



Republic of the Philippines  
Department of Education  
Cordillera Administrative Region  
**DIVISION OF BAGUIO CITY**  
Upper Session Road Extension, Baguio City 2600



**OFFICE OF THE SUPERINTENDENT**

Division Memorandum No. 198

**DOED** DIVISION OF  
**BAGUIO CITY**  
OCT 28 2015  
**RELEASED**

**An invitation from United Boards for Christian Higher Education in Asia for  
Application for its 2016-2017 Fellow Program**

To : Public Schools District Supervisors  
All School Heads of Public Elementary and Secondary Schools  
Mathematics Teachers  
Science Teachers  
ICT Educators  
All Concerned

Date : 26 September 2015

1. Attached is a communication from Undersecretary for Regional Operations, *RIZALINO D. RIVERA*, re: The **United Boards for Christian Higher Education in Asia for Application for its 2016-2017 Fellow program**, for information and appropriate action.
2. Please pay particular attention to paragraph 3 of the said Advisory.
3. See attached information for guidance.
4. Immediate and wide dissemination of this memorandum is desired.

  
**FRANCIS CESAR B. BRINGAS, CESO VI**  
Schools Division Superintendent  
*FN*

OFFICE OF THE UNDERSECRETARY  
FOR REGIONAL OPERATIONS

## ADVISORY

TO : Bureau and Regional Directors  
Schools Division Superintendents  
Heads of Public Elementary and Secondary Schools  
All Concerned

DATE : 21 September 2015

The United Board for Christian Higher Education in Asia invites applications for its 2016-2017 Fellows Program.


The United Board Fellows Program is designed to answer the needs of leadership development for mid-career faculty and administrators from Asian universities and colleges. Through this program, the United Board seeks to develop dynamic new leaders who will help advance whole person education within their home institutions. Fellows will be given the opportunity to learn about global higher education leadership and management systems. Since 2002, more than 180 Fellows, from over 50 institutions in ten countries and regions in Asia, have benefited from this program, and many of them have now assumed important leadership positions in their institutions.

Application procedures and forms can be accessed from this website: <http://www.unitedboard.org/PROGRAMS/LeadershipDevelopment/UnitedBoardFellowsProgram.aspx>. Further inquiries can be directed to Ms. Vivica Xiong and Mr. Kevin Henderson, Program Officers for United Board Fellows Program at [ubfellows@unitedboard.org](mailto:ubfellows@unitedboard.org).

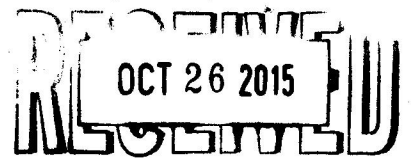
During the application phase, there will be a nomination process, prior to inviting applications from the candidates. We ask either heads of institutions or senior administrators to nominate qualified, mid-career faculty and/or administrators who have demonstrated potential to assume larger roles and responsibilities in the future.

Deadline for the submission of nomination forms is now extended to **October 15, 2015**, and all applications must be submitted by **October 31, 2015**.

Immediate dissemination of and appropriate action for this Advisory is desired.

  
RIZALINO D. RIVERA  
Undersecretary

*Boston College/Fellows/dagar/9-21-15*





OFFICE OF THE UNDERSECRETARY FOR REGIONAL OPERATIONS

SCHOLARSHIP ADVISORY

Scholarship No. 34, s. 2015

TO : Regional Directors
Schools Division Superintendents
Heads of Public Elementary and Secondary Schools



DEPED-CAR Time: \_\_\_\_\_

DATE : 11 September 2015

The SEAMEO RECSAM, announces its offering of four (4) regular courses in FY 2015-2016 namely:

RC-SS-140-1: Inquiry-Based Learning in Secondary Science Education

Course Schedule: April 4-29, 2016

Participant: Science educators or key secondary science teachers

Number of Participants: 2

Deadline of Application: November 27, 2015

RC-PM-140-2: Mathematical Problem Solving in Real-World Situation for Primary Mathematics Classrooms

Course Schedule: April 4-29, 2016

Participant: Mathematics educators or key primary mathematics teachers

Number of Participants: 2

Deadline of Application: November 27, 2015

RC-SS-140-3: Technology-Enhanced Learning (TEL): Enhancing Secondary Science Teaching and Learning through Technology

Course Schedule: April 4-29, 2016

Participant: Science/ICT educators or key secondary science/ICT teachers

Number of Participants: 1

Deadline of Application: November 27, 2015

RC-PM-140-4: Meaningful Primary Mathematics Learning in the STEM Environment

Course Schedule: April 4-29, 2016

Participant: Mathematics educators or key primary mathematics teachers

Number of Participants: 2

Deadline of Application: November 27, 2015

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DIRECT LINE 633

TO: ALL SCHOOLS DIVISION SUPERINTENDENTS

For appropriate action and dissemination.



