Republic of the Philippines
Department of Education
REGIONAL OFFICE IX- ZAMBOANGA PENINSULA

February 1, 2021

Regional Advisory
No. 021 s. 2021

To: All Schools Division Superintendents
Schools Division HR SEPS
All Others Concerned
This Region

SEAMEO Regional Center for Education in Science and Mathematics

5. This has reference to the Memorandum DM-OUCI-2021-023 from the Undersecretary **DIOSDADO M. SAN ANTONIO** Office of the Curriculum and Instruction pertaining to the Subject: **"SEAMEO Regional Center for Education in Sciences and Mathematics (SEAMEO RECSAM)",** announces its regular courses for teachers and teacher educators for Fiscal year 2020/2021 Batch 1 & 2) via online mode.

6. Attention is invited to the courses and scholarship offered as reflected in the table and also the required documents (Annex A) that must be submitted via email at scholarships@deped.gov.ph on or before the deadline. (see attached memorandum)

7. For further queries and clarification, you may contact the DepEd Scholarship Secretariat thru email at scholarships@deped.gov.ph

8. Immediate dissemination of this advisory is desired.

DR. ISABELITA M. BORRES, CESO III
Regional Director

Republic of the Philippines

Department of Education

UNDERSECRETARY FOR CURRICULUM AND INSTRUCTION

MEMORANDUM
DM-OUCI-2021-023

TO : **Minister of Ministry of Basic, Higher and Technical Education, BARMM**
Regional Directors
Schools Division Superintendents
Heads of Public Elementary and Secondary Schools
All Others Concerned

FROM : **DIOSDADO M. SAN ANTONIO**
Undersecretary for Curriculum and Instruction

SUBJECT : **SEAMEO Regional Center for Education in Science and Mathematics**

DATE : **19 January 2021**

The SEAMEO Regional Center for Education in Science and Mathematics (SEAMEO RECSAM) announces its regular courses for teachers and teacher educators for Fiscal Year 2020/2021(Batch 1 & 2) via online mode. The courses and scholarships offered are reflected in the table below:

Regular Courses for Fiscal Year 2020/2021 (Batch)

Course Code	Course Title	Course Dates	Time	No. of Scholarships Available	Deadline of Submission of Requirements
RC-P5-145-1	lmplementing School-Based Alternative Assessment in Primary Science Education	5 - 16 April 2021	10.00am - 12.00pm 2.00pm - 4.00pm Malaysia Time (GMT+8)	Three (3) Slot	5 Feb 2021
RC-PM-145-2	lmplementing School-Based Alternative Assessment in Prirnary Mathematics Education	19 - 30 April 2021		Three (3) Slot	5 Feb 2021

NEAP/PDD/LOZANO

Regular Courses for Fiscal Year 2020/2021 (Batch 2)

Course Code	Course Title	Course Dates	Time	No. of Scholarships Available	Deadline of Submission of Requirements
RC-SS-145-3	Embracing lnquiry-Based Science Education to Enhance lnstructional Capacity of Secondary Science Teachers	14 - 25 June 2021	10.00am - 12.00pm 2.00pm - 4.00pm Malaysia Time (GMT+8)	Two (2) Slot	5 Feb 2021
RC-SM-145-4	Developing Conceptual Understanding in Secondary Mathematics through Standard-Based Curriculum and Best Pedagogical Practices	14 - 25 June 2021		Three (3) Slot	5 Feb 2021

All required documents (Annex A) must be submitted via email at scholarships@deped.gov.ph on or before the deadline.

The application from and other details of the program are enclosed in this memorandum.

For further inquiries and clarification, you may contact the DepEd Scholarship Secretariat thru email at scholarships@deped.gov.ph.

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

COURSE TITLE

Application of (NAME of NOMINEE)

Region: _____

Submitted on (DATE and TIME)

1. Email Addresses:	
2. Training Course:	
3. Contact Numbers:	
4. Designation/Position:	
5. Work Station (School/Office Unit):	
6. School Division Office:	
7. Religion:	
8. Age:	
9. Number of Years in DepEd	
10. Work Experience/s Related to Teaching (Indicate the highlights and duration.)	
11. Outstanding Accomplishments (Max of 5)	
12. Educational Attainment (Indicate School, Program, Specialization, and Title of Thesis/Dissertation, if any.)	
13. What challenges had you experienced as a teacher? What did you learn from them?	
14. What initiatives do you plan to implement so your school/office will benefit from this program?	
15. How did you hear about this scholarship opportunity?	

