



PROGRAMME SPECIFICATIONS

**PROFESSIONAL DIPLOMA**  
**in**  
**Integrated STEM Education**

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THIS PROGRAMME IS ACCREDITED BY:

**LONDON EXAMINATIONS BOARD LIMITED**

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### BASIC COURSE DATA

Originating Institution(s):	London Examinations Board
Programme Title(s):	Professional Diploma in Integrated STEM Education
Quality Assurance Management:	Kuala Lumpur International Education Consortium
Intake Platform:	C-CEPS UTMSPACE Services Sdn Bhd, Malaysia
Delivery Institution:	ALFA and Friends Sdn. Bhd.
Awards to be conferred:	Professional Diploma in Integrated STEM Education
Awarding Body:	London Examinations Board
Mode/Study Pattern:	Blended
Language:	(i) English or (ii) Bahasa Melayu
Duration for completion:	12 months (maximum)
Start Date:	January 2023
Proposed Annual Intake:	10 Intakes per Year

## **1. INTRODUCTION**

There has been a growing emphasis by educators, academicians, and policy makers on the importance of foundational scientific literacy and Science, Technology, Engineering and Mathematics (STEM) skills. Many studies have shown positive learning outcomes when young children were engaged in STEM programmes. Thus, many countries have listed STEM/STEAM education as one of the national agenda, including developing countries such as Malaysia and Indonesia. However, most teachers lack skills and competencies to plan and facilitate integrated STEM learning.

This Professional Diploma in Integrated STEM Education is developed to address the need in developing teachers' capacity in implementing integrated STEM teaching and learning for young children.

This programme is designed based on the International Multi-accreditation Programmes for Academic, Human Capital and Talent Development (IMPACT) blueprint designed by Kuala Lumpur International Education Consortium.

### **1.1 Programme Aims**

This programme aims to provide pedagogical knowledge and skills to preschool and elementary teachers in facilitating STEM teaching and learning to young children. These teachers can be pre-service and in-service teachers in both private and public institutions.

Targeted course participants include but not limited to the following categories:

- Owners, academic directors, principals and school leaders of educational institutions aiming to build their teachers' capacity in teaching and/or facilitating integrated STEM programmes.
- Educators and teachers of educational institutions aiming to improve their own pedagogical knowledge and skills in teaching and/or facilitating integrated STEM programmes.
- Academic Directors, Head of Programmes and curriculum designers of educational institutions aiming to learn the leading practices in integrated STEM education.
- Government agencies and regulators researching on latest trends in integrated STEM education.

## 1.2 Programme Learning Outcomes

At the end of the program, the students will be able to:

- Identify and describe structure, features, scope and sequence of Science, Mathematics, Coding and Robotics, Digital Arts and integrated STEM programmes.
- Reflect on the links between content, learning intentions (knowledge, skills, and behaviours), and teaching practices.
- Use various teaching tools (physical and/or online) and manuals/lesson plans (printed and/or digital) to engage and scaffold the learning in young children.
- Outline effective teaching approaches and practices in integrated STEM education for young children.
- Describe and classify teaching experiences for reflective and observational practices.
- Recognise and apply Problem Based Learning and Design Thinking for integrated STEM teaching and learning.

## 2. PROGRAMME & CURRICULUM STRUCTURE

### 2.1 Structure

The Level 4 Professional Diploma in Integrated STEM Education accrues 60 Credits. The course will be conducted primarily as a blended programme combining face-to-face seminars and self-instructional learning. Students need to submit a final project. The final exam is in the form of Viva presentation.

To further facilitate the students, the program duration will be divided into three parts:

#### **Part 1: 6 Core Units [36 Credits]**

*Face-to-face seminar and self-instructional learning of 360 hours*

- Science Education for Young Children (6 Credits)
- Mathematics Education for Young Children (6 Credits)
- Best Classroom Practices (6 Credits)
- Coding and Robotics for Young Children (6 Credits)
- Digital Arts for Young Children (6 Credits)
- Integrated STEM Teaching and Learning Approaches (6 Credits)

## **Part 2: Final Project [12 Credits]**

*Final Project – Compulsory to Pass*

- Final Project (12 Credits)

## **Part 3: Viva Examination [12 Credits]**

*Oral Exam or Thesis – Compulsory to Pass*

- Viva Examination (12 Credits)
- London Innovation and Strategy Award (LISA) will be granted for students having a minimum of 10 years business experience and pass this Exam.

