**1. Smart Water Rationing and Leak Detection System**

**Description:** Monitor water usage at home/school and alert for leaks or overuse. View usage stats on the website.

* **Sensors:** Water flow sensor, moisture sensor, solenoid valve
* **Features:**
  + View water consumption trends
  + Auto shutoff if leak is detected
  + Alert system via website

**2. Community Smart Trash Bin Monitoring System**

**Description:** Trash bins notify local staff when full.

* **Sensors:** Ultrasonic sensor, weight sensor
* **Features:**
  + Bin fill level on dashboard
  + Status list with timestamps
  + Notification system to staff

**3. Smart Campus Gate Logging with RFID**

**Description:** RFID logs students entering/exiting through gates and displays logs on the web.

* **Components:** RFID RC522, RTC, Pico W
* **Features:**
  + Student dashboard with time logs
  + Admin panel to search logs by student/date
  + Can expand to include facial image upload (manual)

**4. Real-Time Temperature & Fire Alert System**

**Description:** Fire-prone areas (e.g., kitchens, labs) have temperature & smoke sensors monitored via web.

* **Sensors:** DHT11/DHT22, MQ-2 Gas Sensor
* **Features:**
  + Temperature/fire history logging
  + Real-time dashboard updates
  + Emergency alert push to admin panel

**5. Smart Medicine Reminder & Dispenser**

**Description:** System tracks time and reminds users to take medicine. Can open compartments on time.

* **Components:** RTC module, servo motors, buttons, OLED display
* **Website Features:**
  + Add medicine schedules
  + Logs history of taken/missed doses
  + Manual dispense from dashboard

**6. Smart Poultry/Animal Coop Monitor**

**Description:** Monitor temperature, humidity, feed/water levels in a poultry farm.

* **Sensors:** DHT11, water level sensor, IR sensor
* **Features:**
  + View current stats
  + Refill alerts
  + Monitor over time with logs

**7. Classroom Energy Monitoring & Control**

**Description:** Tracks and controls light/fan status from a website to reduce energy waste in unused rooms.

* **Hardware:** Relays for fan/lights, current sensor
* **Features:**
  + Auto shutoff if no motion detected
  + Manual on/off from web
  + Usage tracking dashboard

**8. Smart Donation Box Monitoring**

**Description:** For organizations to monitor donation boxes’ weight (money/food), alert when full.

* **Sensor:** Load cell with HX711
* **Website:**
  + Shows current donations
  + Historical logs
  + Admin alert when full

**9. Low-Cost Environmental Monitoring Station**

**Description:** For monitoring local air quality, humidity, temperature.

* **Sensors:** DHT11, MQ135 (Air Quality), BMP280 (Pressure)
* **Features:**
  + Dashboard with real-time values
  + Historical charts (daily/weekly/monthly)
  + Threshold alerts

### 🔌 1. ****Smart Energy Usage Tracker for Homes/Rooms****

**Purpose:** Reduce electricity costs and waste

* **Parts Needed:** Current sensor (ACS712), Pico W, relay module
* **Features:**
  + Live energy usage stats on website
  + Auto-turn off appliances when idle
  + Daily usage history report

✅ **Usefulness:** Helps households or dorms lower bills  
💰 **Estimated Cost:** ~₱600 total

### 🚿 2. ****Water Wastage Detector for Faucets****

**Purpose:** Alert if water is running too long or dripping

* **Parts Needed:** Water flow sensor or moisture sensor, Pico W
* **Features:**
  + Tracks water usage time
  + Sends alert to website or phone
  + Data log of excessive usage

✅ **Usefulness:** Helps conserve water  
💰 **Estimated Cost:** ~₱400 total

### 🚮 3. ****Smart Trash Bin Level Monitor (for Public Use)****

**Purpose:** Avoid overfilled trash bins in public or schools

* **Parts Needed:** Ultrasonic sensor (HC-SR04), Pico W
* **Features:**
  + Web dashboard of bin status
  + Sends alert when bin is 80-100% full
  + View logs of collection

✅ **Usefulness:** Clean community, less waste overflow  
💰 **Estimated Cost:** ~₱500 total

### 🔓 4. ****RFID-Based Barangay Resident Log System****

**Purpose:** Secure and track residents entering barangay halls, events, or clinics

* **Parts Needed:** RFID reader (RC522), Pico W
* **Features:**
  + Record entry time to website
  + Admin dashboard to view logs
  + Can be used for attendance too

✅ **Usefulness:** Improves barangay security and tracking  
💰 **Estimated Cost:** ~₱600 total

### 💊 5. ****Medicine Intake Reminder System****

**Purpose:** Assist elders or patients in remembering to take meds

* **Parts Needed:** Buzzer, LEDs, RTC, Pico W
* **Features:**
  + Web dashboard to set schedules
  + Buzzer/LED alert when it’s time
  + Track missed doses

✅ **Usefulness:** Prevents missed medications  
💰 **Estimated Cost:** ~₱400 total

