

CSCI 370 Field Session Project Proposal, Summer 2025

Project Background and Description

Client Information:

The Labriola Innovation Complex is a dynamic, 40,000 sq-ft space designed to foster innovation and creativity among thousands of potential users. It includes the Labriola Innovation Hub and the Aramco xWorks project bays. The InnoHub launched in February of 2024 and since that time 3,000+ students have been trained in the wood, metal, electronics, and composites shops and the makerspace. The InnoHub provides dedicated project support and mentoring, has now launched a Prototyping Fund Program, and hosts workshops on design and technical content. CSCI 370 students would work with Director Victoria Bill, Operations Manager Julia Roos, and Shop Manager AJ Lugthart on this project.

Project Description:

To efficiently manage access to training, equipment, and resources, we require a well-structured system that integrates various components to streamline user interaction and manage user training data. This digital system will need to accept and store various data in coordination with physical tap in and check out devices. The list below outlines a list of subsystems needed to make the InnoHub more accessible, user-friendly, and efficient by addressing the key components of user access and equipment management.

This system will need to:

- Develop a database that includes all training information from Canvas and can be updated regularly (approximately weekly) (Canvas integration)
- Checking into an InnoHub workspace using a blaster card tap scanner that will pull up data about which training that user has completed in that workshop (interface with pre-built or redesigned database) and display that information in an accessible format
- Tap in to check out tools from the tool crib (Lib Cal integration with user database)
- Training expiration notification and instructions for re-upping on trainings
- Remove graduated users from Canvas (Canvas integration)
- Maintain a history of shop check-ins in case issues arise
- Support future expansions that may include additional external/user-facing uses and potential internal interface (modular and scalable architecture; cloud-based deployment; user app; name tag printing, etc)

Note: example frontend and tap in systems from other university makerspaces are provided below in the appendices as motivation. The system created for this project should be unique to the Colorado School of Mines.

Desired Skill Set:

- Database Management
- API Integration
- RFID/NFC Programming
- Hardware Integration
- Python/JavaScript/C++/Node.js
- GUI Development (frontend and backend)
- Data Security and Access Control
- Cloud Development
- Automation and Notifications

Team Size: 3-4 students

Work Location: Students will work closely with InnoHub Management; work will take place at the Labriola Innovation Hub or remotely.

NDA: Not applicable, no NDA required.

Intellectual Property: Colorado School of Mines and the Labriola Innovation Hub will retain ownership of all code developed.

Appendix A: Example Front End Webapp from NYU Makerspace

Connected Home Add User Tools

Searching by: NetID

Please only use lower-case letters for net-id

NetID

Search Toggle NetID / Barcode

User:

Edit Barcode

Please input

EDIT SAVE

Not Editable/ Saved

Figure A1: Simple Web-Based Interface Allows for Search by ID Number or ID Card Barcode

Connected Home Add User Tools

Searching by: NetID

Please only use lower-case letters for net-id

netid

Search Toggle NetID / Barcode

User: Liz New

Edit Barcode

21142241219604

EDIT SAVE

Not Editable/ Saved

Hover over a completed training to view the training date

PRINTING	CRAFTING	TOOL ZONE	ELECTRONICS	CUTTING	BASEMENT	MAKERGARAGE
Safety Orientation	Critical	DVR 488	Soldering	Cutting Mini Fusion	Connection Open	Storage Orientation
Sanitizing	Endeavour (Shelby & H&M)	Power Tools	LINO - Supermarket	Universal 1	Turnover	Storage Tools
Advanced 3D	Smoking (TSM)	Shaper	LINO - Unsupermarket	Router	Plastic Injection	
Open	Industrial Smelting Lab	Turntable - Initial	Robotic Arm	Universal	Refuse Open	
	Vacuum Forming	Turntable - Supermarket	3D Scanner		Welder	
	Vinyl Cutter	Lathe - Initial			Welder	
		Lathe - Supermarket			Welder	
		Turntable 110 - Initial				
		Turntable 110 - Supermarket				

Figure A2: Quick Search Showing Completed Trainings and Machines

Appendix B: Example Physical Check-In Stations from CU Boulder

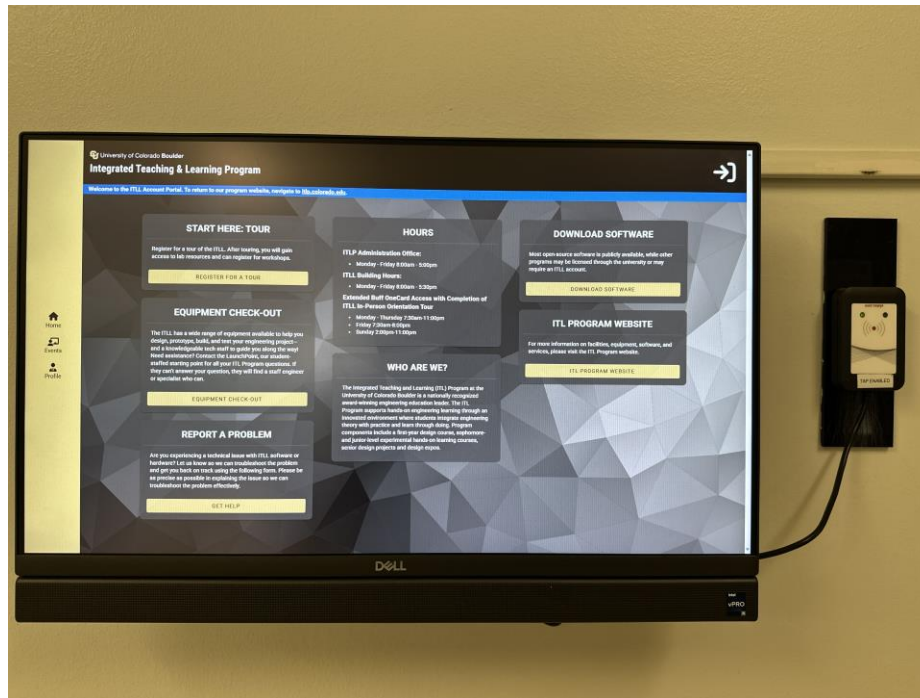


Figure B1: Integrated Card Reader with Informational Display

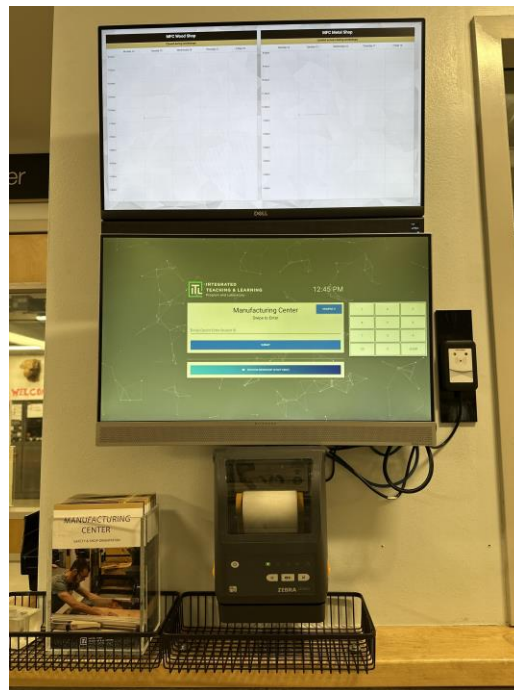


Figure B2: Integrated Card Reader with Display Showing Training Record, Name Tag Printout