## **2.2 Overview of the Programme Structure**

- (a) There are 6 Core units of 6 credits each.
- (b) A Final Project carries 12 credits.
- (c) A Final Examination carries 12 credits.
- (d) To complete the programme and gain the Professional Diploma award, students must also successfully complete all the coursework and project and earn a total of 60 credits.
- (e) Students are required to complete their Professional Diploma in a maximum of 12 months from the time of enrolment as a student.

## **2.3 Standard Delivery Mode**

Blended Learning Mode – Each taught unit will have a total of no less than 6 hours of face-to-face lectures. Online and offline access to the Lecturer and Supervisor is available.

The Student Learning Time for the 36-credit core unit delivery:

<b>Unit</b>	<b>Face-to-face (hour)</b>	<b>Self- instructional learning (hour)</b>	<b>Total (hour)</b>
Science Education for Young Children	6	54	60
Mathematics Education for Young Children	6	54	60
Best Classroom Practices	6	54	60
Coding and Robotics for Young Children	6	54	60
Digital Arts for Young Children	6	54	60
Integrated STEM Teaching and Learning Approaches	6	54	60
<b>Total</b>	<b>36</b>	<b>324</b>	<b>360</b>

#### **2.4 Alternative Delivery Mode**

Professional Diploma by Research – Students need to submit a 5,000-word thesis to earn 48 credits, in lieu of the Part 1 and 2 of this programme. The thesis must be supervised by an approved Supervisor. The Academic Director shall be able to mark the thesis prior to the Viva Examination.

### **3. ADMISSION CRITERIA FOR ENTRY**

An applicant may be admitted on the basis of evidence to suggest that he/she will be able to fulfil and benefit from the objectives of the programme and achieve the standard required for the award.

### **3.1 Summary of Entry Requirements**

This programme is offered in 4 levels with the entry requirements as follows:

#### Professional Diploma Level 4

- (a) Level 3 certificate holders in any field of study; or
- (b) Applicants 21 years old and above without any academic qualification or work experience.

#### Professional Certificate Level 3

- (a) Level 2 certificate holders in any field of study; or
- (b) Applicants 19 years old and above without any academic qualification or work experience.

#### Professional Certificate Level 2

- (a) Level 1 certificate holders in any field of study; or
- (b) Applicants 17 years old and above without any academic qualification or work experience.

#### Professional Certificate Level 1

- (a) Applicants below 17 years old without any academic qualification or work experience.

Applicants must Demonstrate English Language and Bahasa Melayu proficiency in order to participate in the programme taught in both English and Bahasa Melayu.

### **3.2 Advanced Standing / Exemptions / Credits Transfer (APL)**

Consideration for the above for students admitted onto the programme may be considered either at the beginning of a programme, or beyond the beginning of a programme, through an assessment of that student's prior learning, whether certificated or un-certificated. The process for making such a decision is known as the Accreditation of Prior Learning (APL) is a matter of academic judgment exercised by the appointed panel considering applications and approvals of APL.

Where cohorts of students are to be admitted with advanced standing on a regular basis, the arrangement should be subject to an Academic Progression Agreement.



## **4. TEACHING AND LEARNING STRATEGIES**

Central to the philosophy of the programme is the desire to produce independent and thinking students who can use their theoretical knowledge creatively in a variety of contexts, bringing to bear initiative, and application of knowledge and skills acquired through their learning and development.

### **4.1 Approach**

Student centred learning will be strongly encouraged and developed. Action Learning, Cooperative Learning and Problem-Based Learning will be infused into the teaching-learning strategies.

Online Learning, case analysis and self-directed learning resources will be available to support the delivery and attainment of the intended learning outcomes.

The programme will, therefore, “progress significantly beyond the delivery of subject knowledge” and will incorporate knowledge and learning, discourse and informed dialogue, and self-development. It should be noted that the focus will be on facilitating learning rather than teaching and, in this respect, the strategy is designed to facilitate the “deep learning” attributed to a more active participation and self-exploration and discovery of knowledge by students.

