Welcome & Overview

Project recap and today's goals Duration: 1h30 Audience: Software team Goal: Stream and record EMG (Ganglion + Arduino fallback)

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

What is EMG?

EMG = electrical activity of muscles. Frequency content, amplitude, and common noise sources (powerline, motion).

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

Data Flow

```
Muscle -> Electrodes -> Amplifier (Ganglion/Arduino) -> USB -> Python -> CSV -> Model
```

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

OpenBCI Ganglion & BrainFlow

Ganglion: 4 channels, sampling rate 200 Hz. BrainFlow handles streaming and board control via BoardShim.

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

BrainFlow Code Explained

Annotated example: board.prepare_session(), board.start_stream(), board.get_current_board_data(), board.stop_stream()

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

Arduino Alternative

Simulate EMG in absence of hardware using mock_arduino.ino, send comma-separated channels over serial

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

Serial to Python

Use pyserial to read lines, parse CSV rows, and add timestamps before saving.

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

Unified Data Logger

Standard CSV format: timestamp, chan_1..chan_N, label Use DataLogger class to write rows.

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

Live Demo Challenge

Record 10 seconds of 'fist' and save as CSV. Visualize next week with Matplotlib.

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

Team Roles

A1: BrainFlow researcher A2: Arduino interface dev A3: Data logger A4: Visualizer A5: File handler A6: Integrator/presenter

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

Upcoming Milestone

Next week: live visualization + labeling UI Prepare: collect 3 gestures per person (10 reps each).

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.

Q&A & Wrap-Up

Share code, check platform-specific ports, and plan for next session.

Teaching notes: Explain, Demo, and let students code. Refer to README for commands.