<h1 style="text-align:center;color:purple;">Design Thinking Group Project Instructions and Project Brief</h1>

Participants need to work as a group of 5 on the assigned Think Project

- Prepare a presentation on the think project and present it to your mentors and seek their feedback/suggestions. A suggested template will be as follows.
    - Title of the presentation and names of presenters (1 slide)
    - **Empathize**: How did you research into the needs of the users? (1 slide)
    - **Define**: State how you narrowed down the problem (1 slide)
    - **Ideate**: State how you challenge assumptions and created ideas (1 slide)
    - **Prototype**: Talk about your Protype Design and Functionality using Block diagrams (1 Slide)
    - **Test**: Mention details about how you would go about testing the prototype. (1 slide)
    - **(Use additional slides only if necessary)**
- Improve your presentation based on the feedback.
- Do not plagiarize. Refer to existing projects/papers, but solve the problem with a fresh outlook. If you are planning to reuse any figures/ideas, acknowledge the source.
- Your solution will be graded for
    - Innovation
    - Technical depth in your proposed solution
    - Cost effectiveness/ease of implementation/Robustness of proposed Solution
    - Quality of the presentation

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Project 1

"Distraction Monitoring Wristband"

The new generation, particularly students, faces high levels of distraction due to smartphones, social media, and environmental factors, leading to reduced productivity and learning outcomes. In third-world countries, where access to advanced technology is limited, there's a need for an affordable, non-intrusive tool to monitor and mitigate distraction in classrooms or study spaces.

Think of what physiological parameters to be monitored, how to process real time data and provide feedback. Design a distraction monitoring device to help this cause. Think of what sensors you will use, what analog electronics may be required, what processor you will use, how the product will be packaged, etc. Be aware of power consumption, cost, battery size/weight, cultural sensitivities.

Project 2

"Smart Streetlight Dimmer Based on Traffic Flow"

Urban Indian cities suffer from high energy consumption due to streetlights operating at full brightness regardless of traffic conditions. Many areas have low foot or vehicle traffic during late-night hours, yet streetlights remain fully powered, wasting electricity and increasing carbon footprint.

Think of motion, timing based or hybrid system. Think of what sensors you will use, what analog electronics may be required, what processor you will use, how the product will be packaged, etc. Be aware of power consumption, cost, battery size/weight, ease of use, etc.

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Project 3

"Smart Flood Detection System"

Floods in low-lying areas cause damage with little warning. Design a smart flood detection system that monitors water levels, weather conditions, and environmental factors in real-time, and send alerts to authorities, communities, or mobile apps for early flood warnings.

Design a solution for smart flood detection. Think about how to monitor water level, weather information and how to alert the people?

Think of what sensors you will use, what analog electronics may be required, what processor you will use, how the product will be packaged, etc. Be aware of power consumption, cost, battery size/weight, ease of use, etc.

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Project 4

"Smart Waste Bin Monitor"

Urban and facility waste management systems lack efficient, real-time monitoring, leading to overflowing bins, inefficient collection routes, and increased environmental impact. Stakeholders need a smart waste bin monitor that provides accurate fill-level data, automates alerts, and is cost-effective and easy to maintain.

Think of what sensors you will use, what analog electronics may be required, what processor you will use, how the product will be packaged, etc. Be aware of power consumption, initial cost, maintenance cost, and practicality.

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Project 5

"Smart System for Water Conservation"

Water conservation is important everywhere – in the kitchen, in laundries, in irrigating plants, etc. A leaky tap can waste water. A washing machine that is not being run on full load will waste water. A

farmer wastes water by over-irrigating. Consider any one situation where a smart device can help conserve water. Unconsumed water in a water bottle is wasted. Consider any one situation and design a solution to solve the problem.

Think of what sensors you will use, what analog electronics may be required, what processor you will use, how the product will be packaged, etc. Be aware of power consumption, cost, battery size/weight, etc.

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Project 6

"Smart Toy"

One of the earliest applications of the DSP was a solution called "Speak and Spell" which was a toy that helped children to learn how words are spelt. Can you think of a smart toy that can help people learn a new skill or a new language while also being a fun experience to use it? Think of how personal safety can be taught to children, or water / electricity conservation can be taught to children, etc.

Think of what sensors you will use, what analog electronics may be required, what processor you will use, how the product will be packaged, etc. Be aware of power consumption, initial cost, maintenance cost, and practicality.

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Project 7

"Extended Lighting"

Lack of electricity can be a deterrent for people who wish to run small businesses from their homes. During winter, lack of lighting can eat into the livelihood of vendors who make a living by selling vegetables/fruits etc. What is an affordable solution that they can use to be able to extend their work hours in winter? Consider any one situation and design a solution to solve the problem.

Think of what sensors you will use, what analog electronics may be required, what processor you will use, how the product will be packaged, etc. Be aware of power consumption, initial cost, maintenance cost, and practicality.

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