative new services and applications such as Machine-to-Machine (M2M) and Managed Access. In total, Tecore Networks donated over \$1 million in equipment, research and development commitments and other funding to this effort, the first such multi-technology learning center in higher education in the United States.

- A **skylight** in the Study Area was installed on the fourth floor to assist in achieving the 90% daylight and views LEED point. This skylight continues throughout the labs and the conference room on the fourth floor.

Fifth Floor

- The **roof garden** accessible from the fifth floor is one of the highlights of the building and is provided for all occupants of the building to enjoy while also achieving the LEED point for exemplary performance to maximize open space. The plants and trees were carefully selected to ensure that they are native to Florida, and are irrigated with the condensation from the air conditioning system. The condensation is stored in two cisterns located on the ground floor of the north side of the building and is pumped up to the roof garden to water the plants. The water is completely reused and allows the College to achieve the exemplary performance water use reduction LEED point.
- The labs in rooms 507 and 508 have **glass walls** to allow the light into the labs, which achieves the 90% daylight and views LEED point.

Exterior

At the front of the building the College obtained the Alternative Transportation LEED point for Low Emitting and Fuel Efficient Vehicles by providing the **parking spaces** for this type of vehicle.

- On the southeast side of the building a man-made lake overflows into a **natural Florida vegetation retention pond**. This retention pond is part of the Stormwater Management LEED point. All of the landscape used around this project is drought resistant which also gives the LEED point for Water Efficient Landscaping.
- The covered eating area houses **photovoltaic panels** which along with the panels on the southern and western sides of the building generate 53kw of power. This power is used immediately by the building systems and qualifies us for the On Site Renewable Energy at 2.5% LEED point.

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