### 🌡️ 6. ****Community Temperature and Humidity Monitor****

**Purpose:** Monitor climate-sensitive areas like classrooms or barangay clinics

* **Parts Needed:** DHT11/DHT22 sensor, Pico W
* **Features:**
  + Display readings on a public webpage
  + Store daily readings
  + Alert if temp is too high/low

✅ **Usefulness:** Useful for health, agriculture, and comfort  
💰 **Estimated Cost:** ~₱300 total

### 💦 7. ****Public Comfort Room Occupancy & Leak Monitor****

**Purpose:** Detect if comfort room is in use or leaking

* **Parts Needed:** PIR sensor, water level or moisture sensor, Pico W
* **Features:**
  + Tracks usage count per day
  + Alerts janitor if leak is detected
  + Dashboard for CR status

✅ **Usefulness:** Improves hygiene & water management  
💰 **Estimated Cost:** ~₱500 total

### 🔒 8. ****Low-Cost Smart Door Lock with Web Control****

**Purpose:** Control small office or room door remotely

* **Parts Needed:** Servo motor, Pico W, button
* **Features:**
  + Open/lock door via website
  + View lock status history
  + Manual override button

✅ **Usefulness:** For barangay rooms, student offices  
💰 **Estimated Cost:** ~₱400 total

### 🌾 9. ****Urban Garden Soil Moisture Monitor****

**Purpose:** Helps small gardens avoid under- or over-watering

* **Parts Needed:** Soil moisture sensor, Pico W
* **Features:**
  + Live soil moisture on website
  + Alert if water is needed
  + Daily moisture history

✅ **Usefulness:** For barangays, schools, homes with gardens  
💰 **Estimated Cost:** ~₱300 total

### 🏠 10. ****Low-Cost Home Security Motion Alert****

**Purpose:** Alert users if movement is detected at night or while away

* **Parts Needed:** PIR motion sensor, Pico W, buzzer (optional)
* **Features:**
  + Alert on website if motion detected
  + Timestamp log
  + Toggle sensor via web interface

✅ **Usefulness:** Cheap and effective for security  
💰 **Estimated Cost:** ~₱350 total

## 📄 Documentation / System Flow You Can Reuse

### ✅ ****Modules for Each System**** (General Pattern)

1. **Hardware (Pico W):**
   * Collect sensor data
   * Send data to server via HTTP POST or MQTT
   * Optional: Receive command from server (e.g., lock/unlock, turn off relay)
2. **Backend (Node.js + MySQL):**
   * API routes to receive and store sensor data
   * Routes to fetch data for dashboard
   * Admin auth and CRUD functions
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4. Admin panel for control/monitoring  
     
     
     
   🧠 Cheap + Useful IoT-Based Capstone Projects (Using Pico W + Website)

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**Purpose:** Alert if water is running too long or dripping

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**Purpose:** Avoid overfilled trash bins in public or schools

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  + Web dashboard of bin status
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**Purpose:** Assist elders or patients in remembering to take meds

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### 🌡️ 16. ****Community Temperature and Humidity Monitor****

**Purpose:** Monitor climate-sensitive areas like classrooms or barangay clinics

* **Parts Needed:** DHT11/DHT22 sensor, Pico W
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  + Display readings on a public webpage
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### 🔒 18. ****Low-Cost Smart Door Lock with Web Control****

**Purpose:** Control small office or room door remotely

* **Parts Needed:** Servo motor, Pico W, button
* **Features:**
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  + View lock status history
  + Manual override button

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💰 **Estimated Cost:** ~₱400 total

### 🌾 19. ****Urban Garden Soil Moisture Monitor****

**Purpose:** Helps small gardens avoid under- or over-watering

* **Parts Needed:** Soil moisture sensor, Pico W
* **Features:**
  + Live soil moisture on website
  + Alert if water is needed
  + Daily moisture history

✅ **Usefulness:** For barangays, schools, homes with gardens  
💰 **Estimated Cost:** ~₱300 total

### 🏠 20. ****Low-Cost Home Security Motion Alert****

**Purpose:** Alert users if movement is detected at night or while away

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* **Features:**
  + Alert on website if motion detected
  + Timestamp log
  + Toggle sensor via web interface

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   * Routes to fetch data for dashboard
   * Admin auth and CRUD functions
3. **Frontend (HTML/CSS/JS or React):**
   * Dashboard showing sensor values/status
   * Admin panel for control/monitoring
   * Optional mobile responsive interface

## 📂 Do You Want a Starter Pack?

I can give you:

* MicroPython starter code for Pico W
* Node.js backend template (API + MySQL connection)
* Frontend layout (HTML or React)
* ER Diagram
* Documentation template (Word or PDF)

Let me know which project above you're interested in, and I’ll generate the files for you!