## **5. ASSESSMENT STRATEGY**

### **5.1 The Assessment Aims**

The aim of the assessment strategy is to identify formal practices and procedures for assessing and appraising the performance of the students to enable judgments and decisions to be reached concerning:

- (a) The progression of students through the programme;
- (b) How well students have met the programme learning outcomes through the combination of the individual unit learning outcomes;
- (c) The provision of feedback information to students concerning their performance and how they adhered to the generic assessment criteria and the unit-specific assessment criteria;
- (d) The award of credits for individual units;
- (e) The granting of the Professional Diploma award; and
- (f) The granting of Professional Certificate awards should the student fail to complete the programme but successfully completes specific elements.

The underpinning principles which drive the assessment strategies adopted for this programme are the profile of the target students and the programme itself (its philosophy and associated learning outcomes).

The section below summarises the varied assessment tasks or instruments which will be employed in assessing the different programme learning outcomes.

- Final Project in the form of PowerPoint Presentation Slides or any other form as approved by KLIEC; and
- Final Examination in the form of Viva either individually or in a group.

## **5.2 Class Participation and Workshop Assessment**

Class participation and hands-on workshops may be included in the assessment of the programme. Workshops and classroom participation or contribution is an assessment strategy used to (i) encourage students to demonstrate their understanding; (ii) to participate in class discussion; and (iii) to motivate students to do the background reading and preparation for a class session. The assessment of hands-on workshops and their participation in a classroom encourages put into practice what they have learned and rewards the development of oral skills, and group skills such as interacting and cooperating with peers and a tutor. Classroom participation also encompasses active learning in a lab, studio, tutorial, team or group, online (e.g. in portfolios and Learning Management Systems) or in role-plays and simulations.

## **5.3 Case Studies**

Selected case studies may be incorporated into the assessment of units.

## **5.4 Simulation**

Often students will be assessed via scenario and simulation types of tasks related to the intended learning outcomes.

## **5.5 General Assessment Criteria for the Diploma**

Each unit in the programme has specific learning outcomes. There are however some general criteria that will be applied. In assessing a student's work, the following factors will be used for guidance:

- (a) An effectively organised and directed response to the question posed;
- (b) An appropriate range of relevant material applied to the work environment;
- (c) The ability to evaluate critically all arguments;

- (d) The ability to justify in a coherent manner points identified and conclusions reached;
- (e) An acceptable standard of literacy;
- (f) Adherence to any specified word length; and
- (g) Compliance with instructions.

## 5.6 Generic Assessment Criteria

To provide feedback to students, the following grading scale will be used for all assessed elements.

### Distinction: 70% or over

An outstanding piece of work incorporating and integrating both original and secondary sources with a high standard of presentation. The work addresses the brief as set in full. A creative response demonstrating a thorough understanding, analysis and judgment of the central issues. There is extensive coverage balanced with careful selection and organisation of material.

### Merit: Between 60% and 69%

A good response to the assignment, well-structured and presented incorporating relevant information. The work addresses the brief as set in full. In-depth understanding of salient issues and evidence of wide reading. Extensive analytical coverage with confident and balanced selection and organisation of material. May however lack synergy in places with some important ideas not being fully explored.

### Pass: Between 50% and 59%

An acceptable answer that covers the majority of the key issues but may not be sufficiently complete to develop a full understanding of the situation. The brief has been addressed, although some area might not be as fully developed as others. Consideration of the academic underpinning and practical application of material may be limited, perhaps providing only partial consideration of the issues. The analysis is generally adequate but may be overly descriptive in places, lacking critical analysis and displaying limited evidence of the application of wider reading.

### Fail: Less than 50%

Work contains errors, omissions or poorly expressed ideas; in some cases, these omissions may be fundamental. The assessment brief is not addressed to a material extent, either as a whole or in significant dimensions. Lacks an adequate theoretical and conceptual base thereby failing to identify the key issues and possibly demonstrating a basic misunderstanding of the brief. The structure is not always clear possibly due to the student's own lack of understanding. There is no clear line

of argument, with passages not being adequately linked and explained. There is little or no evidence of wider reading.

## 6. ACADEMIC REGULATIONS

The programme will be governed by the following regulations stipulated in this programme hand book.

