



UNIVERSITI SAINS MALAYSIA
School of Educational Studies
Universiti Sains Malaysia
Penang, Malaysia

Course: STEM/STEAM/STREAM Education

Course Title: Linking STEM Education to Everyday Life and Societal Needs

Duration: 6 days (23 - 28 December 2019)

Course Coordinator: Dr Nur Jahan Ahmad

Assistant Course Coordinator: Dr. Nor Asniza Ishak

Invited Lecturers:

1. **Dr. Muzirah Musa**
2. **Dr. Mohd Norawi Ali**
3. **Dr. Rohaya Abdullah**
4. **Dr. Rabiatul Adawiah Ahmad Rashid**
5. **PM. Dr. Shahabuddin Hashim**
6. **Dr. Siti Zuraidah Md Osman**

Participants: 70 teachers from Ikatan Guru Riau Indonesia

Rationale:

Science, Technology, Engineering, and Mathematics (STEM) Education is vital in preparing students to compete for 21st century global economy. Science and technology have advanced at an accelerated pace to keep up with the demand of global economy; thus, a comprehensive understanding of the development of STEM curricula at all educational levels must be fostered in the next generation to come with the hope that they will be the future innovators, inventors and entrepreneurs. Understanding the challenges that discourage STEM students from selecting and persisting in STEM majors may be a crucial answer to the recruitment and retention problem in undergraduate level. As early as young age, they should be encouraged to get involved in activities that can create jobs to generate income, instead of being job seekers as this is very important for them to sustain globally. STEM field is currently very much in focus because in this globalised world, scientific innovation and technology as well as solving problems (using engineering) are needed not just to stimulate economic growth, but also for survival, quality of life and security; thus, STEM is extensively designed to integrate all these four components into one. Moreover, some studies report on lack of involvement of underrepresented groups in STEM field such as females, as well as those who are from low income and poor academic background. In many countries, having STEM degree holders is also a challenge; thus, acquiring STEM related skills is critical for the country for sustainable development and participatory citizen.

Objectives:

The main objective of this course is to expose participants to the various strategies that can be used in secondary science classroom to inculcate STEM skills and acquire basic life skills through investigative inquiry based on real life issues.

At the end of the course, participants are able to:

1. apply various strategies and instructional resources to make STEM/STEAM lessons interesting and meaningful for learning;
2. link real life issues to classroom STEM/STEAM lessons to develop conceptual understanding and scientific values;
3. acquire skills in problem solving and making informed decisions; and
4. develop quality and learner-centred lesson plans to promote STEM/STEAM Education and life skills.

Course Outline: (Note: 35 participants in each room, total of 70 participants)

Time	Room / Activity / Title		Person In Charge
23/12/2019 (Monday)			
8.00am	<u>Venue: Dewan Idris Babjee</u> Registration		Dr. Nur Jahan & Dr. Nor Asniza
8.30-9.00am	<u>Venue: Dewan Idris Babjee</u> Opening Ceremony		All lecturers involved
9.00-9.30am	<u>Venue: Dewan Idris Babjee</u> Pre-Test		Dr. Nor Asniza
9.30-10.00am	Morning Tea		
10.00-1.00pm	<u>Room 1: Physics Lab</u> Title: STEM, Societal Needs & Everyday Life	<u>Room 2: Bio Lab</u> Title: Autonomy in STEAM Education	<u>Room 1:</u> Dr. Nor Asniza <u>Room 2:</u> Dr. Rohaya
1.00-2.00pm	Lunch Break		
2.00-5.00pm	<u>Room 1: Physics Lab</u> Title: Autonomy in STEAM Education	<u>Room 2: Bio Lab</u> Title: STEM, Societal Needs & Everyday Life	<u>Room 1:</u> Dr. Rohaya <u>Room 2:</u> Dr. Nor Asniza
5.00-5.30pm	Afternoon Tea		
6.00-10.00pm	Penang Tour 1: Town		Dr. Nur Jahan & PM Dr. Shahabuddin
24/12/2019 (Tuesday)			
9.00-11.00am	<u>Room 1: Physics Lab</u> STEM Education & Resiliency	<u>Room 2: Bio Lab</u> ESD & STEM Education	<u>Room 1:</u> PM Dr. Shahabuddin <u>Room 2:</u> Dr. Mohd. Norawi
11.00-11.30am	Morning Tea		
11.30-1.30pm	<u>Room 1: Physics Lab</u> ESD & STEM Education	<u>Room 2: Bio Lab</u> STEM Education & Resiliency	<u>Room 1:</u> Dr. Mohd Norawi <u>Room 2:</u> PM Dr. Shahabuddin