##### You said:

give me more something taht is easy but university can still accept

###### ChatGPT said:

Absolutely! Here's a curated list of **easy yet presentable IoT-based capstone project ideas** using **Raspberry Pi Pico W + Node.js + MySQL + HTML/CSS/JS**, which are simple enough for solo or small group work, **low-cost**, and still **acceptable by universities** because they solve real-life or institutional problems.

## ✅ Easy but University-Accepted IoT Capstone Ideas

### 21. ****Wi-Fi-Based Room Occupancy Counter****

**Use Case:** For classrooms, labs, study rooms

* **How it works:** Use an IR sensor or ultrasonic sensor to count people entering/exiting
* **Features:**
  + Live counter on website
  + Resettable each day
  + Helps admins monitor room capacity

📦 **Parts:** 2 IR sensors or 1 ultrasonic sensor  
💰 **Budget:** ~₱300–₱400  
🧠 **Difficulty:** Easy

### 22. ****Temperature and Humidity Logger for Storage Rooms****

**Use Case:** For school labs, computer rooms, barangay clinics

* **How it works:** Uses DHT11 or DHT22 to log temp & humidity
* **Features:**
  + View historical data on website
  + Alerts if temperature exceeds a threshold (e.g., 30°C)

📦 **Parts:** DHT11/DHT22  
💰 **Budget:** ~₱250–₱350  
🧠 **Difficulty:** Very Easy

### 23. ****Simple RFID Attendance Logger****

**Use Case:** For small groups, orgs, barangay staff, or lab access

* **How it works:** Use RC522 RFID + Pico W to log attendance
* **Features:**
  + Admin can view logs online
  + Users scan cards to log in/out
  + Timestamped logs

📦 **Parts:** RC522 RFID module + Pico W  
💰 **Budget:** ~₱500  
🧠 **Difficulty:** Moderate but straightforward

### 24. ****Water Tank Level Monitor****

**Use Case:** For households or barangay water tanks

* **How it works:** Ultrasonic sensor detects water level
* **Features:**
  + Live water level on website
  + Alert if tank is below a threshold

📦 **Parts:** HC-SR04 ultrasonic sensor  
💰 **Budget:** ~₱250  
🧠 **Difficulty:** Easy

### 25. ****Simple Door Open/Close Logger****

**Use Case:** Monitor restricted rooms, labs, or offices

* **How it works:** Magnetic door sensor or limit switch detects open/close state
* **Features:**
  + Real-time status (open/closed)
  + Timestamp logs of when door was opened or closed

📦 **Parts:** Magnetic contact switch (door sensor)  
💰 **Budget:** ~₱100  
🧠 **Difficulty:** Very Easy

### 26. ****Smart Light ON/OFF Monitor****

**Use Case:** Monitor if lights are left on unnecessarily in rooms

* **How it works:** Light-dependent resistor (LDR) detects light presence
* **Features:**
  + Website shows if light is on/off
  + Energy tracking logs per day

📦 **Parts:** LDR + Resistor  
💰 **Budget:** ~₱100  
🧠 **Difficulty:** Very Easy

### 27. ****Simple Buzzer Alert System****

**Use Case:** For simple reminders or alerts in offices

* **How it works:** Pico W activates buzzer on command from web dashboard
* **Features:**
  + Web interface to trigger buzzer
  + Useful for bell/alarm use in small settings

📦 **Parts:** Passive buzzer  
💰 **Budget:** ~₱50–₱100  
🧠 **Difficulty:** Very Easy

### 28. ****Notice Board Display via Web****

**Use Case:** Display school or barangay announcements on an OLED or LCD

* **How it works:** Admin posts on website, Pico W fetches message
* **Features:**
  + Update display in real-time from website
  + Auto-refresh every hour

📦 **Parts:** OLED I2C display or 16x2 LCD  
💰 **Budget:** ~₱200  
🧠 **Difficulty:** Easy

### 29. ****Motion-Triggered Light Logger****

**Use Case:** Security or monitoring room activity

* **How it works:** PIR motion sensor detects movement
* **Features:**
  + Timestamped logs shown on website
  + Optional: Add LED to light up when triggered

📦 **Parts:** PIR sensor, optional LED  
💰 **Budget:** ~₱100  
🧠 **Difficulty:** Very Easy

### 30. ****Rain Detection System****

**Use Case:** For farmers, gardeners, or barangay staff

* **How it works:** Rain sensor detects precipitation
* **Features:**
  + Shows rain status online
  + Stores rainy/non-rainy logs by date/time

📦 **Parts:** Rain sensor module  
💰 **Budget:** ~₱100–₱150  
🧠 **Difficulty:** Easy

## ⚙️ All Projects Use This Stack:

| **Layer** | **Tool** |
| --- | --- |
| Microcontroller | Raspberry Pi Pico W (MicroPython) |
| Backend | Node.js (Express + MySQL) |
| Database | MySQL |
| Frontend | HTML, CSS, JS or React |
| Communication | HTTP (easiest) or MQTT (option |