Republic of the Philippines
Department of Education
Cordillera Administrative Region
Wangal, La Trinidad, Benguet



September 28, 2015

Signature of Ellen B. Donato
ELLEN B. DONATO, Ed.D., CESO III
Regional Director



DEPARTMENT OF EDUCATION

OFFICE OF THE UNDERSECRETARY  
FOR REGIONAL OPERATIONS

**SCHOLARSHIP ADVISORY**

The program aims to provide training interventions in Science and Mathematics education.

Each region is requested to send seven (7) nominees noting the criteria for selection of the participants (see attached Annex A). Please note the need for English language certification from the head of office.

The application forms and other instructions are attached in this advisory. For further inquiries and clarifications, kindly call (60) 4-6522700 or email [director@recsam.edu.my](mailto:director@recsam.edu.my).

All applicants must be endorsed by their respective heads of divisions and regions. Nominations must be sent to the Scholarships Secretariat at the Central Office.

Immediate dissemination of and appropriate action for this Scholarship Advisory is desired.

  
**RIZALINO D. RIVERA**  
Undersecretary

SEAMEO RECSAM/Science & Math/Idagar/09-11-15



OFFICE OF THE UNDERSECRETARY  
FOR REGIONAL OPERATIONS

SCHOLARSHIP ADVISORY

<b>Addressee</b>	Regional Directors Schools Division Superintendents Heads of Public Elementary and Secondary Schools		
<b>Sponsoring Group</b>	SEAMEO RECSAM		
<b>Scholarship Program</b>	Science and Math Training Courses for FY 2015-2016		
<b>Application Addressee</b>	Scholarships Secretariat National Educators Academy of the Philippines Department of Education Room 217, Mabini Building DepEd Complex, Meralco Avenue, Pasig City		
<b>Target Participants</b>	ICT/Secondary and Primary School Teachers/Secondary and Primary School Teachers for Science and Math	<b>Number of Nominees</b>	Seven (7) per region
<b>Date of the Program</b>	FY 2015-2016	<b>Deadline of Submission of Nominees</b>	On or before November 27, 2015
<b>Website/Contact Numbers</b>	director@recsam.edu.my (60) 4-6522700	<b>Endorsement</b>	Division and Regional Heads
<b>Donor Country</b>	Training fee and kits, airfare, airport courtesies, accommodation (twin-sharing), tea breaks, lunch, allowance, per diem, travel insurance, immigration and visa processing, and other support services	<b>DepEd Counterpart</b>	Salary and benefits of the nominee for the duration of the scholarships



DEPARTMENT OF EDUCATION  
OFFICE OF THE UNDERSECRETARY  
FOR REGIONAL OPERATIONS

**SCHOLARSHIP ADVISORY**

**ANNEX A**

**A. QUALIFICATION REQUIREMENTS**

**1. Philippine Government**

- a. Candidate must have rendered at least three (3) years of service;
- b. Must hold a permanent appointment;
- c. Must have a college degree related to the field of study or demonstrated sufficient ability and extensive experience along the field of study;
- d. Must have obtained at least a "very satisfactory" (vs) performance rating for two consecutive rating periods preceding the nomination
- e. Must not have a pending application for scholarship under another program; and
- f. Must have rendered the service obligation required under Executive Order 367 for scholarship recently concluded before he/she can be nominated for another course where the field of study is different from the previous training.

