Specialization:CIVIL ENGINEERING

ListofPBLs (ProblemBased Learning)

1. **Construction of Plastic Roads**
   Plastic roads are an innovative and eco-friendly solution to traditional road construction. They help reduce plastic waste and are often made from recycled materials. Plastic roads can be more resistant to weathering and wear compared to traditional asphalt.They are less prone to cracking and can adapt better to ground movement. They often require less maintenance and can have a longer lifespan. In this PBL, plastic road is constructed with sustainable solution to the society, plastic roads represent a promising advancement in road construction, combining environmental sustainability with improved performance characteristics.

2. **Preparation of Adobe Bricks**
   Adobe bricks are a highly sustainable material that aligns with principles of environmental stewardship, energy efficiency, and local resource utilization. They offer a compelling alternative to more resource-intensive construction materials, especially when used appropriately and maintained properly. InthisPBL,Adobe bricks is constructed with low carbon foot print, longevity, and durability.

3. **Zero Energy Building**
   The purpose of this PBL is to develop a kind of building that represent a forward-thinking approach to construction that aligns with sustainability goals and energy efficiency, offering significant benefits in terms of cost savings, environmental impact, and indoor comfort.

4. **Innovative Plastic Bricks for Sustainable Construction**
   In this PBL, students will explore the development and application of eco-friendly plastic bricks as an alternative to traditional building materials. They will investigate the process of recycling various plastic waste into durable, cost-effective bricks suitable for construction. The project will involve designing a prototype, testing the bricks for strength and durability, and evaluating their environmental impact compared to conventional materials. Students will also examine the potential benefits of using plastic bricks in reducing landfill waste and promoting sustainable building practices. By the end of the project, participants will presenttheir findings and propose real-world applications for their innovative bricks.

5. **Implementing Rainwater Harvesting Systems for Institute Sustainability**
   This project focuses on designing and implementing a rainwater harvesting system for an educational institute to promote environmental sustainability and resource efficiency. Students will assess the institute's water needs, analyze rainfall data, and design a system that captures and stores rainwater for non-potable uses such as irrigation and flushing. The project will involve selecting appropriate collection methods, storage solutions, and filtration systems. Students will also evaluate the potential cost savings and environmental benefits, such as reduced water consumption and lower utility bills. The final deliverable will include a comprehensive proposal, a prototype model, and recommendations for full-scale implementation.

6. **Designing Smart Roads for Enhanced Traffic Management**
   This PBL involves developing innovative "smart road" technologies to improve traffic flow and safety. Students will explore the integration of sensors, IOT devices, and real-time data analytics to create roads that can monitor traffic conditions, manage congestion, and provide instant feedback to drivers. The project will include designing a conceptual model of smart roads, implementing features like adaptive traffic signals, automated incident detection, and dynamic lane management. Students will evaluate the impact of these technologies on traffic efficiency and safety, and consider the potential challenges of installation and maintenance. The project will culminate in a presentation of a detailed prototype and a strategy for deploying smart road systems in real-world scenarios.

7. **Comparative Analysis of Tensile Strength in Various Materials**
   In this PBL, students will conduct a comparative study to evaluate the tensile strength of different materials, such as metals, polymers, and composites. They will design and execute experiments to measure how these materials respond to stretching forces, using tools like universal testing machines. The project will involve preparing material samples, performing tensile tests, and analyzing data to understand the strengths and weaknesses of each material. Students will also explore real-world applications and implications of their findings for industries such as construction and manufacturing. The final deliverable will include a detailed report with charts, conclusions, and recommendations based on their comparative analysis.

8. **Enhancing Pavement Design with Fly Ash Concrete**
   In this project, students will investigate the use of fly ash as a supplementary material in concrete for paving applications. They will examine how incorporating fly ash affects the properties of concrete, such as its strength, durability, and workability. The project will involve mixing various proportions of fly ash with conventional concrete, creating test samples, and analyzing their performance through lab tests and simulations. Students will evaluate the environmental benefits of using fly ash, such as reducing waste and lowering carbon emissions. The project will culminate in a detailed report on how fly ash concrete can be effectively utilized for sustainable and resilient pavement design.