### 6.1 Requirements for the Professional Diploma

Students should have completed and successfully passed both Part 1, Part 2 and Part 3 with a total of sixty (60) Credits.

### 6.2 Grades, Graded Point Average and Final Award Classifications

The Table below sets out the classification bands will apply:

Marks	LEB GPA	LEB Grade	LEB Classification
85 - 100	4.00	A+	HIGH DISTINCTION
70 - 84	3.75	A	DISTINCTION
65 - 69	3.50	B+	HIGH MERIT
60 - 64	3.00	B	MERIT
55 - 59	2.50	C+	HIGH PASS
50 - 54	2.00	C	PASS
45 - 49	1.75	D	MARGINAL FAIL
35 - 44	1.50	E	FAIL
0 - 34	1.00	F	HIGH FAIL

### **6.3 Professional Diploma with Distinction**

The Professional Diploma with Distinction may be awarded to candidates of exceptional merit. In order for the Board of Examiners to consider making the award, a candidate will be required to:

- (a) Pass all the units of the Professional Diploma stage at the first attempt; and
- (b) Achieve an overall aggregate unit mark of 70% or above.

### **6.4 Resits**

The Board of Examiners may, at its discretion, permit students who fail in a unit to make good that failure by resubmitting the unit assignment (and each resit shall be subject to an additional charge).

Note: All resits will have to be undertaken within 2 months after the release of the results of the previous term. Dates will be announced by LEB along with the release of the results.

A student who resit a unit or element of a unit is normally required to achieve a mark of 50% for that unit or element unless the Board of Examiners sets alternative minimums as part of the resit conditions.

A maximum of two resits are permitted for a given unit after which the student will be required to withdraw from the programme.

Only in exceptional circumstances will the Board of Examiners permit a student to resit a particular unit more than twice.

### **6.5 Special Provision for Upgrading Classifications**

The Board of Examiners may in its absolute discretion allow Students to improve their overall classification by giving Students the opportunity to resit Units in an attempt to attain a higher overall classification. The maximum number of resits allowed per Unit is two (and each resit shall be subject to an additional charges).

### **6.6 Failure to Submit Course Work, Deferment**

Failure to submit the required course work within the due date, without prior authorisation may be interpreted as failure in that element of assessment and a zero mark will be recorded.

Deferment of unit assessment is only allowed with valid reasons and students will need to apply for deferment at least 10 days prior to the assessment submission due date.

## **6.7 Compensation**

Where a student marginally fails one unit the Board of Examiners may exceptionally exercise its discretion and compensate the failure. The Board of Examiners is authorised to allow compensation in a unit provided the overall aggregate marks for the unit to be compensated is not less than 45% and where one of the assessed components is not less than 40% (for units where there are 2 assessed components).

Only TWO (2) compensated pass can be granted by the Board of Examiners.

With their discretionary powers, the Board of Examiner can grant additional compensation to a student under special circumstances.

## **6.8 Illness or Withdrawal**

Where a student's performance has been adversely affected by illness or other unforeseen circumstances, duly authenticated by evidence and made known to the Academic Director and presented to the Board of Examiners, the Board of Examiners may exercise its discretion in a manner appropriate to the case.

The Board of Examiners may agree to set aside the results of the assessment(s) affected by these circumstances and, the student may be offered the opportunity to retake the assessment(s) on the next available occasion, as if for the first time.

Where a student's performance, conduct or attendance indicates that they are unlikely to complete the course on which they are engaged, the Board of Examiners may require the student to withdraw from the programme.

## **6.9 Duration**

The Board of Examiners have the right to terminate any student who does not successfully complete all the requirements of the programme within 18 MONTHS for the Diploma programme taken from the date of commencement on the programme unless prior extensions had been granted by the Board of Examiners.

## **6.10 Academic Irregularities**

The Board of Examiners will have the right to fail part or all of the assessments of any student found guilty of cheating, plagiarism, and collusion, falsifying data or impersonation (one person impersonating another to gain unfair advantage).

Students will be required to undertake that material submitted for assessment is their own unaided work. Training will be provided in academic conventions for acknowledging the ideas or quotations from the work of others.