**B. FINANCIAL ASSISTANCE**

1. DepEd will provide the salary of the nominee for the duration of the award
2. Donor Country

**C. DOCUMENTARY REQUIREMENTS (DEPED)**

1. Supporting documents to be submitted prior to screening and evaluation:
  - a. A letter of nomination addressed to the Chairman of the DepEd Scholarship Committee signed by the Regional Director or its duly authorized official
  - b. Updated Personal Data Sheet/Resume with list of in-service training and seminars attended (spell out acronyms of organizer/s and topic/s or subject/s of the training; certificates of training **NEED NOT** be submitted)
  - c. Certified copy of statement of actual duties and responsibilities
  - d. Copy of Passport
2. Other documentary requirements to be submitted if accepted:
  - a. Certified copy of service record
  - b. Photocopy of Diploma (Baccalaureate/graduate)
  - c. Photocopy of Transcript of Records (Baccalaureate /graduate)
  - d. Certification that the nominee has no pending scholarship nomination to other program
  - e. Certification that the nominee has no pending administrative or criminal case
  - f. Certification from the school/division that the nominee has no financial or office accountabilities



DEPARTMENT OF EDUCATION

OFFICE OF THE UNDERSECRETARY  
FOR REGIONAL OPERATIONS

**SCHOLARSHIP ADVISORY**

g. Scholarship Contract

**D. PROGRAM REQUIREMENTS (SEAMEO RECSAM)**

- a. Proficient in English
- b. Must be in excellent health condition (a medical certificate accomplished by a government physician certifying that the participant is medically fit for a 4-week programme is to be attached to the course application form)
- c. Should not be more than 50 years of age
- d. Should not be an expectant mother (for female participant)
- e. Course requirements can be seen in the attached supplement in the general information regarding the courses









15. Overseas Courses attended including Courses of SEAMEO Regional Centre/Project

Name of Courses	Country/SEAMEO Regional Centres/Projects	Dates	
		From	To

16. Publications

Title of Publications	Year Published

17. \*English Language Qualifications

i) IELTS Band \_\_\_\_\_

ii) TOEFL Score \_\_\_\_\_

iii) Others (Please Specify)

Exam \_\_\_\_\_ Grade \_\_\_\_\_

\* (Please submit a certified copy of certificate)

\_\_\_\_\_  
Date Signature of Applicant/Participant

**Recommended by the Ministry of Education**

\_\_\_\_\_  
Date Signature

\_\_\_\_\_  
Name of official on behalf of the Minister of Education

IMPORTANT: THIS FORM SHOULD BE COMPLETED IN DUPLICATE. A COPY TO BE DISPATCHED THROUGH YOUR MINISTRY OF EDUCATION BY REGISTERED AIRMAIL TO REACH THE FOLLOWING ADDRESS

**THE DIRECTOR  
SEAMEO RECSAM, 11700 GELUGOR, PENANG, MALAYSIA**

It must be accompanied by a medical certificate that the intending participant is medically fit for the course.

## COURSE DESCRIPTION

### REGULAR COURSES FOR FISCAL YEAR 2015/2016

4 – 29 April 2016

COURSE CODE	COURSE TITLE
RC-SS-140-1	INQUIRY-BASED LEARNING IN SECONDARY SCIENCE EDUCATION
RC-PM-140-2	MATHEMATICAL PROBLEM SOLVING IN REAL-WORLD SITUATION FOR PRIMARY MATHEMATICS CLASSROOMS
RC-SS-140-3	TECHNOLOGY-ENHANCED LEARNING (TEL): ENHANCING SECONDARY SCIENCE TEACHING AND LEARNING THROUGH TECHNOLOGY
RC-PM-140-4	MEANINGFUL PRIMARY MATHEMATICS LEARNING IN THE STEM ENVIRONMENT



**SOUTHEAST ASIAN MINISTERS OF EDUCATION ORGANISATION  
REGIONAL CENTRE FOR EDUCATION IN SCIENCE AND MATHEMATICS**

Jalan Sultan Azlan Shah, 11700 Gelugor, Penang, Malaysia

Telephone: 604-6522700

Fax: 604-6522737

Website: <http://www.recsam.edu.my/>

## REGULAR COURSES FOR FISCAL YEAR 2015/2016

4 – 29 April 2016

Course Code	Course Title	No. of Scholarships Offered Per Country	Deadline for Documents to Reach RECSAM
RC-SS-140-1	Inquiry-Based Learning in Secondary Science Education	2	27 November 2015
RC-PM-140-2	Mathematical Problem Solving in Real-World Situation for Primary Mathematics Classrooms	2	27 November 2015
RC-SS-140-3	Technology-Enhanced Learning (TEL): Enhancing Secondary Science Teaching and Learning through Technology	1	27 November 2015
RC-PM-140-4	Meaningful Primary Mathematics Learning in the STEM Environment	2	27 November 2015