Time	Room / Activity / Title		Person In Charge
1.30-2.30pm	Lunch break		
2.30-5.00pm	Visit to RECSAM		Dr. Nur Jahan & Dr. Nor Asniza
5.00-9.00pm	Penang Tour 2: Batu Feringgi		Dr. Nur Jahan & Dr. Nor Asniza
25/12/2019 (Wednesday) (X'mas Holliday)			
9.00-11.00am	<u>Workshop 1: Physics Lab</u> Computational Thinking in STEM Education	<u>Workshop 2: Bio Lab</u> STEM Design Thinking Challenge	<u>Workshop 1:</u> Dr. Siti Zuraidah <u>Workshop 2:</u> Dr. Nur Jahan & Student
11.00-11.30am	Morning Tea		
11.30-1.30pm	<u>Workshop 1: Physics Lab</u> Computational Thinking in STEM Education	<u>Workshop 2: Bio Lab</u> STEM Design Thinking Challenge	<u>Workshop 1:</u> Dr. Siti Zuraidah <u>Workshop 2:</u> Dr. Nur Jahan & Student
1.30-2.30pm	Lunch break		
2.30-5.30pm	<u>Workshop 1: Physics Lab</u> Reflection & Group Presentation	<u>Workshop 2: Bio Lab</u> Reflection & Group Presentation	<u>Workshop 1:</u> Dr. Siti Zuraidah <u>Workshop 2:</u> Dr. Nur Jahan & Student
5.00-5.30pm	Afternoon Tea		
5.30pm-	Freestyle Activity		
26/12/2019 (Thursday)			
9.00-11.00am	<u>Room 1: Physics Lab</u> Philosophy, Religion and Science (STREAM)	<u>Room 2: Bio Lab</u> Assessment in STEM Education using Rubrics	<u>Room 1:</u> Dr. Adawiah <u>Room 2:</u> Dr. Muzirah Musa
11.00-11.30am	Morning Tea		
11.30-1.30pm	<u>Room 1: Physics Lab</u> Assessment in STEM Education using Rubrics	<u>Room 2: Bio Lab</u> Philosophy, Religion and Science (STREAM)	<u>Room 1:</u> Dr. Muzirah Musa <u>Room 2:</u> Dr. Adawiah
1.30-2.30pm	Lunch break		

Time	Room / Activity / Title	Person In Charge
2.30-3.00pm	Post-Test	Dr. Nor Asniza
3.00-3.30pm	<u>Venue: Dewan Idris Babjee</u> Reflection (Group 1 & Group)	Dr. Nur Jahan & Dr. Nor Asniza
3.30-4.00pm	<u>Venue: Dewan Idris Babjee</u> Closing Ceremony	All lecturers involved
4.00-4.30pm	Afternoon Tea	
12.00am	Travelling Penang-KL	Dr. Nur Jahan & Dr. Nor Asniza
27/12/2019 (Friday)		
9.00-12.00pm	Visit to National STEM Centre	Dr. Nur Jahan & Dr. Nor Asniza
12.00-2.00pm	Lunch Break	
2.00-5.00pm	Putrajaya Tour	Dr. Nur Jahan & Dr. Nor Asniza
28/12/2019 (Saturday)		
10.00-1.00pm	PetroSains & KLCC Tour	Dr. Nur Jahan & Dr. Nor Asniza
1.00-2.30pm	Lunch Break	
2.30-5.00pm	Pusat Sains Negara	Dr. Nur Jahan & Dr. Nor Asniza
29/12/2019 (Sunday)	Participants' Departure	