ANNEX A
LIST OF REQUIREMENTS

Qualification	Documentary Requirements
a. Filipino citizen	1. Updated Personal Data Sheet 2. Endorsements from the head of office a. endorsement from school principal/division chief b. endorsement from the Schools Division Office through the Office of the SDS c. Nomination Letter from the Regional/Bureau Director or his/her duly authorized representative (thru the Regional HRDD Chiefs)
b. Must be 50 years old below c. Must have rendered at least five (5) years of service in the government (DepEd) at the time of nomination	
d. Must hold a permanent appointment at the organization nominating him/her e. Must be computer literate and have access to stable Internet connection to enable them to participate in online interactions	
f. Must have no pending administrative and/or criminal case	
g. Must have a college degree and/or sufficient demonstrated ability and experience related/relevant to the course he/she is applying for	
h. Must have a good command of the English language (spoken and written)	
i. Must have professional development needs aligned with the KRAs of the organization j. Must have outstanding accomplishments related/leading to the program applying for	
k. Must have no pending nomination for scholarship in another program/course or have already rendered the required service obligation for a scholarship previously enjoyed	
l. Physically and mentally fit	
m. Not an expectant mother	

REGULAR COURSES

FOR FISCAL YEAR 2020/2021

BATCH 1:

5-16 APRIL 2021 & 19-30 APRIL 2021

BATCH 2:

14-25 JUNE 2021

SEAMEO RECSAM, PENANG, MALAYSIA

COURSE INFORMATION BOOKLET

TABLE OF CONTENTS

Page

COURSE CODE, TITLE AND DATE

REGULAR COURSES FOR FISCAL YEAR 2020/2021 (BATCH 1)

Course Code	Course Title	Date	No. of Scholarships Offered per Country
RC-PS-145-1	Implementing School-based Alternative Assessment in Primary Science Education	5-16 April 2021	3
RC-PM-145-2	Implementing School-based Alternative Assessment in Primary Mathematics Education	19-30 April 2021	3

REGULAR COURSES FOR FISCAL YEAR 2020/2021 (BATCH 2)

Course Code	Course Title	Date	No. of Scholarships Offered per Country
RC-SS-145-3	Embracing Inquiry-Based Science Education to Enhance Instructional Capacity of Secondary Science Teachers	14-25 June 2021	2
RC-SM-145-4	Developing Conceptual Understanding in Secondary Mathematics through Standard-Based Curriculum and Best Pedagogical Practices	14-25 June 2021	3

IMPORTANT DATES

Date	Action
15 February 2021	Deadline to receive nominations from Ministries of Education
26 February 2021	Notification of acceptance to successful applicants (via email) **Please ensure email ID provided in participation form are valid*.

SOUTHEAST ASIAN MINISTERS OF EDUCATION ORGANIZATION
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/

1.0 QUALIFICATIONS

1.1 The **qualifications** required for the course participants are described in the annexures of different courses (refer to item 4.0). Please follow required qualifications strictly in your selection of participants. This would maximise impact of the courses and the nominated participants are expected to carry out multiplier effect training upon completion of the course.

1.2 Completed application form and other relevant documents of the nominated candidates must be sent to SEAMEO RECSAM by **15 February 2021**. OR, a list of the names of potential nominees with the certified copy of their qualifications in Science/Mathematics must be sent.

1.3 For selection purposes, Ministries of Education are encouraged to nominate at least **FOUR CANDIDATES** for RC-PS-145-1, RC-PM-145-2 and RC-SM-145-4 **AND** at least **THREE CANDIDATES** for RC-SS-145-3. SEAMEO RECSAM will only shortlist **THREE CANDIDATES** for RC-PS-145-1, RC-PM-145-2 and RC-SM-145-4 **and TWO CANDIDATES** for RC-SS-145-3. SEAMEO RECSAM has the right to reject candidates that do not match the requirement of the course. Please notify us if your country is unable to fill the number of the scholarships specified. The vacant places may be offered to other member countries.

1.4 All participants must have at least a moderate knowledge of written and spoken English.

2.0 GENERAL INFORMATION

2.1 Class Schedule

Participants are required to attend all classes via online as scheduled below:

Monday - Friday: 10.00am – 12.00pm & 2.00pm – 4.00pm / Malaysia Time (GMT+8)

3.0 PARTICIPANTS FROM SEAMEO MEMBER COUNTRIES ON FEE-PAYING BASIS

The following are conditions for participants from SEAMEO Member Countries on fee-paying basis:

i. They will also follow the requirements of the programme;
ii. They pay a minimum course fee. (For further enquiries, kindly write to Director, SEAMEO RECSAM, Jalan Sultan Azlan Shah, 11700 Gelugor, Penang, Malaysia, or email director@recsam.edu.my; Fax: +604-6522737).

4.0 COURSE DESCRIPTION

4.1 Course Code: RC-PS-145-1

Course Title: IMPLEMENTING SCHOOL-BASED ALTERNATIVE ASSESSMENT IN PRIMARY SCIENCE EDUCATION

Introduction:

Alternative assessment refers to any non-traditional classroom practice that focuses on continuous monitoring on the individual student progress in learning. It is usually taken to mean that it is in direct contrast to traditional forms of standardised evaluation and paper-and-pencil testing. Traditional assessment requires candidates to read questions and respond in writing, for examples, tests and inventories, and the common response formats may be multiple-choice, short answer and essay. Alternative assessment is also known under various terms, such as formative, performance, portfolio and authentic assessment, based on oral and written responses and presentations, project work or using rubric to measure proficiency.