**Level**

P: Primary  
S: Secondary

**Subject**

S: Science  
M: Mathematics

## REGULAR COURSES FOR FISCAL YEAR 2015/2016

**Course Code: RC-SS-140-1**

**Course Title: INQUIRY-BASED LEARNING IN SECONDARY SCIENCE EDUCATION**

### **Rationale:**

Science educators are confronted with great challenge and responsibility especially in making students learn. A considerable number of students are not motivated towards science learning hence the low academic achievement. There is a need to re-orient the way science teaching and learning is done. Inquiry-based science education (IBSE) is one of the effective researched-proven teaching and learning approach. It is an innovative educational method which has strong motivational impact on students and teachers (Trna, 2014). Also, it emphasizes the development of higher-order cognitive skills that have been identified as critical for the development of scientific thinking (Hughes, 2014). As such, students generally do not learn by memorizing the facts but instead it is about working with living things, observing natural phenomena, formulating investigable questions, giving explanation with evidence and providing suitable solutions to explain observed phenomenon and address questions and problems. Thoron and Burleson (2014) confirmed the work of Gibson and Chase (2002) that students who learn science using an inquiry approach score higher on science achievement tests, have improved science process skills, and have more positive attitudes towards science.

### **Objectives:**

The main objectives of this course are to provide the participants with necessary knowledge and skills required to carry out inquiry-based learning in science.

At the end of the course, participants should be able to:

- 1 acquire knowledge and philosophy of carrying-out inquiry-based science learning;
- 2 use research-based innovative inquiry-based learning approaches;
- 3 adopt current teaching skills necessary to enhance students' learning and interest in science through inquiry-based learning;
- 4 identify various entities that can support inquiry-based learning; and
- 5 collaboratively plan, design and implement inquiry-based science lesson.

### **Course Contents:**

This course highlights the exemplary pedagogy and good classroom practices. Participants will have the opportunity to actively immerse into the philosophy of inquiry-based science education. Participants are encouraged to participate actively in the intellectual discourse and collaboration in designing and carrying-out an inquiry-based lesson. Furthermore, it will provide a platform for the participants to practice good global citizenship in learning together with fellow Southeast Asian citizens.

The major areas Include:

1. Fundamentals of Science Inquiry
  - 1.1 What is Inquiry-based Science Education
  - 1.2 Hands-on Science Learning: Inquiry versus Non-Inquiry
  - 1.3 Science Process Skills
  - 1.4 Formulating Investigable Questions

- 1.5 Relationship of Inquiry and HOTS Encompassing Education for Sustainable Development and Education for Intra and International Understanding
- 1.6 Managing Science Inquiry Learning Environment
2. Experiencing Levels of Inquiry-based Learning for Diverse Learners
  - 2.1 Confirmation
  - 2.2 Structured
  - 2.3 Guided
  - 2.4 Open
3. Adopting Inquiry-based Learning Approaches
  - 3.1 Problem-based Learning
  - 3.2 Project-based Learning
  - 3.3 Socio-Scientific Issues-based Learning
  - 3.4 Research-based Learning
  - 3.5 STEM Education
4. Enhancing Inquiry-based Learning
  - 4.1 Integrating ICT
  - 4.2 Cross-Disciplinary Approaches
    - 4.2.1 Science Inquiry and Language Learning
    - 4.2.2 Science Inquiry and Citizenship Education
5. Assessing Inquiry-based Learning
6. Inquiry-based Learning Support and Resources
  - 6.1 Scientific Community Involvement
  - 6.2 Science Resource Centres
  - 6.3 Science Research Projects
  - 6.4 Online Resources
7. Theory into Practice
  - 7.1 Planning, Designing, Implementing and Improving Lessons Plans and Strategies with Emphasis on Inquiry-based Learning Using the Lesson Quality Improvement Processes

**Duration:** Four Weeks

**Participants:** Science Educators or Key Secondary Science Teachers

**English Proficiency:** Minimum IELTS Band of 4.5 or Equivalent

**Expected Output:**

1. Group Project Work Report
2. Individual Multiplier Effect Action Plan

**References:**

- Hughes, P. W. (2014). *Teaching Scientific Inquiry: Inquiry-based Training for Biology Graduate Teaching Assistants Improves Undergraduate Learning Outcomes*. Toronto: Higher Education Quality Council of Ontario.
- Thoron, A. C. & Burlison, S. E. (2014). Students' Perceptions of Agriscience When Taught through Inquiry-based Instruction. *Journal of Agricultural Education*, 55 (1), 66-75.
- Trna, J. (2014). IBSE and Gifted Students. *Science Education International*, 25 (1), 29-39.

