PROPOSAL FOR

Five-Level Applied AI Learning Pathway

Electronics & Electrical Engineering Track

From Intelligent Systems to Future-Ready Engineering

Proposed for

Higher Education Institutions Across Africa

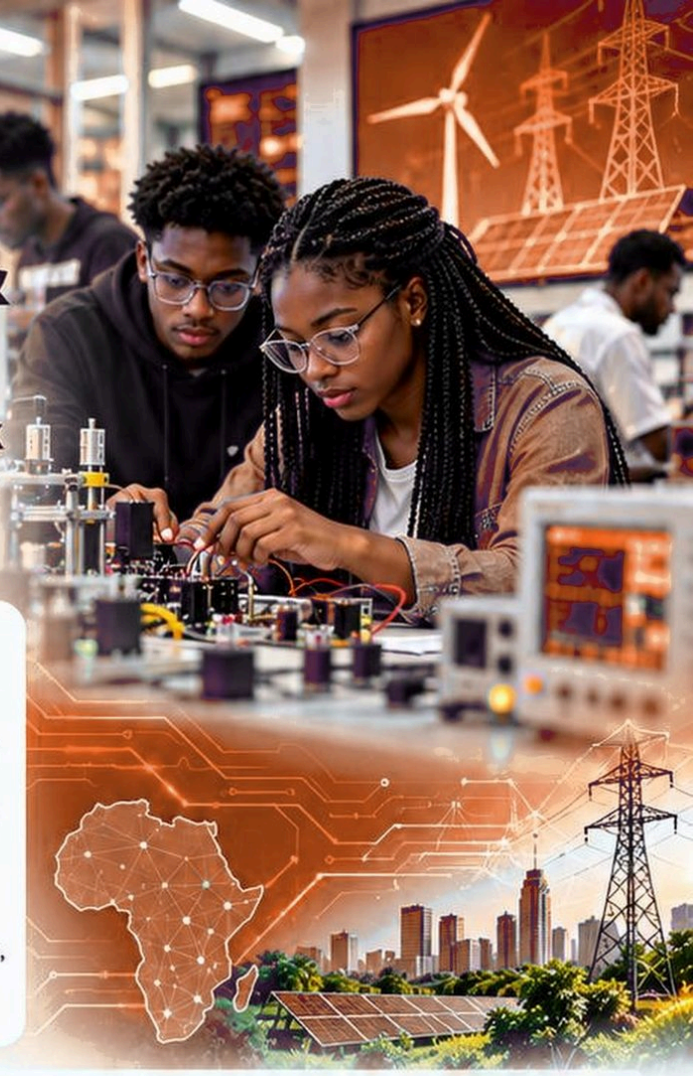


PROPOSAL FOR

Executive Summary & Program Objectives

Electronics & Electrical Engineering Track

Empowering Future-Ready Electronics & Electrical Engineering Students Through a Structured AI Learning Journey



EXECUTIVE SUMMARY

This **five-level applied AI learning pathway** equips students from electronics, electrical, instrumentation, embedded systems, VLSI, power systems, control and related disciplines with progressive AI capabilities. The program takes learners from AI literacy and productivity to engineering data analysis, embedded AI, intelligent automation, and AI product innovation, with a strong focus on real-world applications in electronics and electrical engineering domains.

Each level consists of **75 hours of learning (30 hours theory + 45 hours hands-on)**, designed for **higher education institutions across Africa.** The program is delivered with industry-aligned content, practical projects, and supported by El Roi Nexus AI to ensure an engaging, relevant and future-ready learning experience.

TARGET AUDIENCE

Designed for students across key electronics and electrical engineering disciplines

- Electronics & Communication Engineering
- Electrical & Electronics Engineering
- Electrical Engineering
- Instrumentation & Control
- Embedded Systems
- VLSI / Chip Design
- Power Systems & Renewable Energy
- Related Electronics Programs

PROGRAM OBJECTIVES

A structured pathway to build real-world AI capabilities for future engineering careers

1. Build AI literacy and digital productivity for electronics and electrical students.
2. Develop engineering data analysis and decision-support capability.
3. Enable domain-specific AI applications for embedded, power and instrumentation systems.
4. Prepare students for automation, robotics and intelligent engineering workflows.
5. Strengthen portfolio, certification awareness and career readiness for evolving engineering roles.