Rationale:

The primary purpose of classroom assessment is to obtain information to inform teachers' teaching and improve students' learning. It is not to evaluate and classify student performance, but rather, to monitor student progress in achieving learning outcomes throughout a course. Hence, classroom assessment is always an integral component of instructional activities. However, often because of wanting to achieve standardisation, traditional testing has been commonly adopted, particularly in consideration to big class size and managing timing in grading. But then the compression of an entire semester of work into a short time of testing that is used to account for a major portion of a grade is surely a misrepresentation of the efforts of students. The role of assessment must be meaningful and holistic in presenting students' performance. In the teaching and learning of science, assessment must be closely related to its contents, pedagogies used and classroom instructional practices. The various perspectives assumed by assessment *as* learning, assessment *of* learning, and assessment *for* learning are fundamental for effective science teaching and learning. These assessment methods may overlap and interact, nonetheless no single one can provide sufficient information to effect positive changes in the teaching and learning process.

On the other hand, alternative assessment gives the student the opportunity to demonstrate the depth and scope of what they have learned rather than being limited to just a few responses on a traditional test or exam. A student performance assessment must not be the average grading of a cumulative set of work for a given time period. With alternative assessment, students are encouraged to provide their own responses rather than simply selecting from a given list of options. In logical perspectives, alternative assessment should be used to determine what students can and cannot do, in contrast to what they do know or do not know. In other words, alternative assessment measures applied proficiency more than measuring knowledge. Typical examples of alternative assessment include portfolios, project work, and moment-by-moment observation of students in action or while doing science experiments and other activities that are accompanied with some type of rubric. Specifically, a portfolio of work is an alternative assessment that allows a student to select or develop the presentation he or she thinks best depicting his or her study skills and understanding of concepts. Therefore, student portfolios, grading with rubrics, and other alternative assessment strategies can help us determine more accurately how well learning outcomes have been achieved.

Objectives:

This course aims to equip participants with the notion of classroom assessment as an integral part of science instruction. As such, participant will be engaged in activities that would enable them to acquire knowledge, attitude, skills and values.

Upon completion of the course, the participants will be able to:

1 relate the interrelationships of assessment with classroom instruction, pedagogy and curriculum in the teaching and learning of science in the 21st century perspective;
2 explain the purposes and practices of the various types of classroom assessment;
3. discuss the importance of the relationship between school-based alternative assessment to classroom instructional activities and curriculum;
4. adopt assessment instruments or tools that are suitable to monitor students' performance in science learning;
5. integrate technology in science assessment; and
6. plan, design and implement science lesson by adapting an instructional design with emphasis on assessment as well as congruency to content and pedagogy.

Course Contents:

This course adopts assessment as the systematic process of gathering information about what a student knows, is able to do, and is engaging in learning to do. It showcases the application of various school-based alternative assessment to inform classroom teaching and improve learning, in contrast of traditionally used to evaluate and classify student achievement. The participants will explore on the relationships of assessment to pedagogy, curriculum and instructional practices in the classroom, which is necessary to use various alternative assessment methods which will includes giving feedback, analysing students' homework and enhancing skills related to observation and probing questioning techniques.

It is essentially an activity-oriented course that calls for deep reflection of the participants' professional experiences pertaining to the various issues and challenges encountered in the teaching and learning of science, particularly related to assessment generally, and on alternative assessment specifically. The course activities are designed to cater for discussions, presentations, and hands-on and minds-on sessions.

The major areas in the core component include:

1. Current Trends in Science Education
   - 1.1 21st Century Learning Skills in Science Education
   - 1.2 Current Practices in Classroom Instructions on Science Education
   - 1.3 Trends and Issues in Assessment on Science Education

2. Fundamentals of Assessment
   - 2.1 School-based Classroom Assessment
   - 2.2 Assessment *as, for* and *of* Learning
   - 2.3 Traditional versus Alternative Assessment

3. Aligning Science Pedagogy and Assessment Practices
   - 3.1 Using Assessment to Develop Student Motivation for Science Learning
   - 3.2 Integrating Science Classroom Assessment and Practices
     - Inquiry-based learning

- Problem-based learning, and
- Project-based Learning

3.3 Exemplary Alternative Assessment on Science Learning
- Student portfolios
- Performance tasks
- Assessment rubrics
- Oral, written or demonstration presentations
- Self and peer assessment
- Direct and indirect observation
- Questioning techniques
- Authentic assessment in outdoor science learning

4. Information and Communications Technology in Assessment
   4.1 Digital Tools for Assessment in Learning
   4.2 Online/Web-based Resources for Assessment

