INDUSTRIAL SOLUTIONS LABORATORY

Company Information

Company Name	*GKN Automotive - Newton*	**Date Submitted**	*05/2/2025*
Project Title	*Design of a Transfer Cart for Rework Parts (GKN_TRANSFER)*	**Planned Starting Semester**	*Fall 2025*

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

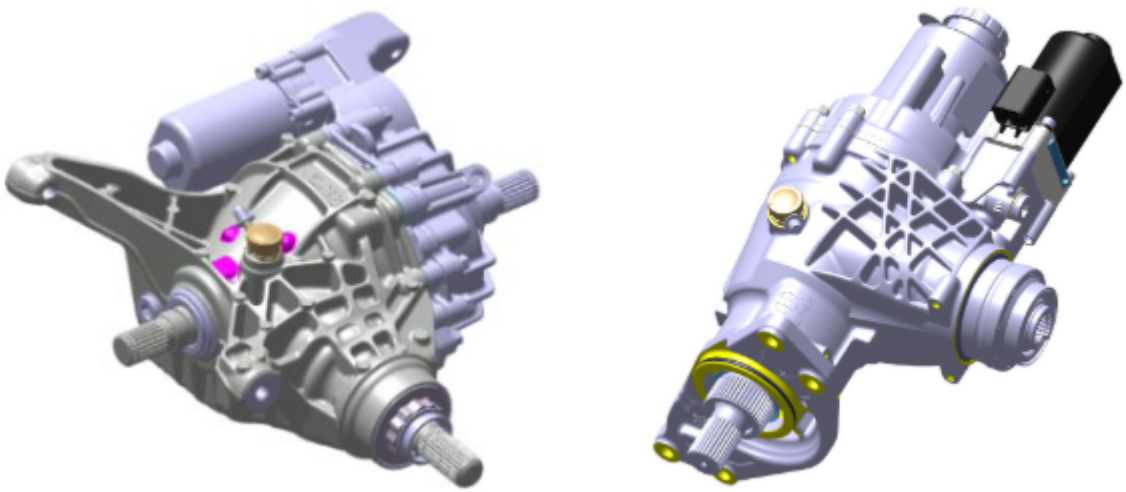
Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

Discipline	Number	Discipline	Number
Mechanical	4-5	Electrical	
Computer		Systems	0-1

Company and Project Overview:

GKN Automotive, Newton is a leader in Tier 1 automotive axle assembly and component manufacturing. There are 2 plants at the Newton site, machining and assembly. Plant 1 is the machining facility where differential rings and pinions are machined and manufactured. Plant 2 is the axle assembly plant. With 14 assembly lines and 4 major products it is a lean and diverse facility. The four main products that are manufactured are RDM (Rear Drive Module), FDU (Front Drive Unit), PTU (Power Transmission Unit), and Hydraulic disconnect clutches. With each of these units there are variants of clutch engagement, differential gear ratio and axle size.

INDUSTRIAL SOLUTIONS LABORATORY



With the 14 assembly lines in the plant, inevitably there will be rework during the assembly process. With this, the assembly line needs a way to transfer pallets with rejected units to the rework area for processing. This transfer cart will need to speak with the assembly line and rework cell to know it is connected before the pallet begins to transfer.

Project Requirements:

The specific design of the rework transfer cart will be left up to the senior design engineering team. The expectation is that the cart connects to the current assembly lines and rework stations.

There are two different assembly lines that have slightly different interface needs. We would like one cart designed and prototyped for each line. For each line, an operator would push the cart up to the line that has the rejected parts on a pallet. They would engage the cart physically to the line. The pallet would be transferred onto the cart. The cart with the rejected parts is pushed by an operator to the rework line. The carts are physically connected to the rework line and pushed off the cart and onto the rework line. When reworked parts are complete and available the process is reversed. The carts should:

- Connect to current assembly line/rework station
- Be able to connect to the assembly lines to take or reintroduce pallets
- Moveable (on casters) and lightweight as possible
- Have conveyor rollers to roll pallet onto and off the cart easily
- Have no pinch points
- Be safe for Operators and easy to use with little or no physical strain

Expected Deliverables/Results:

- Two (2) functional assembly/rework transfer carts
- Assembly line connections to align cart and transfer pallets
- Design and build of the transfer carts. Carts should be long enough to fit pallets.

  - Cart Dimensions
    - Width – 14 3/8 inches
    - Height – 32 inches
  - Pallet Dimensions
    - Width – 11 7/16”
    - Length – 27 9/16 inches

- Full mechanical prints
- Complete parts lists
- Full CAD package and Bill of Material to allow someone else to reproduce the carts
- Build done by NLT the end of March to allow testing at GKN and revisions to occur if necessary.

Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team’s work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter’s location, it must be returned to campus for the Expo. It is also a mandatory part of this Program that the Industry supporter attend the 2 expos to grade their team’s performance. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Creo Parametric
- Ability to travel to GKN’s Newton facility as required.