Highlights 2013

Global Metrology Academy
HIGHLIGHTS OF ACHIEVEMENTS 2013

1. Group courses
   - GMA-GT-2013-01 Metrology in Electricity and Magnetism
   - GMA-GT-2013-02 Metrology in Chemistry
   - UNIDO-KRISS workshop: Length, MRQ, Thermometry/Humidity

2. Individual courses
   - Length, Thermometry, Fluid flow, Acoustics/Vibration, Gas Analysis

3. What we have done for raising
   - Effectiveness in Close Partnership

4. Acknowledgements
   - From Participants
   - To everyone who has made it possible

5. GMA group courses 2014
   - Three technical courses scheduled
### Group Courses 2013

Offering THREE (3) courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Themes</th>
<th>Dates</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIDO-KRISS Workshop 4</td>
<td>Length, Mass, Thermometry/Humidity</td>
<td>April 14 - 26, 2013</td>
<td>14 (7 countries)</td>
</tr>
<tr>
<td>GMA-GT-2013-01 Electricity and Magnetism</td>
<td>Voltage and current, DC resistance and impedance, High voltage/current and power, Magnetic field</td>
<td>June 23 - July 4, 2013</td>
<td>15 (13 countries)</td>
</tr>
<tr>
<td>GMA-GT-2013-02 Chemistry</td>
<td>Gas analysis, Bio analysis, Organic analysis, Inorganic analysis</td>
<td>September 2 - 13, 2013</td>
<td>16 (11 countries)</td>
</tr>
</tbody>
</table>

Accommodating 45 participants
GROUP COURSES 2013

- **South America**: 2 participants
- **Middle East**: 1 participant
- **Africa**: 9 participants
- **Asia**: 33 participants

Total 45 participants

- 28 participants with advanced degrees (MSc and PhD)
- Not only from the developing world but also from advanced NMIs
- Calibration/testing officers, plus expert metrologists
## INDIVIDUAL COURSES 2013

<table>
<thead>
<tr>
<th>Areas</th>
<th>Beneficiary countries</th>
<th>Employers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Lithuania</td>
<td>Vilnius Gediminas Technical University</td>
</tr>
<tr>
<td>Length</td>
<td>Pakistan</td>
<td>National Physical and Standards Laboratory (NPSL)</td>
</tr>
<tr>
<td>Thermometry</td>
<td>Syria</td>
<td>National Standards and Calibration Laboratory (NSCL)</td>
</tr>
<tr>
<td>Gas Analysis</td>
<td>Singapore</td>
<td>National Metrology Center, A<em>STAR (NMC/A</em>STAR)</td>
</tr>
<tr>
<td>Length</td>
<td>Lithuania</td>
<td>Vilnius Gediminas Technical University</td>
</tr>
<tr>
<td>Fluid Flow</td>
<td>The Philippines</td>
<td>National Metrology Laboratory – ITDI (NML-Phil)</td>
</tr>
<tr>
<td>Acoustics and Vibration</td>
<td>Vietnam</td>
<td>Vietnam Metrology Institute (VMI)</td>
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</tbody>
</table>

Covering 5 areas

62 person-weeks
We’ve done for effectiveness...

- **Close partnership**
  - GMA-Participants-Lecturers
  - Sharing information
  - Finding solutions to problems faced
  - Social events

- **Interactive classes**
  - Two-way communications between Lecturers and participants
  - Clear understanding of needs/problems
  - Better understanding of knowledge in subject metrology areas

- **Programming for effective learning**
  - Lectures (AM) + Intensive lab session for practice (PM)

- **“Metrology in General” incorporated**
  - Lectures on NQI, CIPM MRA, QMS, Measurement uncertainty

- **Action plans developed**
  - Achievements leading to substantial applications on site

- **Financial resources shared**
  - KRISS
  - UNIDO (√) PTB

- **Global/Regional network provided:** websites/members
  - BIPM, DCMAS
  - APMP, SIM, COOMET, AFRIMETS

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KRISS is a privileged partner of UNIDO.
GMA and global KRISSians
<table>
<thead>
<tr>
<th>Metrology Electricity and Magnetism</th>
<th>Subjects</th>
<th>Time slots allocated</th>
</tr>
</thead>
<tbody>
<tr>
<td>MiG</td>
<td>Metrology in General</td>
<td>Two days (including evaluation)</td>
</tr>
<tr>
<td>EM-01</td>
<td>Voltage and Current</td>
<td>Two days each (technical lectures plus hands-on practice)</td>
</tr>
<tr>
<td>EM-02</td>
<td>DC Resistance and Impedance</td>
<td></td>
</tr>
<tr>
<td>EM-03</td>
<td>High Voltage/Current, and Power</td>
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<tr>
<td>EM-04</td>
<td>Magnetic Field</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Metrology in Chemistry</th>
<th>Subjects</th>
<th>Time slots allocated</th>
</tr>
</thead>
<tbody>
<tr>
<td>MiG</td>
<td>Metrology in General</td>
<td>Three days</td>
</tr>
<tr>
<td></td>
<td>Lab report presentation</td>
<td>One day (presentations followed by Q&amp;A)</td>
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<tr>
<td>QM-01</td>
<td>Gas Analysis</td>
<td>One day each (technical lectures plus hands-on practice)</td>
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<tr>
<td>QM-02</td>
<td>Bio Analysis</td>
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<tr>
<td>QM-03</td>
<td>Inorganic Analysis</td>
<td></td>
</tr>
<tr>
<td>QM-04</td>
<td>Organic Analysis</td>
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*Orientation & tour in and vicinity of Daejeon offered on Saturday before opening of each course.*
### PROGRAMMING DAILY SCHEDULE