5. International, National and School-Based Standardised Assessment
   5.1 Impact of TIMSS and PISA in Assessment Practices
   - Construction of Test Items based on Bloom's Taxonomy, and relating to TIMSS and PISA formats

6. Workshop Enhancing Understanding on Alternative Assessment
   (either on 6.1 or 6.2; 3 days or approx. 18 hours)
   6.1 Performance assessment OR Diagnostic assessment
   - Applying various alternative assessment strategies or tools in the above assessment

   OR
   6.2 Improvisation of teaching materials

7. Theory into Practice (TiP):
   Design and Development of Instructional Materials and Lesson Plan (approx. 24 hours)
   - Planning, designing, developing, implementing and improving the quality of lesson plans and teaching strategies by fostering classroom alternative assessment practices in learning activities through the lesson quality improvement process.
   - Reflection, debriefing and discussion leading to finalisation of lesson plan and completion of project work

Duration: Two Weeks

Participants: Science Educators or Key Primary Science Teachers

English proficiency: Able to communicate moderately in English

Expected output:
1. Project Work Report
2. Individual Multiplier Effect Action Plan

References:

Gardner, J. (2006). *Assessment and learning*. London: SAGE Publication

Liu, X.F. (2010). *Essentials of science classroom assessment*. California: SAGE Publication.

Mulvahill, E. (2018) 25 alternative assessment ideas. Retrieved from

https://www.weareteachers.com/alternative-assessment-ideas/

National Research Council. (1996). National science education standards. Washington, DC: The National Academies Press. Retrieved from https://doi.org/10.17226/4962.

Rousseau, P. (2018). Best practices in alternative assessment. Ryerson University. Retrieved from https://www.ryerson.ca/content/dam/lt/resources/handouts/Alternative_Assessments.pdf

4.2 Course Code: RC-PM-145-2

Course Title: IMPLEMENTING SCHOOL-BASED ALTERNATIVE ASSESSMENT IN PRIMARY MATHEMATICS EDUCATION

Introduction:

Assessment is a systematic process of gathering information about what a student knows, is able to do, and is learning to do. Assessment information provides the foundation for decision-making and planning for instruction and learning. The traditional form of student assessment often involves paper and pencil tests to gather average grading of a cumulative set of work for a given time period. However, alternative assessment allows a more holistic approach to student assessment in the form of student performance. With alternative assessments, students are able to provide their responses to the intended assessment which are more varied in nature that can indicate a broader range of their learning competency.

Rationale:

The primary purpose of classroom assessment is to obtain information to inform teachers' teaching and improve students' learning. Hence the role of assessment must be meaningful and holistic in presenting students' performance accurately. In the teaching and learning of mathematics, assessment must be closely linked to its contents, pedagogies used and classroom instructional practices. The various perspectives assumed by assessment *as learning*, assessment *of* learning, and assessment *for* learning are fundamentals of assessment for effective mathematics teaching and learning.

Alternative assessment gives students the opportunity to demonstrate the depth and scope of what they have learned rather than being limited to traditional tests or examinations. In logical perspectives, alternative assessment should be used to determine the cognitive, affective, and psychomotor abilities of students in their learning. In other words, alternative assessment measures applied proficiency more than measuring knowledge. Therefore, it is important that teachers know the latest trend of assessment and how to use various assessment methods and tools to gauge the students' progress in learning mathematics.

Objectives:
This course aims to equip participants with the notion of classroom assessment as an integral part of mathematics instruction. As such, participants will be engaged in activities that would enable them to acquire knowledge, attitude, skills and habits to operationalise the integration of various methods and tools of alternative assessment that align to their instructional strategies as routine classroom practices.

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

1. gain understanding on the principles, purposes, and practices of the various types of classroom assessment;

2. explain the interrelationships of classroom assessment with pedagogy and curriculum in the teaching and learning process;
3. discuss the potential influences of national and school-based assessments to classroom teaching and curriculum development;
4. enhance skills to align current active mathematics teaching and learning approaches that promote mathematical thinking;
5. develop tasks, assessment methods and tools to gauge students' achievement in learning mathematics;
6. integrate technology in mathematics assessment; and
7. plan, design and implement mathematics lesson by adapting an instructional design with emphasis on assessment as well as congruency to content and pedagogy.

Course Contents:

The course focuses on the significance of assessment in planning mathematics lessons and the coherence of the essential components that align to assessment procedures. These aspects will ensure quality of student learning and teaching effectiveness. The course activities are designed to cater for discussions, presentations, mathematical discourse, and hands-on and mind-on session.