In cases of suspected plagiarism or cheating the student will be interviewed by the Academic Director and the findings will be reported to the Board of Examiners, which will decide the appropriate penalty. The work concerned may be set aside or marked down. In serious cases, a student may be required to withdraw from the programme.

## **6.11 Students Appeals**

Students do not have any right of appeal against the academic judgment and processes relating to grading and conferment of awards by the academic and examination boards.

## **6.12 External Examiners/Verifiers**

At least one External Examiner/Verifier will be appointed. Appointments will normally be for three years but may be for longer periods.

The External Examiner(s)/Verifier(s) may see any of the assessed work submitted including examination scripts, course work and dissertations.

External Examiners/Verifiers will be subject to the Assessment Regulations above and in particular no recommendation for the conferment of an award may be made without the written consent of the approved External Examiner(s)/Verifier(s). On any matter which the External Examiner(s)/ Verifier(s) have declared a matter of principle, the decision of the External Examiner(s)/Verifier(s) shall either be accepted as final by the Board of Examiners or shall be referred to the Academic Board. Any unresolved disagreement between External Examiners/Verifiers shall be referred to the Academic Board.

## 6.13 Plagiarism

Plagiarism is where a student incorporates another person's work by unacknowledged quotation, paraphrase, imitation or other device in any work submitted for progression towards or the conferment of an award in a way, which suggests that it is the student's original work.

Where a person has reasonable grounds to suspect plagiarism and judges that it substantially affects the submitted work it is the responsibility of that person to inform the student's Academic Director in writing of the nature of the suspicion and to provide relevant supporting evidence.

It is the responsibility of the person or persons assessing the submitted work to complete the marking and record any action taken in the event of suspected plagiarism.

It is the responsibility of the Academic Director to:

- (a) Notify the student concerned in writing at the earliest appropriate time after a case of plagiarism has been alleged and include a copy of a written statement made by any person, remind the student of an External Examiner's/Verifier's right to require a viva examination, inform the student of the procedures to be followed before the Board of Examiners meets to consider the case and to invite him or her to submit a written statement to it by a given deadline;
- (b) Inform the Academic Board that the Board of Examiners will be considering a case of suspected plagiarism;
- (c) Cause any necessary investigation to be conducted as a matter of urgency and ensure that the Board of Examiners receives all information pertinent to its consideration of the case.

In a case of suspected plagiarism, it is the right and duty of the Board of Examiners to:

- (a) Receive all information pertinent to the case in written form or verbal evidence including the submitted work itself;
- (b) Seek further advice where appropriate;
- (c) Confirm or reject the accusation of plagiarism; determine its recommendation where it confirms the case according to the circumstances and severity of the case.



The Board of Examiners may recommend that:

- (a) The case constitutes plagiarism and that the student fails with or without the right of resubmission;
- (b) The submitted work fails. It will then be the responsibility of the Board of Examiners to determine whether or not this failure in assessment can be compensated for in the light of the student's overall performance or whether or not the student will be required to retake part or all of the elements for progression towards or the conferment of the award;
- (c) The student be penalised by a reduction in the mark for this assessment and/or classification of the award. The Board of Examiners shall then agree a mark and/or classification; and/or
- (d) The student be issued with a formal reprimand in writing and a copy of this lodged in the student's file.

After a meeting of the Board of Examiners it will be the responsibility of the Academic Director to inform the student.

#### **6.14 Extension Requests**

It is important that students adhere to the stated deadlines, otherwise the assessment process becomes unnecessarily cumbersome, and students can become overburdened by the end of the course. In exceptional cases of short-term difficulty, an extension may be granted. Note that pressure of work or 'running out of time' are not normally considered sufficient justification for an extension. It is the student's responsibility to foresee, plan for and effectively manage the pressures of the course and work.

#### **6.15 Extension Request Procedures**

- (a) Requests for extensions must be submitted to the Academic Director a minimum of 10 days prior to the submission deadline, for consideration by the Programme Manager. Only one extension is allowed for each unit.
- (b) Evidence should be provided if an extension request is submitted.
- (c) If the request is accepted, then it is normal for a one-week extension to be granted.

