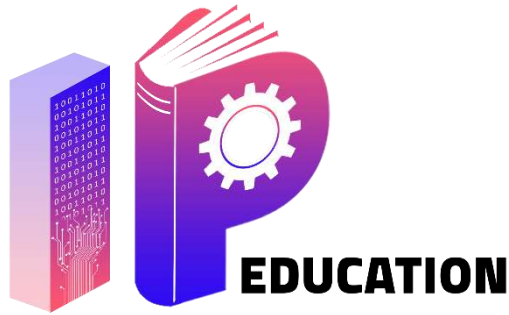




TOT Program

Certified STEAM Teacher Professional Diploma

Course Title: Misbar - STEAM TECH Architects

Prerequisites: none

Credit hours: 30

Target audience: Educators, educational supervisors, trainers, and graduates of scientific/technical disciplines

Course Description:

The Certified STEAM Teacher Program is an integrated professional diploma designed to qualify teachers with the technical and pedagogical knowledge required to teach Science, Technology, Engineering, Arts, and Mathematics (STEAM) in accordance with global best practices and accredited standards in international schools.

The program bridges academic concepts with practical application by training participants to design and execute educational projects. It focuses on integrating robotics, programming, Artificial Intelligence (AI), the Internet of Things (IoT), and 3D design into the classroom environment, ensuring the creation of inquiry-based, problem-solving, and project-based learning experiences.

Additionally, it prepares teachers to map curriculum plans and design educational units aligned with international benchmarks and modern school accreditation requirements, empowering them to lead STEAM tracks with high efficiency locally and internationally.

The Content	Duration (hour)
Module 1: Educational Robotics • Introduction to educational robotics architectures • Robot core components and motion/drive systems • Fundamental logic and programming structures • Structural engineering and model designs • Practical tasks, problem-solving, and challenge design • Integrating robotics across the STEAM spectrum Module 2: Arduino & Embedded Systems • Introduction to the Arduino microcontroller platform • Core electronics principles and components • Circuit design, breadboarding, and connections • Interfacing with sensory inputs and actuator outputs • Implementation blueprints for practical classroom projects Module 3: Internet of Things (IoT) • Foundational infrastructure and concepts of IoT • Establishing network configurations and device connectivity • Protocols for remote monitoring and hardware control • Designing smart educational models and applications • Real-world educational use cases for IoT environments Module 4: Artificial Intelligence inside STEAM • Comprehensive definitions and macro concepts of AI • Machine Learning (ML) mechanics and smart engines • Designing curriculum tasks driven by generative/predictive tools • Introduction to script-based programming for AI via Python Module 5: 3D Design & Printing • Geometric foundations and principles of 3D modelling • Utilizing computer-aided design (CAD) applications • Model optimization, mesh slicing, and printing setups • High-impact prototyping applications in schools	30

Module 6: Early Childhood Platforms (Up to Grade 4)

- Deploying specialized kits: LEGO Education WeDo, Snap Circuits, Mechanical LEGO kits
- Facilitating hands-on mechanical and technical activities

Module 7: Pedagogical Methodology for STEAM

- Deep-dive into the educational philosophy of integrated tracks
- Project-Based Learning (PBL) framing and execution cycles
- Structuring standard-based Inquiry Learning processes
- Engineering high-retention instructional pathways

Module 8: Applying Cognia Standards

- Introduction to Cognia accreditation frameworks
- Educational quality assurance indicators and expectations
- Establishing performance metrics, scoring benchmarks, and evaluation
- Formal documentation of active classroom STEAM evidence

Module 9: Curriculum Mapping & Content Design

- Building structured annual and semester curriculum maps
- Designing macro and micro lesson structures
- Writing rigorous, measurable learning outcomes
- Developing objective diagnostic, formative, and summative assessment tools
- Aligning home-grown content maps to strict international benchmarks

Assessment & Certification Requirements

To successfully secure the official Certified STEAM Teacher professional credential, candidates must pass both evaluation milestones:

1. Theoretical Examination (40% of Total Grade)

Measures conceptual clarity across STEAM philosophy, instructional robotics, foundational programming architectures, Arduino logic, integrated IoT schemes, AI models, active teaching methodologies, and Cognia framework requirements.

2. Practical Capstone Project: Model Lesson Delivery (60% of Total Grade)

Trainees must curate and execute a fully integrated classroom model lesson. This requires submitting a highly professional macro lesson plan, original instructional materials, and a recorded video presentation (maximum 15 minutes) capturing live teaching strategies, active student engagement metrics, and integrated objective assessment models.

Evaluation focuses on planning depth, objective alignment, seamless multidisciplinary STEAM synthesis, technology deployment, pacing, and communication clarity.

Graduation & Certification Benchmarks

- Maintain a minimum cumulative attendance of 85% across all scheduled training hours.
- Secure a passing score on the comprehensive theoretical examination.
- Achieve a satisfactory passing score on the practical model lesson capstone portfolio evaluation.
- Attain an overall combined final minimum grade of no less than 70%.

Certification Validity: Earning the Certified STEAM Teacher credential formally certifies an educator's capacity to design and implement rigorous STEAM tracks, launch high-tech innovation environments, and direct complex student technical projects in full alignment with accredited international educational standards and school requirements.

Expected Outcomes:

By the end of this Diploma program, trainees are eligible to:

1. STEAM Framework & Instructional Design

- Apply STEAM philosophy practically through Inquiry-Based and Project-Based Learning (PBL) strategies.
- Construct curriculum maps and design comprehensive lesson plans aligned with global educational benchmarks.

2. Educational Robotics & Embedded Systems

- Deploy educational robotics kits to demonstrate core scientific and engineering principles.
- Design and program embedded systems using Arduino platforms to build Internet of Things (IoT) projects.
- Integrate Artificial Intelligence (AI) applications and programming as core instructional tools.

3. Digital Fabrication & Hardware Deployment

- Create 3D models and technically prepare them for execution via 3D printing.
- Utilize and manage modern educational kits that support hands-on, inquiry-driven technical instruction.

4. Quality Standards & Professional Delivery

- Implement global quality and academic accreditation standards (**Cognia**) for STEAM programs.
- Empower educators to deliver exemplary, active-learning model lessons and manage modern tech labs effectively.

5. Teacher Competencies

- Instructional Leadership: Develop curriculum maps, cross-disciplinary units, and activities to confidently teach specialized STEAM programs in international schools.
- Lab & Environment Management: Manage robotics labs effectively while building interactive, inquiry-driven, and hands-on classroom environments.
- Competition Mentorship: Train, mentor, and strategically prepare students to participate and excel in technological innovation competitions.