The major areas include:

1. Trends and Issues of Educational Assessment in the 21st Century
   - 1.1 21st Century Skills in Mathematics Teaching and Learning
   - 1.2 Assessment in Mathematics Teaching and Learning

2. Fundamental of Assessment
   - 2.1 Principle, purposes and practices
   - 2.2 Aligning Assessment with Learning Standards in a Curriculum

3. Potential Influence of National and School-based Assessment in Student Learning
   - 3.1 National, Classroom-based and School-based Assessment in Practices
   - 3.2 Construction of Classroom-based Assessment Plan

4. Aligning Mathematics Pedagogy and Assessment Criteria
   - 4.1 Developing Assessment Criteria for Student Learning
   - 4.2 Constructivism and its Implications to Assessment
   - 4.3 Formative and Summative Assessment in Mathematics Classroom
   - 4.4 Self-Assessment and Peer Assessment

5. Enhancing Teacher's Understanding and Practices on the Role of Assessment
   - 5.1 Questioning Techniques
   - 5.2 Performance Tasks
   - 5.3 Marking Rubrics
   - 5.4 Importance of Feedback
   - 5.5 Observation Skills
   - 5.6 Analyses of Students' Work and Homework
   - 5.7 Developing Student Motivation for Learning

6. The Use of Information and Communications Technology (ICT) in Assessment
   - 6.1 Computer-based Test Items
   - 6.2 Online/Web-based Resources for Assessment

7. Theory into Practice
   7.1 Planning, Implementing and Improving the Adopted Appropriate Strategies, Skills and Assessment Practices, through the Lesson Quality Improvement Processes.

Duration: Two Weeks

Participants: Mathematics Educators or Key Primary Mathematics Teachers

English Proficiency: Able to communicate moderately in English

Expected Output:
1. Project Work Report
2. Individual Multiplier Effect Action Plan

References:

Dix, P. (2010). *The essential guide to classroom assessment*. Great Britain: Ashford Colour Press Ltd.

Gareis, C. R. & Grant, L. W. (2012). *Teacher-made assessments: How to connect curriculum, instruction, and student learning*. (3nd ed.). New York and London: Routledge.

Gardner, J. (2006). *Assessment and learning*. London: SAGE Publication.

Irons, A. (2008). *Enhancing learning through formative assessment and feedback*. New York and London: Routledge.

Mulvahill, E. (2018) 25 alternative assessment ideas. Retrieved from https://www.weareteachers.com/alternative-assessment-ideas/

Rousseau, P. (2018). Best practices in alternative assessment. Ryerson University. Retrieved on Jun.1, 2019 from https://www.ryerson.ca/content/dam/lt/resources/handouts/Alternative_Assessments.pdf

Waugh, K. C. & Gronlund, N. E. (2013). *Assessment of student achievement.* (10th ed.). USA: Pearson.

Wyatt-Smith, C. & Cumming, J. (2009). (Ed.) *Educational assessment in the 21st century: Connection theory and practice*. New York: Springer.

4.3 Course Code: RC-SS-145-3

Course Title: EMBRACING INQUIRY-BASED SCIENCE EDUCATION TO ENHANCE INSTRUCTIONAL CAPACITY OF SECONDARY SCIENCE TEACHERS

Introduction:

Inquiry-Based Science Education (IBSE) emphasises on allowing students the opportunity to explore "hands-on", to experiment, to ask questions and to develop responses based on reasoning. Science should be innovative for finding new facts and developing technology. This method is based on students' inquiry and they should find the procedure and solution. Students can get scientific knowledge and skill thorough IBSE.

Rationale:

Inquiry-based science education (IBSE) is widely believed as an inspiring way of learning science by engaging students in planning and conducting their scientific investigations. Ironically, today the number of students who are interested in studying science has decreased in many countries, including in SEAMEO region. This could be due to several negative factors, such as outdated method of science teaching and learning in schools, lack of apparatus and science materials for hands-on activities, evolving new scientific and technological environments, and changing students' learning styles. The IBSE approach which focuses on hands-on investigative process in learning is generally recognised as an innovative method to motivate young people in science learning as well as to prepare them for lifelong learning. To fulfill the aspiration of IBSE as an effective science learning method, the implementers at the ground level, clearly the school teachers, must understand and commit to actualise the principles of this educational method. Therefore, it is relevant and important to include IBSE in the development of science teacher professional skills for its application.

Objectives:

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

Upon completion of this course, the participants will be able to:

1. acquire knowledge and philosophy of carrying-out inquiry-based science education;
2. use research-based innovative inquiry-based science education approaches;
3. adopt current teaching skills necessary to enhance students' learning and interest in science through inquiry-based science education;
4. identify various entities or organisations that can support inquiry-based science education; 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. Fundamental 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
    - 1.6 Relationship of Inquiry and SDGs
    - 1.7 Managing Science Inquiry Learning Environment

2. Experiencing Level 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
   3.5 STEM approach in science education

4. Enhancing Inquiry-based Learning
   4.1 Integrating ICT
   4.2 Interdisciplinary Approaches in Science Instruction, and
   4.3 Science Content Knowledge

5. Assessing Inquiry-based Learning
   5.1 Critical Thinking
   5.2 Project Planning
   5.3 Communication Skills

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. Workshop on Improvisation of Teaching Aids