KEY HIGHLIGHTS

A comprehensive, hands-on and industry-aligned AI learning experience

- **5** Progressive Levels
- **375** Total Learning Hours
- **150** Hours Theory
- **225** Hours Hands-on
- Productivity AI Tools Embedded
- Real-World Engineering Use Cases

STUDENT TRANSFORMATION JOURNEY

From AI awareness to real-world innovation

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
AI-Aware Student	AI-Enabled Analyst	Embedded AI Builder	Intelligent Automation Designer	Applied AI Innovator
Understand | Explore | Use	Analyse | Model | Solve	Build | Integrate | Deploy	Automate | Optimise | Validate	Create | Innovate | Lead

Program Architecture & Five-Level Roadmap

From Intelligent Systems to Future-Ready Engineering

A structured, progressive learning pathway designed for Electronics & Electrical Engineering students to develop in-demand AI skills, apply them to real-world engineering challenges, and become future-ready graduates.



Academic Structure per Level

30 Hours Theory per Level + **45 Hours** Hands-on per Level = **75 Hours** Total per Level

Total Program Engagement

375 Total Learning Hours
Across Five Levels
(75 Hours x 5 Levels)

Flexible Delivery Options

The pathway can be embedded into semester delivery, offered as modular bootcamp blocks, or delivered in a blended faculty-supported format.

- Semester Integrated
- Modular Bootcamps
- Blended Faculty-Supported

Program Summary — Level-Wise Focus

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
AI basics, prompt techniques, productivity tools, engineering use cases.	Data analysis fundamentals, visualization, dashboards, AI-supported decision making.	Embedded AI applications, IoT, edge systems, smart devices.	Intelligent automation, robotics, industrial workflows, control improvement.	AI product lifecycle, prototyping, deployment, capstone innovation project.

Key Highlights

- Productivity AI Tools
- Real-World Mini-Projects
- Portfolio-Ready Outcomes
- Faculty Enablement Compatible
- El Roi Nexus AI Platform Support

Detailed Curriculum – Levels 1 & 2

From AI Literacy to Data-Driven Engineering Decisions



LEVEL 1

AI Foundations & Intelligent Productivity

Build strong AI foundations and use AI tools for smarter academic and personal productivity.



Industry Skills Covered

- What is AI and how it works
- Types of AI and engineering examples
- Prompt engineering basics
- AI productivity tools
- Research assistance
- Document drafting
- Presentations
- Spreadsheet support
- Responsible AI and ethics

Hands-on Use Cases

- Summarize technical datasheets and component notes
- Create study notes and flashcards
- Prepare presentations and lab reports
- AI-powered communication and email drafting
- Research and interview preparation

Outcome:
Learners confidently use AI tools for learning, communication and productivity.

LEVEL 2

Applied Data Analysis & System Modelling

Develop data skills and apply AI to analyze information and generate engineering insights.



Industry Skills Covered

- Data basics and data types
- Working with datasets
- Data analysis with Python or no-code tools
- Visualization and storytelling
- AI for engineering, production and energy analysis
- Intro to dashboards and reporting
- Document intelligence
- AI for research and decision support

Hands-on Use Cases

- Analyse sensor and machine data
- Generate insights from lab or survey data
- Create interactive dashboards
- Research and compare engineering information
- Automate technical reporting

Outcome:
Learners work with real-world data, create visualizations and use AI to support academic and engineering decisions.

