

# Biomedical Engineer

*By Team #2849B, Jessica Taylor, Caston Highschool Fulton, IN*



## What is a biomedical engineer?

A biomedical engineer is an engineer who works in the medical field and uses engineering and science skills to make devices such as artificial organs, replacement body parts, and machines that diagnose medical problems.

## What do they do?

As said above, biomedical engineers make artificial organs, replacement body parts, and machines that diagnose medical problems. They use their knowledge of engineering, biology, chemistry, computer science, and biomechanical principles to design, develop, and evaluate biological, agricultural, and health systems and products, such as artificial organs, prostheses, instrumentation, medical information systems, and health management and care delivery systems.

## How do they use the engineering design process?

Biomedical engineers use the design process every time they want to make a new device, just like we do when we want to add a new part to our robot. If a biomedical engineer wants to make a prosthetic leg, they need to use the engineering design process to figure out multiple problems. Some of the problems they need to figure out include what material the leg will be made out of, how much it will cost to make the leg, how the leg will function, and other problems. First, the engineer will ask questions to figure out how to get past these obstacles. They ask questions such as "What is the best material to make the prosthetic out of?" and with these questions they come up with solutions to the constraints, ignoring any solutions that do not meet certain constraints. Next, they begin to make different designs of prosthetics. Biomedical engineers will work together with other specialists to brainstorm designs. The team then scores the designs through a decision matrix, or Pugh chart, to see how the design will work with certain criteria. Whichever design scores the highest on the chart is

the one that the engineers will go with to make the prosthetic leg. Once the plan to make the prosthetic leg is made, the materials are ordered and delivered, and the machines are set, then the engineers will begin making the prosthetic. When they first make the prosthetic, it might not work properly. They will run tests on it to see what the issues are, then tweak the design to fix these issues. Biomedical engineers will run multiple tests and tweak a design multiple times until they successfully make a prosthetic leg that reliably works and fits all of the constraints.

## **How does their design process compare to ours?**

The design process used by biomedical engineers is the same as the process that robotics teams, including our own, use. The engineering design process is a very important part of VEX Robotics. The process is used by teams every time they want to make a change to their robot. The design process is used to organize every page in the team's engineering notebook to show how the team made their robot and the components of the robot. This is similar to how biomedical engineers keep track of their steps when building prosthetics and other devices. Documenting these steps allows the engineers to show other engineers how they made the device, and it also allows them to go back in their steps to see where they messed up and be able to fix an issue.

## **How has VEX prepared someone for this career?**

VEX has taught students who want to go into this career many different skills. These skills include how to document in an engineering notebook, how to use the engineering design process, how to work with a team, and decision-making skills. With these skills, a student can more easily go to college and become a biomedical engineer.

# Works Cited

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