8. Theory into Practice
   8.1 Planning, Designing, Implementing and Improving Lesson Plans and Strategies with Emphasis on Inquiry-based Learning Using the lesson Quality Improvement Processes

Duration: Two Weeks

Participants: Science Educators or Key Secondary Science Teachers

English Proficiency: Able to communicate moderately in English

Expected Output: 1. Project Work Report
2. Individual Multiplier Effect Action Plan

References:

Ban chi, H., & Bell, R. (2008). The Many Levels of Inquiry. *Science and Children*, 46(2), 26-29

Bulba, D. (2019). *What is Inquiry-Based Science?* Smithsonian Science Education Center https://ssec.si.edu/stemvisions-blog/what-inquiry-based-science

Settlage, J., Southerland, S. A., Smetana L. K., & Lottero-Perdue P.S. (2018). Teaching Science to Every Child. *Using Culture as a Starting Point*, 179-181

MacKenize, T. (2016) *Bringing inquiry-based learning into your class*. https://www.edutopia.org/article/bringing-inquiry-based-learning-into-your-class-trevor-mackenzie

4.4 Course Code: RC-SM-145-4

Course Title: DEVELOPING CONCEPTUAL UNDERSTANDING IN SECONDARY MATHEMATICS THROUGH STANDARD-BASED CURRICULUM AND BEST PEDAGOGICAL PRACTICES

Introduction:

The 21st century is a globalisation era characterised by transformation. The world is experiencing rapid transformations from the old to the new; from the traditional to the contemporary; and eventually from the known to the unknown. As a response to the call for transformation, future workforce need to have the courage to face the unknown and the wisdom to generate solutions to problems that are still unknown at the present. This imply that schools need to function as "an incubator for talent, rather than a factory to mass produce knowledge workers" (Welsh, 2018).

Rationale:

School mathematics curriculum reforms have been accelerated worldwide since the arrival of the 21st century (NCTM, 1989; NCTM, 2000; Council of Chief State School Officers, 2009; SEAMEO RECSAM, 2017). One crucial aim of these reforms is to develop school mathematics programmes that could nurture school graduates who are able to apply mathematics successfully when dealing with challenges in their workplace. In the ASEAN region, a Common Core Learning Standards (CCRLS) in Mathematics had been developed as a guide to establish quality curriculum and best instructional practices for school mathematics (SEAMEO RECSAM, 2017).

Major instructional shifts are expected in these reforms. From the angle of teaching, teachers are expected to develop classroom pedagogies that will shift their roles from being a provider of information to a facilitator of learning. From the learning perspective, students are expected to be able to make sense of the mathematics learnt. When sense making is carefully integrated with the contents of mathematics, students will develop deep understanding that will enable them to apply mathematics flexibly (NCTM, 2009). In view of this, 21st century mathematics teachers not only need to have a good grasp of pedagogical competencies, they also need to have a deeper level of understanding in the mathematics contents to be taught to their students (Nolan, Dixon, Safi & Haciomeroglu, 2016). Deep level of understanding is closely related to big ideas in mathematic which is defined as "an idea that is central to the learning of mathematics, one that links numerous mathematical understanding into a coherent whole" (Charles, 2005 cited in Yeo & Toh, 2019). Thus, the focuses of this course are: (a) essential features of a coherent mathematics curriculum, (b) conceptual understanding of the big ideas of some key strands in secondary mathematics, and (c) best pedagogical practices in helping secondary students develop a deep level of understanding in mathematics.

Objectives:

By and large, this course intends to equip the participants with the necessary knowledge, skills and competencies required to design, implement, evaluate and improve a mathematics curriculum which promotes conceptual understanding in mathematics at the secondary classroom level.

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

1. gain understanding of the development of standard-based curriculum in mathematics;
2. gain a better insight of their own country mathematics curriculum by comparing it with the SEA-BES Common Core Regional Learning Standards in Mathematics;
3. gain a deeper understanding of the big ideas in secondary mathematics;
4. develop the competencies of teaching secondary mathematics towards conceptual understanding;
5. assess the process and product of learning secondary mathematics towards conceptual understanding; and
6. collaboratively plan, implement and evaluate a lesson on teaching secondary mathematics towards conceptual understanding.

Course Contents:

This course will provide ample opportunities for participants to study the curriculum and pedagogical practices of mathematics at the secondary school level. It will also allow the participants to compare mathematics curricula of the ASEAN region with reference to the SEA-BES Common Core Regional Learning Standards in Mathematics. A brief introduction to assessment based on both process and product (Danielson & Marquez, 2016) will also be presented to the participants.

