Mechatronics Super Study Bible (MSB) – Framework v1.0

Below is a *living* master outline that merges the two catalogues into one coherent roadmap. It's arranged so you can point to **any heading or sub-heading** and say, "Professor GPT—zoom in on *that*." I'll then unpack concepts, add examples, problem sets, or project ideas on-demand.

PHASE 0 → College-Level Readiness & Mindset

Code(s)	Topics & Competencies
CLC 120	Growth mindset, self-advocacy, time-management, study systems, financial literacy, DEI awareness
Workforce / Supervisor Essentials (De Anza)	Communication, conflict resolution, team leadership, employment law

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PHASE 1 → Core Foundations (Start Here)

1. **Mathematics & Applied Physics**
    - *CLC ARM 110* (Mechatronics Math Fundamentals)
    - *Shop Essentials (Applied Math)* sequence (De Anza)
2. **Safety Culture**
    - *ARM 111* + De Anza **Safety** series (OSHA, PPE, LOTO, ergonomics, environmental hazards)
3. **Technical Graphics & CAD Literacy**
    - *ARM 117 & 118* (3-view sketching, dimensioning, CAD basics)
    - De Anza **Inspection** → Blueprint Reading, GD&T primer
4. **College Success Checkpoint** – verify you can:
    - Read a print, apply basic trig, convert units, explain OSHA 1910 LOTO steps.

PHASE 2 → Domain Building Blocks

Domain	Lake County Series	De Anza Series	Outcome
Mechanical Systems	ARM 151-153	Mechanical Systems 101-271	Force, torque, gear/belt/chain design, lubrication, alignment
Electrical & Electronics	ARM 156-158	Electrical Systems 101-321, Motor Controls, NEC overview	AC/DC analysis, instrumentation, sensors, motors
Fluid Power	ARM 191-193	Hydraulics & Pneumatics 101-391	Hydraulic/Pneumatic circuit design, valves, actuators, contamination control
Automation & Controls	ARM 171-176 (Automation I-VI)	PLCs 201-305 + Siemens stack, Motor Controls, Photonics	PLC architecture, ladder logic, HMI, motor drives, laser processes
Manufacturing Processes	Fundamentals of High-Tech Mfging I-III, Photonics	Metal Cutting, Welding 101-331	Material removal, welding processes (SMAW/GMAW/GTAW), laser cutting
Quality & Lean	—	Lean, Six Sigma, SPC, ISO 9001, TS 16949	Defect prevention, kaizen events, GD&T inspection
Rigging & Assembly	—	Rigging 111-220, Fasteners 101	Safe lifting, hardware selection, mechanical assembly

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PHASE 3 → Systems Integration & Robotics

1. **Robotics**
    - *ARM 181-183* (Robot Programming & System Integration I-III)
    - De Anza **Robotics** 201-370
2. **Advanced Troubleshooting & TPM**
    - De Anza Troubleshooting 181, Total Productive Maintenance 141

- ARM sequencing: systematic fault isolation in multi-domain systems

3. **Data-Driven Manufacturing**
    - De Anza Metrics for Lean 231, SPC Overview 211, Six Sigma tools
    - PLC data manipulation (ARM 176) → feed into OEE dashboards (stretch project)

PHASE 4 → Professional Practice & Leadership

- **STEM Workplace Professional Skills** (*ARM 155*)
- **Supervisor Essentials** (De Anza)
- Project management, technical writing, multicultural teamwork, legal compliance.

PHASE 5 → Capstone / Portfolio

Track	Lake County	De Anza Complement	Deliverable
Integrated Cell	ARM 196-198	Robot Installations 370, PLC/HMI programming	Build & document a working mini-FMS with robot, conveyors, sensors
Quality Six-Sigma	—	Six Sigma Goals & Tools 310	Green-belt-style project reducing defect ppm
Advanced Welding Automation	ARM 115 Photonics + Welding series	Welding Automation 291-331	Program a laser-GMAW hybrid workstation

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How to Use the Framework

1. **Pick Your Layer** – e.g., "Phase 2 → Automation & Controls → PLC Architecture."
2. **Ask Me** – *"Professor GPT, drill into PLC Architecture: give me learning objectives, key equations, practice labs, and quiz questions."*
3. **Iterate** – I'll provide content; when you're ready, request the next chunk or ask to link concepts (e.g., "Connect hydraulic proportional valves to PLC analog I/O troubleshooting.").

4. **Portfolio Sync** – At each Phase checkpoint I can help design mini-projects so you accumulate demonstrable skills.

Next Steps

1. **Gap-Assessment** – Tell me which Phase you're starting from or any prior knowledge to skip ahead.
2. **Depth Preference** – Do you want bite-sized weekly modules, or immersive deep-dives with problem sets?
3. **Resource Mode** – Text explanations only, or do you want schematics, code snippets, and simulation files?

Let me know, and we'll begin sculpting your personal Mechatronics Super Study Bible—one focused lesson at a time.