**Course Code: RC-PM-140-2**

**Course Title: MATHEMATICAL PROBLEM SOLVING IN REAL-WORLD SITUATION FOR PRIMARY MATHEMATICS CLASSROOMS**

**Rationale:**

Problem solving is the heart of mathematics. It is an activity where students are given the opportunities to do mathematics: to construct, conjecture, explore, test, and verify (Lester, Masingila, Mau, Lambdin, Santon, & Raymond, 1994). It has a long history in the teaching and learning of mathematics. It is also an instructional approach, which provides a context for students to learn and apply mathematics in the real-world situation.

A student's mathematical education is simply not complete if that student has not experienced the usefulness of mathematics in the real world. This experience comes through real-world problem solving. This course focuses on teaching and learning mathematics through problem solving in the real-world context and enquiry-oriented environment which are characterised by the teacher who facilitates students to construct a deep understanding of mathematics ideas and processes by engaging them mathematically in real-world situations.

**Objectives:**

The main objectives of this course are to provide the participants with the necessary knowledge and skills required to carry out problem solving in the real-world context and enquiry-oriented environment in the learning of mathematics.

At the end of the course, participants should be able to:

1. acquire basic knowledge and philosophy of carrying out mathematical problem solving in real-world situations during the process of learning mathematics;
2. use creative and innovative problem solving strategies;
3. adopt current teaching skills necessary to enhance students' learning and interest in mathematics through problem solving in real-world situation;
4. develop skills to utilise problem solving strategies and approaches necessary to create mathematics lesson that promote and enhance mathematics learning using real-world situation;
5. assess the learning of mathematics; and
6. collaboratively plan, design and implement problem solving in the real-world context and enquiry-oriented environment lesson.

**Course Contents:**

This course highlights exemplary problem solving strategies and approaches, and effective classroom practices. It is activity-oriented and participants are encouraged to engage actively in initiating activities that facilitate discussions, sharing of experiences, demonstrations, designing and carrying out a problem solving inquiry-based lesson. Furthermore, it provides a platform for the participants to practice good global citizenship in learning together with fellow Southeast Asian teacher educators.

The major areas include:

- 1 Fundamentals of Problem Solving in Mathematics Education
  - 1.1 Nature and Basics of Mathematics Education



- 1.2 Problem Solving, Real-World Context and Enquiry-oriented Environment
- 1.3 Sustainable and Life-long Learning
- 1.4 Learner-centred Learning
- 2 Strategies and Approaches to Enhance and Promote Mathematics Learning Utilising Real-World Context
  - 2.1 Problem Solving
  - 2.2 Structured Problem Solving and the Management of the Blackboard (Bansho)
  - 2.3 Model and Heuristics approaches
  - 2.4 Problem-based Learning (PBL4C)
  - 2.5 Realistic Mathematics Education
  - 2.6 Questioning Techniques and Facilitation
- 3 Assessment for Mathematics Learning
  - 3.1 Assessment for Learning
  - 3.2 Observation Skills
  - 3.3 Instruments and Techniques of Assessment for Learning
- 4 Theory into Practice
  - 4.1 Planning, Designing, Implementing and Improving Lessons Plans and Strategies with Emphasis on Promoting and Enhancing Mathematical Thinking using the Lesson Quality Improvement Processes.

**Duration:** Four Weeks

**Participants:** Mathematics Educators or Key Primary Mathematics Teachers

**English Proficiency:** Minimum IELTS Band of 4.5 or Equivalent

**Expected Output:**

1. Group Project Work Report
2. Individual Multiplier Effect Action Plan

**References:**

Lester, F.K.Jr., Masingila, J.O., Mau, S.T., Lambdin, D.V., dos Santon, V.M. and Raymond, A.M. (1994). 'Learning how to teach via problem solving'. In Aichele, D. and Coxford, A. (Eds.) *Professional Development for Teachers of Mathematics*, pp. 152-166. Reston, Virginia: NCTM.

