

The Desire to Design

Taneasha Roberts grew up in Kansas City in an area with homeless people and broken down buildings.

Part of her decision to become an architectural engineer was out of a desire to help others. It also helped that she really like math, especially long division, and science, especially biology, even in grade school. One of her favorite memories is of field trips taken to nature centers. In 10th grade, she took a technical class and won an award using computer assisted design (AutoCAD) software for 2D and 3D design and drafting.

That was it for Roberts. “I knew I wanted to put down my ideas and use the application of science in my own designs,” she says. Today, as a fifth-year undergraduate student at the University of Kansas, she will be graduating in May and start a career as an architectural engineer.



Architectural engineering has to do with designing every detail of the skeleton of a building. This takes a lot of math and science. It means knowing about electrical, heat and thermal properties of materials. Engineers need to know the strengths and weaknesses of materials and how they can work together to get the result wanted. They have to understand electrical currents, gravity and the dynamics of motion.

Architectural engineers deal with the beams, girders, joists and columns in a building. They ask themselves, what physics principles do I use to design a building that gravity won't pull down? What materials will make it sturdy enough to withstand strong winds and heavy snow loads? What floor plan will make it big enough to hold the people and equipment that will be in the building?

Even something that might seem simple like heating and air conditioning requires science. For example, a locker or shower rooms in a school would require different temperatures than a meeting or a classroom. She uses math to figure out what size system is needed, to design the duct work to make sure each room gets the right amount of air flow and to decide where to put temperature regulators.

Lighting has its own questions. Roberts asks herself how much light will hit the surface? How will light hit the surface? What type of lights will give you the desired result? Which is most energy efficient? What size of wiring will make sure electricity is conducted safely?

There's also fire protection. That uses chemistry, which is the study of the composition and reactions of matter, especially on the scale of atoms and molecules. “Multiple elements break down into smaller elements, so when you know how much of each certain element is in a reaction you know how combustible a material is. This is the first step in solving all problems for fire safety,” says Roberts. Then she uses math to calculate how many elements of each type are needed for a certain chemical reaction, or in the case of fire safety, to prevent a certain chemical reaction. Knowing this, she can choose the best materials and sprinkling systems.

Roberts has worked her way through college by working two jobs at a time, tutoring, and earning scholarships. She has also been president of KU's branch of the National Society of Black Engineers. She has some advice to students. “If you're interested in something, just stick with it. Don't quit when it gets tough. With practice it becomes perfect. Not everything is easy,” she says.

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