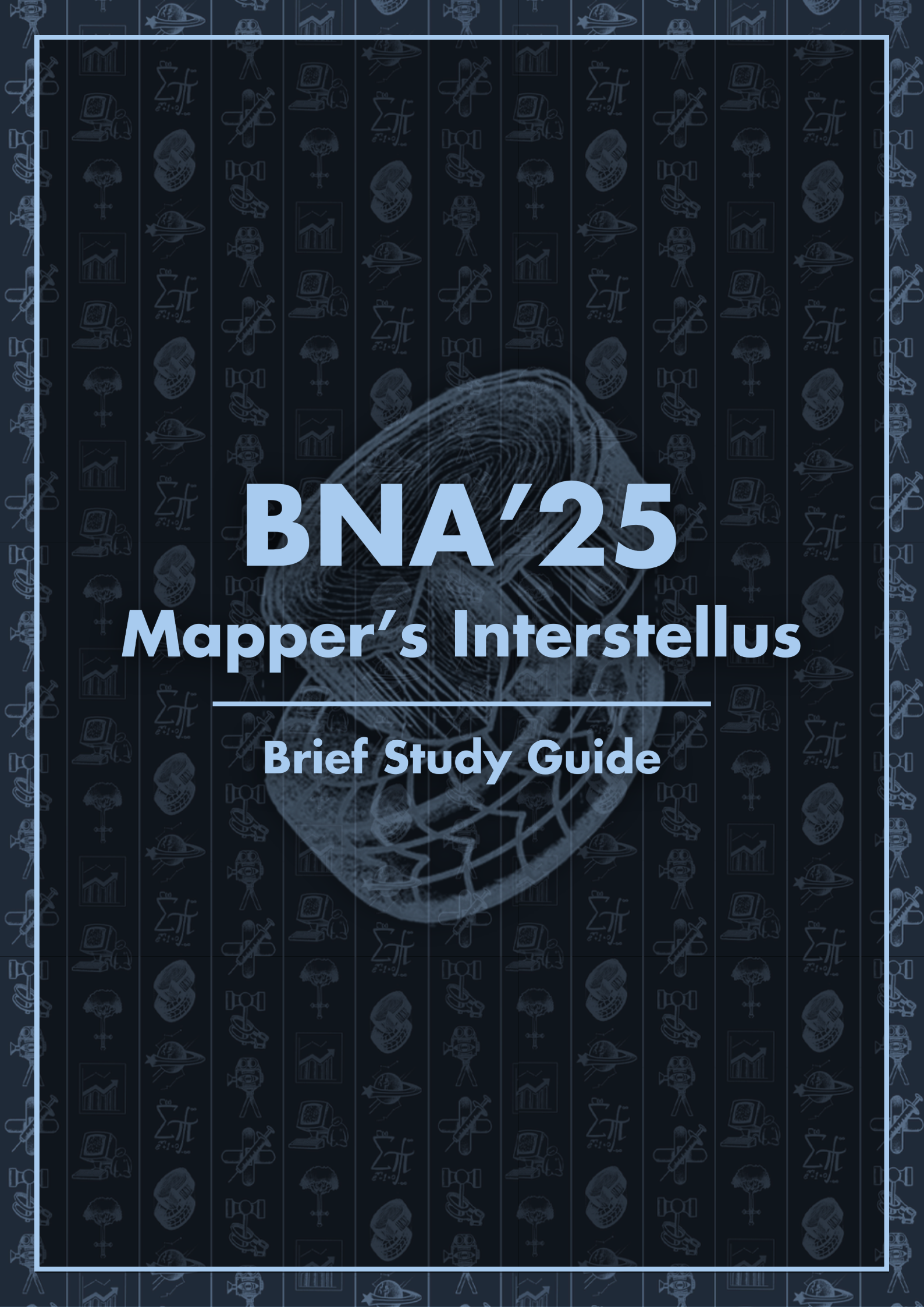

BNA'25

Mapper's Interstellus

Brief Study Guide

Mapper's Interstellus

"Mapper's Interstellus" is the engineering module at Beaconhouse Notion of Academia '25, designed to captivate delegates with a vast exploration of mechanical, electrical, and civil engineering. Delegates will design and construct working models, ranging from electrical devices to resilient mechanical solutions and sustainable civil structures. They will be constantly challenged to apply their knowledge of physics, mechanics, and materials science to solve real-world problems, all while balancing creativity with practicality.

Round

1

The first round, titled **"Acceleration Arc"**, challenges delegates to demonstrate their technical prowess in mechanical engineering, creativity in design, and problem-solving skills under real-world constraints. Teams will be tasked with constructing a functional rollercoaster using provided materials and adhering to specific design criteria. The goal is to create a track that allows a marble to traverse the course seamlessly without derailing, testing their understanding of velocity, potential and kinetic energy, gravity, and centripetal force. Delegates will be evaluated on their rollercoaster's performance, focusing on smoothness, speed, stability, and innovation. Success will require analytical thinking, precise design, and adaptability.

Delegate Cap: 3 per team

2

The second round, titled **"Egg-ineering"**, pushes delegates to demonstrate advanced engineering skills

and a deep understanding of physics in a practical task. Teams will design and build an electric car using materials provided to protect an egg, symbolizing a passenger, using engineered crumple zones and protective features for collision safety. The cars will undergo different kinds of impact tests to evaluate structural integrity and protection, with judges assessing innovation, durability, and functionality. This challenge emphasizes crash safety, energy dynamics, and physics principles, requiring creative problem-solving and a focus on energy absorption and impact resistance.

Delegate Cap: 3 per team

3

The third round, titled **"Tectonic Trials"**, invites delegates to apply their civil engineering skills and understanding of structural integrity in an intense task. Teams will be challenged to design and build an earthquake-resistant building using wooden sticks, with weight and material constraints to test resilience. Delegates must balance stability and flexibility to absorb seismic energy. Once built, the designs will be tested on an earthquake simulator to withstand simulated shocks. This challenge tests creativity and the ability to apply engineering principles to real-world solutions. Delegates will receive study materials in advance to equip them with the necessary knowledge.

Delegate Cap: 2 per team

Note: The information in this document is subject to changes.