**Course Code: RC-SS-140-3**

**Course Title: TECHNOLOGY-ENHANCED LEARNING (TEL): ENHANCING SECONDARY SCIENCE TEACHING AND LEARNING THROUGH TECHNOLOGY**

**Rationale:**

For the last two decades digital technologies have become inseparable from development and research in the science education. However, it has not been fully integrated into the field of teaching and learning of science. "Billions of dollars have been invested to equip schools with educational technological tools, yet the vast majority of the teachers do not use technology in meaningful ways in their instruction (Guzey&Roehrig, 2012, p.162)". There is a potential for supporting and enabling learning through exploring the use of animations, simulations and games of scientific phenomena. Therefore, technology-enhanced learning (TEL) should be maximised to improve the hands-on and minds-on activities in science classrooms.

The TEL, which is organized around the types of learning technologies to make science learning authentic and to provide the tools to sustain engaged participation in making sense of the real world. There is a growing importance of technological applications that will improve the students' understanding of teaching and learning of science contents. There is a need to understand various strategies and effective learning approaches to implement learning technologies. TEL complements well with constructivist teaching approaches and assessment for developing higher order thinking skills (HOTS).

**Objectives:**

The main objective of this course is to provide participants opportunities to use technology to enhance science pedagogical content knowledge and skills.

At the end of the course, participants should be able to:

- 1 acquire basic knowledge on types of TEL;
- 2 develop skills in using TEL applications and tools to improve teaching and learning in secondary science;
- 3 adopt strategies such as project-based learning, active learning, life-long learning for enhancing effective teaching and learning of secondary science; and
- 4 collaboratively plan, design, implement, and make conclusion of a secondary TEL lesson study.

**Course Contents:**

This course emphasizes a good learning of theory with reflective classroom practices based on TEL. The knowledge and skills acquired would enable participants to initiate TEL for improving secondary science classroom practices in their respective schools.

The major areas include:

- 1 Type of Technology-enhanced Learning
  - 1.1 E-Learning
  - 1.2 Blended Learning
  - 1.3 Mobile Learning
  - 1.4 Web-based Learning
  - 1.5 Game-based Learning

- 2 Applications that Support Technology-enhanced Learning
  - 2.1 Animations
  - 2.2 Simulations
  - 2.3 Digital Games
  - 2.4 Videos
- 3 Tools for Technology-enhanced Learning
  - 3.1 Non-digital Games
  - 3.2 Digital Games
- 4 Strategic Approaches for TEL
  - 4.1 Project-based Learning
  - 4.2 Active Learning
  - 4.3 Problem-based Learning
- 5 Science Education
  - 5.1 Issues and Trend in Secondary Science Education
  - 5.2 Selected Strategies/Approaches in Teaching and Learning of Science
  - 5.3 Technology-based Assessment (e.g. Google Docs, Clickers, Hot Potatoes)

**Duration:** Four Weeks

**Participants:** Science/ICT Educators or Key Secondary Science/ICT teachers

**English proficiency:** Minimum IELTS band of 4.5 or equivalent

**Expected output:**

1. Project Work Report
2. Multiplier Effect Action Plan

**References:**

Allen, B., (2007). *Blended learning: tools for teaching and training*. London: Facet Publishing.

Becker, K., Kehoe, J. & Tennent, B. (2007). Impact of personalised learning styles on online delivery and assessment. *CampusWide Information Systems*, 24(2), 105-119.

Campbell, T., Wang, S. K., Hsu, H. Y., Duffy, A. M., & Wolf, P. G. (2010). Learning with web tools, simulations, and other technologies in science classrooms. *Journal of Science Educational Technology*, 19, 505-511.

Cooper, S. (2010). Predicting protein structures with a multiplayer online game. *Nature*, 466, 756-60.

Divaharan, S., & Lim, C. P. (2010). Secondary school socio-cultural context influencing ICT integration: A case study approach. *Australasian Journal of Educational Technology*, 26(6), 741-763.

Guzey, S. S., & Roehrig, G. H. (2012). Integrating educational technology into the secondary science teaching. *Contemporary Issues in Technology and Teacher Education*, 12(2), 162-183.

