

CEP Mapping of the Project

1. Knowledge Profile (K's) Mapping

K's Attributes How K's Are Addressed Through Our Project CO PO				
K Code	Attribute	How K's Are Addressed Through Our Project	Related COs	Related POs
K4	Specialist Knowledge	Applied fundamental knowledge of electronics, embedded systems, solar tracking mechanisms, soil moisture sensing, and irrigation control using ESP32/Arduino.	CO1, CO2	PO1
K5	Engineering Design	Designed the dual-axis solar tracker , developed logic for servo motor control, soil moisture thresholding, and irrigation automation with IoT features	CO2, CO3, CO4	PO3, PO5,
K6	Engineering Practice	Practically implemented the system using ESP32, LDRs, capacitive soil sensors, servo motors, relay modules, and water pumps following prototyping standards.	CO3, CO4, CO5	PO4, PO5, PO6

2. Complex Engineering Problems (P's) Mapping

P's Attributes How P's Are Addressed Through Our Project CO PO				
P Code	Attribute	How P's Are Addressed Through Our Project	Related COs	Related POs
P4	Practical Implementation	Assembled hardware modules including solar panel, servo motors, soil sensors, relay, and pump , and physically integrated them with ESP32/Arduino.	CO2, CO3	PO4, PO5
P5	Experimentation & Testing	Conducted experiments to calibrate soil moisture threshold values , test dual-axis solar tracking under varying sunlight, and debug circuits.	CO3, CO4	PO4, PO9
P6	Prototyping & Validation	Developed a working prototype of smart irrigation with solar tracking, validating the design against real-world conditions.	CO4, CO5	PO5, PO6

3.Complex Engineering Activities (A's) Mapping

A's Attributes How A's Are Addressed Through Our Project CO PO				
A Code	Attribute	How A's Are Addressed Through Our Project	Related COs	Related POs
A3	Teamwork & Collaboration	Worked collaboratively in design, coding, assembly, and testing , distributing tasks for efficiency and learning.	CO4	PO9, PO11
A5	Ethics & Sustainability	Ensured the project promotes renewable energy usage, water conservation, and eco-friendly practices , addressing global SDGs.	CO3, CO5	PO6, PO7