75 Hours per Level
30 Hours Theory + 45 Hours Hands-on

Flexible Delivery

Real-World Projects

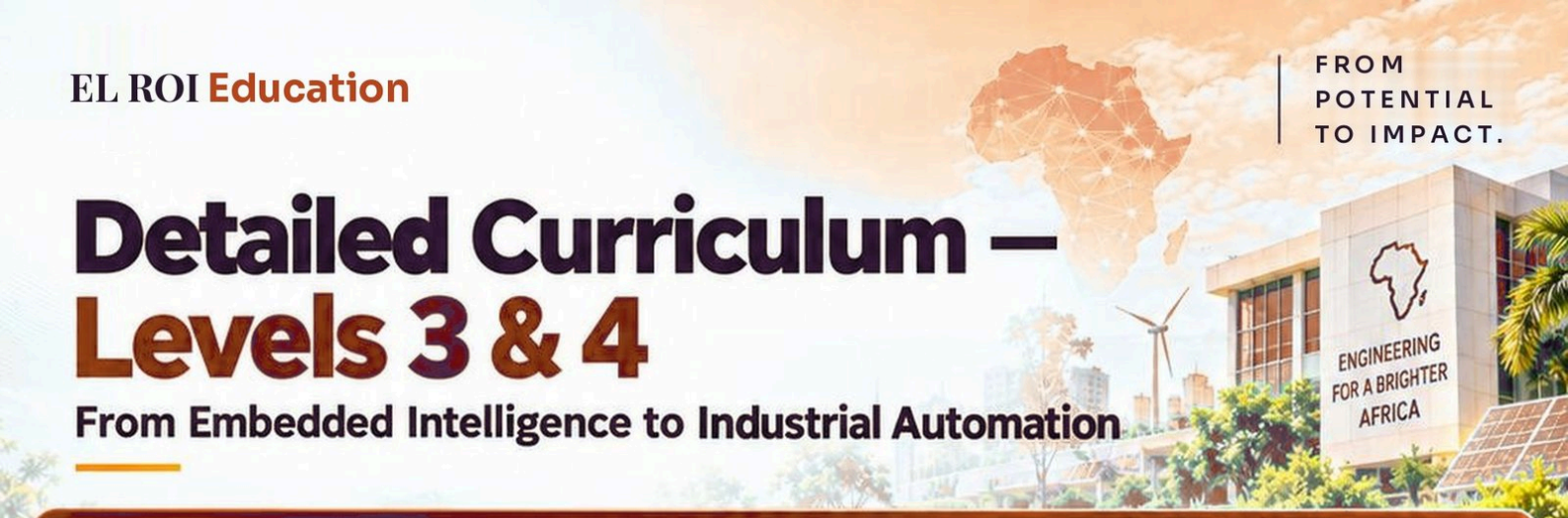
Industry-Oriented Certification Readiness

Productivity AI Tools in Every Level

El Roi Nexus AI Platform

Detailed Curriculum — Levels 3 & 4

From Embedded Intelligence to Industrial Automation



LEVEL 3 — Embedded AI & IoT Systems

Apply AI to embedded systems and IoT devices for real-time intelligence and edge applications.



Industry Skills Covered

- Edge AI and embedded AI concepts
- IoT architecture and protocols
- Sensor integration and data acquisition
- TinyML and model optimization
- Real-time systems and RTOS basics
- Security and privacy in IoT
- Embedded deployment workflows

Hands-on Use Cases

- Build an IoT-based smart monitoring system
- Develop a TinyML model for edge inference
- Create a predictive maintenance prototype
- Design a smart energy monitoring device

Outcome

Learners develop embedded AI applications and integrate sensors, edge models and IoT platforms.

LEVEL 4 — Intelligent Automation & Robotics

Design and implement AI-driven automation systems for industrial and real-world applications.



Industry Skills Covered

- Computer vision for industrial automation
- AI for control systems and robotics
- Reinforcement learning basics
- PLC and SCADA integration concepts
- Digital twins and simulation
- Human-robot collaboration and safety
- Automation workflow design

Hands-on Use Cases

- Object detection for quality inspection
- Path planning for robots
- AI-based process control system
- Digital twin for a manufacturing line

Outcome

Learners build AI-based automation solutions and simulate/test robotic and industrial applications.

Flexible Delivery | **Faculty-Supported Adoption** | **Industry-Oriented Learning** | **Portfolio Development** | **El Roi Nexus AI Platform Access**

DETAILED CURRICULUM —

Level 5 & Capstone Studio

Advanced Applied AI, Innovation & Real-World Impact



LEVEL 5

AI Product Development & Innovation

Apply end-to-end AI product development skills to create impactful solutions for electronics, electrical and intelligent systems use cases.

Industry Skills Covered

- AI product design and user-centric thinking
- Problem framing and domain discovery
- Rapid prototyping and MVP development
- Integrating AI models and APIs
- Low-code or no-code solution building
- Solution testing and iteration
- Deployment fundamentals
- Measuring impact and ROI
- Future trends in AI and engineering career pathways

Hands-on Use Cases

- Build a mini AI-powered engineering application
- Create a research or industry MVP
- Develop an embedded, power or industrial use-case solution
- Solve a local challenge through AI
- Present a showcase-ready prototype

Learner Outcome

Learners design, build, test and present an end-to-end applied **AI product** or innovation concept.

Integrated Capstone Studio

From Learning to Real-World Engineering Impact

01 Capstone Components

- Problem selection
- Solution scoping and planning
- Data/content setup
- Workflow design and implementation
- Testing and iteration
- Demo day presentation

02 Platform & Tool Exposure

- El Roi Nexus AI platform
- Prompt tools and AI assistants
- Dashboards and analytics tools
- No-code/low-code tools
- APIs and integrations
- Collaboration and project management tools

03 Final Deliverables

- Working prototype
- Presentation deck with impact analysis
- Documentation
- Portfolio artifact

75 Hours for Level 5
30 Hours Theory + 45 Hours Hands-on

Project-Based Learning

Industry-Oriented Certification

El Roi Nexus AI Platform

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Electronics & Electrical Engineering Track



Delivery Model & Learning Experience

Flexible. Practical. Future-Ready.