Hartley, J. (2007). Teaching, learning and new technology: A review for teachers. *British Journal of Educational Technology*, 38(1), 42-62.

**Course Code: RC-PM-140-4**

**Course Title: MEANINGFUL PRIMARY MATHEMATICS LEARNING IN THE STEM ENVIRONMENT**

**Rationale:**

In this 21st century, scientific and technological innovations have become increasingly important as we face the benefits and challenges of both globalisation and a knowledge-based economy. To succeed in this new information-based and highly technological society, students need to develop their capabilities in Science, Technology, Engineering and Mathematics (STEM) to levels much beyond what was considered acceptable in the past." (National Academies of Science, 2007). STEM is multidiscipline-based, incorporating the integration of other disciplinary knowledge into a new whole. STEM education is a process for teaching and learning that offers students opportunities to make sense of the world and take charge of their learning, rather than learning isolated bits and pieces of content. In the STEM environment, there is an emphasis on activities that allow students to engage in real-world problems and experiences through context-based, problem-based, enquiry-based learning activities that lead to higher order thinking. The role of STEM cannot be underestimated in preparing students for the challenges of the future. Innovation is the key to economic growth and STEM is the key driver of innovation. A STEM education provides foundations to acquire further skills as students make their lifetime transitions to the labour market.

In this course, mathematics education is intertwined with the other three areas. These areas are focussed together not only because the skills and knowledge in each discipline are essential for student's success, but also because these fields are deeply intertwined in the real world and in how students learn most effectively. The participants are guided and experience instructional models which require students to be actively engaged in cooperative environments where their instructors help facilitate creativity and inquiry learning. They are encouraged to engage in discourse, shaping arguments, solving problems, experimenting, designing, creating, and gathering supporting evidence. They will also construct a learning environment to provide students opportunity to experience discussion, debate, discovery, creation, and innovation.

**Objectives:**

The main objective of this course is to develop participants' knowledge and skills in the teaching of mathematics in STEM education specifically to support students learning of mathematics in a multidisciplinary environment and engage them in real-world problems and experiences.

At the end of the course, participants should be able to:

1. understand mathematics as the language in STEM education;
2. provide appropriate contexts to help students integrate mathematics and other subjects;
3. develop student thinking and problem solving;
4. integrate real-world issues ;
5. use assessment to inform learning; and
6. collaboratively plan, design, implement, analyse and make conclusion of a quality mathematics lesson plan.

**Course Contents:**

This course is activity-oriented and participants will have to engage actively in initiating activities that facilitate discussions, sharing of experiences, demonstrations, planning and developing lessons in integrating mathematics in STEM education.

The major areas include:

- 1 Trends and Issues in Mathematics Education
  - 1.1 STEM Education as a Multidisciplinary Approach to Learning
  - 1.2 Mathematics in STEM Education
  - 1.3 Key Elements of Good STEM Practice
  - 1.4 Key Obstacles Hindering Cross-curricular Teaching and Learning
- 2 Strategies and Approaches to Promote Learning of Mathematics in a Multidisciplinary Environment
  - 2.1 Problem Solving
  - 2.2 Contextual Learning
  - 2.3 Problem-based Learning (PBL4C)
  - 2.4 Project-based Learning
  - 2.5 Questioning Techniques and Facilitation
- 3 Technology as Fundamental Part of Learning
  - 3.1 Flexible Learning
  - 3.2 Dynamic Mathematics Software
- 4 Assessment for Mathematics Learning in STEM Education
  - 4.1 Assessment for Learning
  - 4.2 Observation Skills
  - 4.3 Instruments and Techniques of Assessment for Learning
- 5 Planning, Designing, Implementing and Improving Lesson Plans and Strategies with Emphasis on Mathematics in STEM Environment using the Lesson Quality Improvement Processes.

**Duration:** Four Weeks

**Participants:** Mathematics Educators or Key Primary Mathematics Teachers

**English Proficiency:** Minimum IELTS Band of 4.5 or Equivalent

**Expected Output:**

1. Group Project Work Report
2. Individual Multiplier Effect Action Plan

**References:**

National Academies of Science. (2007). *Rising above the gathering storm. Report from the Committee on Prospering in the Global Economy of the 21<sup>st</sup> Century*. Washington, DC: National Academics Press.