## **6.16 Non-Submission of Assignment**

Failure to hand in the assignment for any reason and without prior approval of the Academic Director will result in the student's work being penalised in accordance with the Academic & Assessment Regulations governing the conduct of the Diploma programme. Please note the following:

- (a) All newly registered and continuing students are automatically enrolled for the units;
- (b) Once enrolled for the unit it is compulsory to submit the course work on/before the given deadline;
- (c) The Deferment Form (DF) along with the evidence must be submitted 10 days prior to the submission due date to the Academic Director if the student wishes to apply for a deferment/extension;
- (d) Work which is submitted after the designated deadline is deemed late;
- (e) If an approved DF has been submitted by the original assignment deadline, and the work is received before the extended deadline indicated on the DF, the work will be marked with no limitation of the grade available;
- (f) If the submitted work is late but within 7 days of the deadline, and there is no approved DF, the work is assessed but the highest mark available is the minimum passing mark of 50. There is no entitlement to feedback although feedback may be offered;
- (g) There is no entitlement to submit late after an agreed submission extension;
- (h) If the work is tendered without an approved DF more than 7 days after the deadline, it is not marked and the student is considered absent and having failed that unit / component; and
- (i) Absent is recorded if neither the course work nor the DF is submitted.

## **7. UNIT SPECIFICATION**

### **7.1 Science Education for Young Children**

Science is omnipresent in our world and the demands for socially responsible and environmentally sustainable futures, are constant policy themes. As countries progressively reorient themselves for a new global reality, the role of education in forming the groundwork for science, technology and innovation becomes increasingly important.

In a global society, development concerns are everyone's concern, and the knowledge, skills, values, and attitudes to engage are crucial. Meeting the growing

demand for Science, Technology, Engineering, and Mathematics (STEM) professionals however, is globally constrained by supply side workforce shortages. In support of countries encouraging and supporting their people with future STEM opportunities, there exists the unfulfilled global opportunity in preschool and elementary classrooms to accommodate STEM and as a result, science learning.

Young children are keen and able to learn science concepts. They have an innately curious disposition that presents as enjoyment and a sense of wonderment for observing and thinking about nature and the world around them. Such dispositions impart positivity into their experiences which are similarly affirming in the formation of attitudes and beliefs towards science. Structured exposure to scientific concepts and scientifically informed language in these settings further situates the acquisition of new knowledge and skills within the context of existing capability. This imparts the foundations for deeper conceptual learning at higher levels of education. The early development of scientific literacy therefore fosters active learners engaged in thinking and working scientifically. As such, scientific literacy in this sense, is focused on the needs of young children as future citizens engaging capably with science at a personal and social level.

#### Learning Outcome

Upon completion of this unit, students will be able to:

- Identify and describe structure, features, scope and sequence of a science programme.
- Reflect on the links between content, learning intentions (knowledge, skills, and behaviours), and teaching practices.
- Use various teaching tools (physical and/or online) and manuals/ lesson plans (printed and/or digital) to engage and scaffold the learning in young children.
- Outline effective teaching approaches and practices in science education for young children.

#### Indicative Content/Areas of Study

- Domains of scientific knowledge
- Scientific Skills
- Attitudes and behaviours in scientific enquiry
- Hands on, play based learning
- Child centred, enquiry-based learning
- Spiral curriculum
- Experiential learning on selected science experiments

### Teaching and Learning Strategy

- Student centred learning will be strongly encouraged and developed. Cooperative Learning and Problem-Based Learning will be infused into the teaching-learning-assessment strategies.
- Self-directed learning resources will be available to support the delivery and the appropriate assessment tools/tasks will be used to assess the intended learning outcomes.

Blended Learning Mode - Each taught unit will have a total of no less than 6 hours of face-to-face lectures and tutorials per unit. Online and offline access to the Lecturer and Supervisor is available.

### Unit Assessment

- Class Attendance & Participation: 100%

### Resources

- Course materials provided by KLIEC.
- Online resources.

## **7.2 Mathematics Education for Young Children**

Mathematics is the foundation of science and STEM learning. Children need to have a good foundation in mathematics in order to excel in science and technology related subjects. It is also important to teach mathematics in a sequence and structured way as the children acquire the mathematical concepts and skills progressively from basic to advanced level. In addition, it is crucial to ensure the approach of teaching and learning mathematics is in line with the leading practices so that the positive learning experience would inspire the young children to love mathematics.