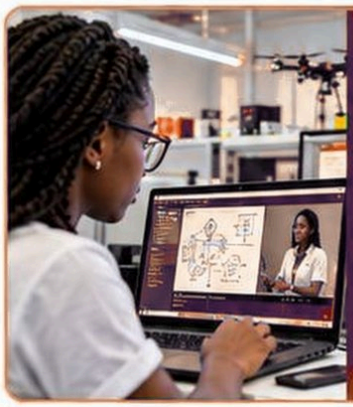
A blended, hands-on learning experience designed for electronics and electrical engineering graduates to build real AI skills, work on practical projects and gain career-ready competencies for intelligent systems, automation and innovation.

Delivery Options



Immersive Modular Delivery

- 5 to 6 day intensive blocks
- Guided practice and mini-projects
- On-campus delivery
- Faculty supported



Embedded Academic Delivery

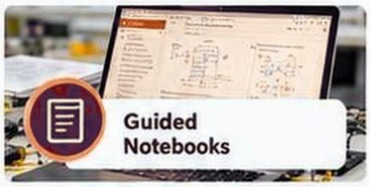
- Weekly or periodic sessions integrated into the academic calendar
- Blended delivery
- Continuous lab practice
- Platform enabled

Learning Methodology

1. **Learn** — Concepts, tools and best practices.
2. **Experiment** — Hands-on labs with guided notebooks.
3. **Build** — Mini-projects to apply skills.
4. **Apply** — Solve real electronics and electrical use cases and industry problems.
5. **Demonstrate** — Present solutions, get feedback and build a portfolio.

Hands-on Components


Coding & No-Code Labs


Guided Notebooks


Prompt Labs


Mini-Projects


Assignments


Capstone Development


Faculty Mentoring


Platform Access

75 Hours per Level
30 Hours Theory + 45 Hours Hands-on

Real-World Use Cases Across Disciplines

Project-Based Progression



Projects, Assessment & Certification Readiness

Learn | Build | Showcase | Get Certified | Be Career Ready

Electronics & Electrical Engineering Track

ENGINEERING FOR A BRIGHTER AFRICA

A PROGRESSIVE AI JOURNEY

FROM CONCEPTS TO REAL-WORLD PROJECTS AND INDUSTRY-RECOGNISED CERTIFICATIONS



1 Project Progression Roadmap

A HANDS-ON JOURNEY FROM FOUNDATIONS TO REAL-WORLD INNOVATION



LEVEL 1

AI Productivity Mini Project

Use AI tools to solve a simple engineering task and improve productivity.



LEVEL 2

Data Analysis & Insight Mini Project

Analyse real data from electrical systems and extract meaningful insights.



LEVEL 3

Embedded AI / IoT Project

Build intelligent electronics/IoT systems with sensors and edge AI.



LEVEL 4

Automation or Robotics Project

Design and build automated systems using AI, control and robotics.



LEVEL 5

Capstone AI Product or Innovation Demo

Develop a complete solution addressing a real-world problem and showcase it.

2 Assessment Framework

A BALANCED EVALUATION OF LEARNING, SKILLS AND REAL-WORLD APPLICATION

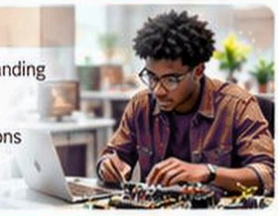
20% Participation & Attendance	**20%** Quizzes	**25%** Guided Labs	**25%** Mini-Projects	**10%** Final Project / Demo

3 Certification Readiness

GAIN PRACTICAL SKILLS ALIGNED TO INDUSTRY-RELEVANT CERTIFICATIONS

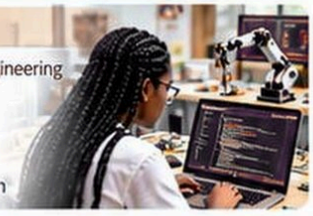
FOUNDATION STAGE

- AI awareness and ecosystem understanding
- Prompt engineering fundamentals
- Data literacy for engineering applications
- Responsible AI basics



ADVANCED STAGE

- AI application development for engineering use cases
- Generative AI and RAG systems
- Agentic systems awareness
- Analytics and workflow automation



4 Key Outcomes for You

BUILD SKILLS, REAL EXPERIENCE AND CREDIBILITY FOR YOUR FUTURE CAREER

Portfolio-Ready Artifacts
Real projects, code, reports and demos to showcase your skills.