The major areas of course contents include:

1. Mathematics Curriculum Reform in the 21st Century
    - 1.1 Standard-Based Curriculum in Mathematics
        - 1.1.1 Rationales for Standard-Based Curriculum
        - 1.1.2 Criticisms on Standard-Based Curriculum
    - 1.2 Prominent Influences on Standard-Based Curriculum in Mathematics
        - 1.2.1 National Council of Teachers of Mathematics (NCTM) Principles and Standards for School Mathematics
        - 1.2.2 Common Core State Standards for Mathematical Practice
    - 1.3 SEAMEO Basic Education Standards (SEA-BES): Common Core Regional Learning Standards (CCLRS) in Mathematics
        - 1.3.1 Aims of SEA-BES CCLRS in Mathematics and Its Framework
        - 1.3.2 Strands of Mathematics Contents in Key Stage 3
        - 1.3.2 Comparative Study on School Mathematics Curricula of ASEAN Countries
        - 1.3.3 Comparing School Mathematics Curricula of ASEAN Countries with SEA-BES CCLRS in Mathematics
    - 1.4 Essential Elements of 21st-Century Curriculum in Mathematics
        - 1.4.1 Mathematical Contents
        - 1.4.2 Mathematical Thinking and Processes
        - 1.4.3 Mathematical Values, Attitudes and Habits for Human Character

2. Best Pedagogical Practices in Teaching Towards Conceptual Understanding in SEA-BES CCLRS Key Stage 3 Mathematics Contents
   2.1 Identifying Big Ideas in each strand for Key Stage 3
   2.2 Making Connections Between Big Ideas in each strand for Key Stage 3
   2.3 Teaching Towards Big Ideas in each strand for Key Stage 3

3. Assessing the Process and Product of Conceptual Learning in Mathematics
   3.1 Performance Assessment
   3.2 Assessment Tools and Techniques

4. Theory into Practice: Planning, Implementing, Evaluating and Improving a Lesson on Teaching Secondary Mathematics towards Conceptual Understanding.

Duration: Two Weeks

Participants: Mathematics Educators or Key Secondary Mathematics Teachers

English Proficiency: Able to communicate moderately in English

Expected Output: 1. Project Work Report
2. Individual Multiplier Effect Action Plan

References:

Charles, R. I. (2005). Big ideas and understanding as the foundation for elementary and middle school mathematics. *Journal of Mathematics Education Leadership, 7*(3), 9-24.

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Danielson, C. & Marquesz, E. (2016). *Performance tasks and rubrics for middle school mathematics. Meeting rigorous standards and assessments*. New York, NY: Routledge.

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National Councils of Teachers of Mathematics. (1989). Curriculum and evaluation standards for schools mathematics. Reston, VA: Author.

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Nolan, E. C., Dixon, J. K., Safi, F. & Haciomeroglu, E. S. (2016). *Making sense of mathematics for teaching high school*. Bloomington, IN: Solution Tree.

Welsh, B. L. (2018). *Education 4.0? The Classroom Meets a Brave New World*. Retrieved from https://medium.com/@brianna_91610/education-4-0-the-classroom-meets-a-brave-new-world-f6eba1dde8fc

Yeo, J. B. W. & Toh, T. L. (2019). Big ideas in mathematics. In Toh, T. L. & Yeo, J. B. W. (Eds.), *Big Ideas in Mathematics. Year Book 2019 Association of Mathematics Educators*, pp.1-10, Singapore: World Scientific.

5.0 CONTACT US

For further information, please contact:

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Penang, Malaysia

Tel: +604 6522 700 l Fax: +604 6522 737 l Email: director@recsam.edu.my

Officer in-charge:
Ms. Noraini Daud l Email: noraini_daud@recsam.edu.my l Tel: +604 6522 741

Appendix 1

Please affix passport photograph

APPLICATION FORM

REGULAR COURSES FOR FISCAL YEAR 2020/2021

Please type or write clearly in capital letters. Do not leave any space blank. Use "NIL" or "N/A" where applicable

Please tick √ your choice. Kindly note that once you have indicate the subject, you are NOT allowed to change.

Application for: ☐ RC-PS-145-1 ☐ RC-PM-145-2 ☐ RC-SS-145-3 ☐ RC-SM-145-4

Course Code:	**Course Date:**
Title Of Course:	**Your Country:**

1. PERSONAL DATA

Family Name (surname) :	Date of birth : Day | Month | Year
First Name :	Nationality (citizenship) :
Other Names :	Gender : Male / Female #
City and country of birth :	Marital status : Single / Married #
Passport No : Type of Passport: Expiry Date:	Religion :

Delete accordingly

2. COMMUNICATION AND MAILING ADDRESS

Applicant's Office Address :		Applicant's Postal / Home Address :
Mobile Phone Number Country | Area | Number		Home telephone | Country | Area | Number
Office telephone Country | Area | Number	Telefax Country | Area | Number	Email

Person to be contacted **in case of emergency** :
Name :_____
Telephone :_____ Mobile Phone Number:_____
Address :_____
Email :_____

3. EDUCATION (list from highest qualification)

Name of Colleges/ Institutions/ University & Country	Major Field of Study	Years of study : from - to	Degree

4. EMPLOYMENT RECORD (list from current position onwards)

Name of Institution/Employer	Position	Years of work: from - to

Delete accordingly

Describe your work and responsibility:

5. REASONS FOR APPLYING THIS COURSE

Please state briefly the reasons for applying to this course and how you hope to benefit from the course.