### Learning Outcome

Upon completion of this unit, students will be able to:

- Identify and describe structure, features, scope and sequence of a Mathematics programme.
- Reflect on the links between content, learning intentions (knowledge, skills, and behaviours), and teaching practices.
- Use various teaching tools (physical and/or online) and manuals/ lesson plans (printed and/or digital) to engage and scaffold the learning in young children.
- Outline effective teaching approaches and practices in mathematics education for young children.

### Indicative Content/Areas of Study

- Domains of mathematics
- Numeracy Skills
- Attitudes and behaviours in mathematics learning (i.e. Growth Mindset)
- Hands on, play based learning
- Child centred, enquiry-based learning
- Spiral curriculum
- Experiential learning on selected mathematics activities
- Concrete – Pictorial – Abstract (CPA) Approach
- Problem solving with multiple strategies
- Procedural and conceptual understanding in mathematics

### Teaching and Learning Strategy

- Student centred learning will be strongly encouraged and developed. Cooperative Learning and Problem-Based Learning will be infused into the teaching-learning-assessment strategies.
- Self-directed learning resources will be available to support the delivery and the appropriate assessment tools/tasks will be used to assess the intended learning outcomes.

Blended Learning Mode - Each taught unit will have a total of no less than 3 hours of face-to-face lectures and tutorials per unit. Online and offline access to the Lecturer and Supervisor is available.

### Unit Assessment

- Class Attendance & Participation: 100%

### Resources

- Course materials provided by KLIEC.
- Online resources.

## **7.3 Best Classroom Practices**

With educational practices and policies constantly getting upgraded, educators must be informed of the leading classroom practices to enhance the learning outcomes of the students. With a dynamic environment, the classroom brings together children from various abilities and personalities. Thus, requiring the teachers to be able to use observational methodology to access the children's learning disposition during the

learning tasks and scaffold their learning. Through practice, teachers will develop their observational skills against the success criteria for the intended learning outcomes. Combine with reflective teaching practises, teacher will further develop into becoming an effective teacher.

### Learning Outcome

Upon completion of this unit, students will be able to:

- Describe and classify teaching experiences for reflective and observational practices.

### Indicative Content/Areas of Study

- Leading Classroom Best Practices
- Reflective Practice
- Observational Practice
- Learning Disposition
- Evidence Based Assessment

### Teaching and Learning Strategy

- Student centred learning will be strongly encouraged and developed. Cooperative Learning and Problem-Based Learning will be infused into the teaching-learning-assessment strategies.
- Self-directed learning resources will be available to support the delivery and the appropriate assessment tools/tasks will be used to assess the intended learning outcomes.

Blended Learning Mode - Each taught unit will have a total of no less than 3 hours of face-to-face lectures and tutorials per unit. Online and offline access to the Lecturer and Supervisor is available.

### Unit Assessment

- Class Attendance & Participation: 100%

### Resources

- Course materials provided by KLIEC.
- Online resources.

## 7.4 Coding and Robotics for Young Children

The demand for STEM-related jobs will remain strong in the future and that programmers are required in almost every field. Learning to code and perform simple programming will develop young children's critical thinking skills; which include logical thinking and computational thinking skills. With sufficient learning opportunities to apply and practice these skills, they would acquire the problem-solving skill which is essential for their future success. This module serves as an introductory course to the advance level of Coding and Robotics programme.

### Learning Outcome

Upon completion of this unit, students will be able to:

- Identify and describe structure, features, scope and sequence of a Coding and Robotics programme.
- Reflect on the links between content, learning intentions (knowledge, skills, and behaviours), and teaching practices.
- Use various teaching tools (physical and/or online) and manuals/ lesson plans (printed and/or digital) to engage and scaffold the learning in young children.
- Outline effective teaching approaches and practices in coding and robotics for young children.

### Indicative Content/Areas of Study

- Computational Thinking
- Visual Programming
- Visual Communication – Animated stories & greeting cards
- Introduction to robotics

### Teaching and Learning Strategy

- Student centred learning will be strongly encouraged and developed. Cooperative Learning and Problem-Based Learning will be infused into the teaching-learning-assessment strategies.
- Self-directed learning resources will be available to support the delivery and the appropriate assessment tools/tasks will be used to assess the intended learning outcomes.