Stronger AI Productivity
Work smarter with AI tools across design, analysis and documentation.

Real Project Exposure
Hands-on experience with electronics, electrical systems and intelligent solutions.

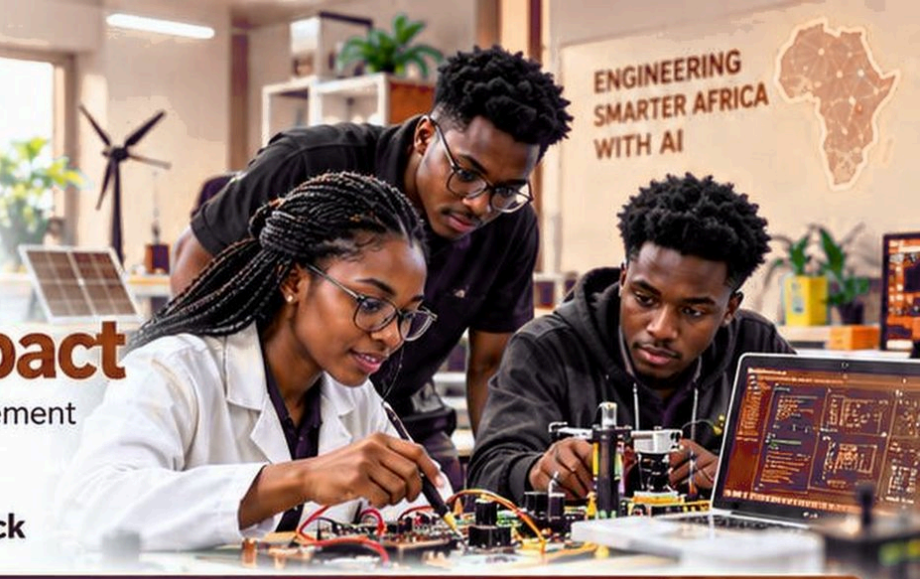
Improved Employability
Be ready for internships, placements and future opportunities.

75 Hours per Level 30 Hours Theory + 45 Hours Hands-on	**Flexible Delivery**	**Real-World Projects**	**Industry-Oriented Certification Readiness**	**Productivity AI Tools in Every Level**	**El Roi Nexus AI Platform**

Commercial Model, Roles & Institutional Impact

A Flexible Pathway for Scalable AI Enablement in Higher Education

Electronics & Electrical Engineering Track



1 Commercial Model

1. Per-Student Pricing
Transparent, affordable pricing per student.

2. Per-Level Engagement
Pricing options based on individual or multi-level engagement.

3. Bundled Programs
Cost-effective bundles across multiple levels.

4. Annual Platform Access Options
Institution-wide or cohort-based platform plans.

5. Faculty Enablement Add-ons
Optional training, certification and ongoing support for academic staff.

6. Custom Implementation Support
Onboarding, integration and program design support.

Final commercials depend on cohort size, program scope, delivery model and customization or integration requirements.

2 Roles & Responsibilities

El Roi Education Responsibilities

- Provide platform access and technical infrastructure.
- Design and curate content and curriculum.
- Develop guided learning assets.
- Provide assessment templates and rubrics.
- Share real-world project frameworks.
- Support faculty onboarding and enablement.
- Provide progress reporting and learning analytics.

Institution / Partner Responsibilities

- Student enrolment and cohort management.
- Classroom/lab/infrastructure coordination.
- Faculty facilitation and student support.
- Academic scheduling and calendar alignment.
- Local mentoring and project guidance.
- Attendance and participation tracking.
- Approvals and governance support.

3 Institutional Impact

AI-Enabled Student Learning



Stronger Project Portfolios



Faculty-Supported Adoption



Internship & Innovation Readiness



Improved Employability



Scalable AI Adoption



Electronics & Electrical AI Readiness Outcomes

Students progress from AI literacy to real-world engineering AI application, automation and innovation, ready for modern workplaces and advanced study.

- **75 Hours per Level** — 30 Hours Theory + 45 Hours Hands-on
- **Flexible Delivery**
- **Real-World Projects**
- **Industry-Oriented Certification Readiness**
- **Productivity AI Tools in Every Level**
- **El Roi Nexus AI Platform**