6. OVERSEAS COURSES/ CONFERENCES/ SEMINARS ATTENDED INCLUDING PROGRAMME OF SEAMEO RECSAM

Name of Conference/ Seminar	Venue	Date: from - to

Delete accordingly

7. ENGLISH LANGUAGE PROFICIENCY

	Excellent	Good	Fair	Basic	Remarks
Listening					
Speaking					
Writing					
Reading					

8. INFORMATION, COMMUNICATION AND TECHNOLOGY (ICT) SKILLS PROFICIENCY

	Excellent	Good	Fair	Basic	Remarks
Microsoft Office					
Email					
Internet					

…… ……

Date Signature of Applicant/Participant

Recommended by Ministry of Education

…… ……

Date Signature & Name of Official on behalf of Minister of Education

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

DIRECTOR

SEAMEO RECSAM, JALAN SULTAN AZLAN SHAH,
11700 GELUGOR, PENANG, MALAYSIA

Appendix 2

SEAMEO RECSAM SCHOLAR AGREEMENT

THIS DEED is made the_____day of_____Two Thousand and Twenty One (2021) between_____of _____

(hereinafter called 'the Scholar') of the first part and the Southeast Asian Minister of Education Organization (hereinafter called 'SEAMEO') of the second part.

WHEREAS the Scholar will pursue the course of training specified in the Schedule hereto (hereinafter called 'the Course') at the SEAMEO Regional Centre for Education in Science and Mathematics in Penang, Malaysia under a scholarship granted by SEAMEO. AND WHEREAS the Scholar has expressed his willingness to accept the Scholarship upon the terms hereafter set out:

NOW THIS DEED witnessed as follows:

1. In this deed unless the context of otherwise requires:

   Words importing the masculine gender include females;

   Words in the singular include the plural and words in the plural include the singulars;

2. The Scholar hereby covenants:

   (i) that he will enter upon and diligently continue in the Course and that he will complete the Course within the prescribed time specified in the Schedule hereto;

   (ii) that he will devote his whole time to the Course and will, to the best of his ability apply himself to the Course to the satisfaction of the supervisors, tutors or instructors associated therewith;

   (iii) that he will follow all the sessions of the Course and sit for all the assessment tests prescribed, if any, for the Course within the limits of time prescribed in the Schedule hereto;

   (iv) that he will conform to the regulations and discipline in force from time to time at his place of study or training and at his place of residence;

   (v) that all rights, including title, copyright and patent rights, in any work produced by him as part his course/project of SEAMEO RECSAM shall be vested in the Course;

   (vi) that he will refrain from participation in political activities not normally permitted in the institutional in which the Course is taken;

3. If the Scholar shall:-

   (i) be idle or grossly misbehaves himself towards the supervisors, tutors, or instructors associated with the Course or commit a breach of his obligations under this deed; or

   (ii) by reason of illness or injury be unable to carry out his obligations under this deed;

   Then in either of those cases SEAMEO may forthwith terminate the scholarship by giving notice to the Scholar but without prejudice to the rights of the parties hereunder in respect of any antecedent breach of the covenants and stipulations herein contained.

4. The Scholar for himself and his/her personal representative hereby further undertakes:-

(i) to indemnity and keep harmless SEAMEO against all proceedings, suits, actions, claims, demands, costs and expenses whatsoever which may be taken or made against SEAMEO or incurred or become payable by SEAMEO in respect of injury (whether fatal or otherwise) to any person of damage or loss to any property occasioned directly of indirectly by any act, omission or other default by the Scholar while on or otherwise in relation to or arising out of the Course.

5. It is hereby agreed that any right, function or power conferred on SEAMEO under this deed may be exercised by the Director or any person duty authorized by him in that behalf.

IN WITNESS WHEREOF the Scholar and SEAMEO by its duty authorized representative have set their hands and seals hereunto the day and year first above written.

THE SCHEDULE ABOVE REFERRED TO

Signed, sealed and delivered by)
The SCHOLAR in the presence of:)
)
)
Signature .....) .....
(Witness)) (Signature of SCHOLAR)
)
Name .....)
Address .....)
.....)

Signed, sealed and delivered by the DIRECTOR of the SEAMEO)
Regional Centre for Education in Science and Mathematics in Penang)
Malaysia, who has been duty authorized to act in that behalf for the)
)
Signature .....) .....
(Witness)) (Signature of DIRECTOR, SEAMEO RECSAM)
Name .....)
Address .....)
.....)

Appendix 3

CHECKLIST

Name: _____

Country: _____

No	ITEM	QUANTITY	YES/NO
1	APPLICATION FORM	1	
2	SCHOLAR AGREEMENT	1	

*Note: Deadline for nomination form submission is **15 February 2021***