Blended Learning Mode - Each taught unit will have a total of no less than 3 hours of face-to-face lectures and tutorials per unit. Online and offline access to the Lecturer and Supervisor is available.

### Unit Assessment

- Class Attendance & Participation: 100%

### Resources

- Course materials provided by KLIEC.
- Online resources.

## **7.5 Digital Arts for Young Children**

Digital innovations and technologies are changing the way in which artists view the world. Being able to draw digitally prepares children for jobs that do not exist in an uncertain future world of work. The ease of publishing, sharing, and selling digital art has made many new jobs and careers available for digital artists all around the world. Introducing young children to digital art is a great way to encourage creativity while helping them get accustomed to using technology and at the same time, developing a new skill.

### Learning Outcome

Upon completion of this unit, students will be able to:

- Identify and describe structure, features, scope and sequence of a Digital Arts programme.
- Reflect on the links between content, learning intentions (knowledge, skills, and behaviours), and teaching practices.
- Use various teaching tools (physical and/or online), media and manuals/ lesson plans (printed and/or digital) to engage and scaffold the learning in young children.

### Indicative Content/Areas of Study

- Programme Framework
- Human drawing
- Animal drawing
- Environment drawing
- Architecture drawing
- Manipulation Skills
- Artistic Skills
- Critical and Creative Thinking Skills
- Spiral curriculum
- Experiential learning on conducting Digital Art lessons



### Teaching and Learning Strategy

- Student centred learning will be strongly encouraged and developed. Cooperative Learning and Problem-Based Learning will be infused into the teaching-learning-assessment strategies.
- Self-directed learning resources will be available to support the delivery and the appropriate assessment tools/tasks will be used to assess the intended learning outcomes.

Blended Learning Mode - Each taught unit will have a total of no less than 3 hours of face-to-face lectures and tutorials per unit. Online and offline access to the Lecturer and Supervisor is available.

### Unit Assessment

- Class Attendance & Participation: 100%

### Resources

- Course materials provided by KLIEC.
- Online resources.

## **7.6 Integrated STEM Teaching and Learning Approaches**

The term STEM education has been loosely used by many and often the STEM curriculum or programmes are taught in silos or isolated. Many educators describe STEM education by individual STEM disciplines in a multi-disciplinary approach without applying the interdisciplinary or transdisciplinary approach. Thus, the terms 'Integrated STEM' is used to explicitly identify STEM curriculum or programs that intentionally integrate the disciplines of STEM. Integrated STEM education must intentionally include the teaching and learning of STEM concepts and provides the opportunity to practise the technological or engineering practices.

Design Thinking is a systematic engineering design process for problem solving. It is used to solve real-world problems through its iterative process involving five stages; namely empathize, define, ideate, prototype and test. This Design Thinking process encourages students to learn, think critically, collaborate and innovate. It nurtures them to be creative problem solvers. It is no longer about knowledge acquisition but application of knowledge and skills to real-life situations. Solving real-world problems allows meaningful learning and this integrated STEM module refers to the issues elucidated in the UNESCO's Sustainable Development Goals to learn STEM with empathy from a global perspective.

### Learning Outcome

Upon completion of this unit, students will have understood:

- Recognise and apply Problem Based Learning and Design Thinking for integrated STEM teaching and learning.

### Indicative Content/Areas of Study

- Integrated STEM Framework
- Problem Based Learning
- Design Thinking Process
- Sustainable Development Goals
- Experiential learning Integrated STEM teaching and learning

### Teaching and Learning Strategy

- Student centred learning will be strongly encouraged and developed. Cooperative Learning and Problem-Based Learning will be infused into the teaching-learning-assessment strategies.
- Self-directed learning resources will be available to support the delivery and the appropriate assessment tools/tasks will be used to assess the intended learning outcomes.

Blended Learning Mode - Each taught unit will have a total of no less than 3 hours of face-to-face lectures and tutorials per unit. Online and offline access to the Lecturer and Supervisor is available.

### Unit Assessment

- Class Attendance & Participation: 100%

### Resources

- Course materials provided by KLIEC.
- Online resources.