<table>
<thead>
<tr>
<th>UNIDO-KRISS Workshop 4</th>
<th>Subjects</th>
<th>Time slots allocated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MiG</strong></td>
<td>Metrology in General</td>
<td>THREE days</td>
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<tr>
<td></td>
<td>Lab report presentation</td>
<td>One day</td>
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<tr>
<td></td>
<td>Technical tour, cultural experience</td>
<td>One day</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>Length standards, Gauge block</td>
<td>Four days each – parallel sessions (technical lectures plus hands-on practice, wrap-up discussion)</td>
</tr>
<tr>
<td><strong>MRQ</strong></td>
<td>Mass, Pressure, Vacuum</td>
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<tr>
<td><strong>TH</strong></td>
<td>SPRT, TPW, Thermocouple, Humidity, Hygrometer</td>
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**Programming focused on a most effective learning**

- **Intensive Laboratory Session**
  - Lectures (AM) + Practice (PM)

- **Action Plan Development**
  - solutions to problems in face, future development plan

- **“Metrology in general” incorporated**
  - Lectures on NQI, CIPM MRA, QMS, Uncertainty

**Substantial Applications for better services on site**
**EVALUATION, IMPACT MONITORING**

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**Average rating of Satisfaction (**)**

4.72/5.00

(*) GMA group courses 2013

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**TRAINING REPORT ON**

**METROLOGY IN ELECTRICITY AND MAGNETISM**

**KOREA RESEARCH INSTITUTE OF STANDARDS AND SCIENCE**

**KRISS-DAEJEON KOREA**

24 JUNE - 5 JULY 2013

By

RAIBAN CHIKWANSHA

Research Scientist – Electrical Metrology

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**IMPACT OF ACTIVITY UNDERTAKEN**

KRIS-NML Technical Collaboration in Metrology
(to be accomplished 6 months after the activity & after a year)

1. **Type of Activity**
   - Technical study at KRISS
   - Technical Expert Advice at NML
   - Donation of Equipment

2. **Details of the Activity**
   2.1 For technical study: scope of study topics, schedule of study, trainer(s), trainee(s), duration
   2.2 For technical advice: specific concern/area where technical advice is needed, technical expert(s), duration
   2.3 For donated equipment: Equipment Name, Brand, Model, Serial No., delivery date, date put in service, purpose of equipment

3. Describe the outcome of the activity undertaken, elaborating through examples. You may add other results of the activity undertaken not mentioned below.
   - cite new service(s) offered; month when service started
   - improvement in existing services offered; cite examples
   - improved CMC; cite concrete example

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**Technical Study Report on Thermometry**

[GMA-IT-2013-05]

- Course Title: Thermometry (Temperature measurement).
- Activities and Outcomes

A. Key subjects of study (1st Week: July 1-5, 2013)
   - Realization of ITS-90 from mercury to aluminum fixed points: Practice on the realization method of aluminum (Al), zinc (Zn) and tin (Sn) freezing points, as well as gallium melting point, triple point of water (TPW) and triple point of mercury (Hg). The practice was focused on heating, cooling and annealing of SPRT and the role of supper cooling phenomenon in pure metals as an indicator of quality of freezing plateau. The supper cooling plateau and recovery time were observed and the cell was induced to form the inner and outer layer mantles, where the equilibrium state takes place. I have learnt how to get good flat freezing plateau (stable plateau), which can continue for a long period of time.
They say thanks in a voice...

The course was very nice and very important. The course content was so rich coupled with extensive hands-on laboratory sessions which made learning and understanding easier.

I learnt great lessons in organizing trainings, making people feel at home and also encouraging the spirit of sharing. Thanks for the pictures, training materials and all the gifts. And both your smiles made the photos look very good.

I want to extend my deepest gratitude to you and Miss Hanna and GMA for the excellent job that you did to organise such an excellent training course. The course was a big success and I believe all participants benefited.

I really appreciate what KRISS is doing to train people from the whole world. The knowledge gained there is very rare to gain from anywhere in the world.

Asking the global metrology community for more opportunities of HRD in metrology and support for more people from the developing world.
Profound thanks and appreciation to

Participants, their NMIs, and governments over the globe

BIPM, APMP, SIM, COOMETs, AFRIMETS for promoting GMA courses

UNIDO, PTB Sharing resources for participants

and to KRISS colleagues

who shared effort in offering group and individual courses in 2013

and agreed to continue offering metrology HRD programs in 2014
GMA GROUP COURSES 2014

For inquiry regarding the course information, please contact:
Sangwook Seo, senior project manager/GMA at swseo@kriss.re.kr, with attention to Dr. Gyeong Hee Nam, Head of GMA/KRISS at ghnam@kriss.re.kr.

- **Mass & Related Quantities (MRQ)**
  - March 10-21, 2014

- **Length & Dimensional Measurement (LDM)**
  - April 7-18, 2014

- **Thermometry & Humidity (TH)**
  - June 9-20, 2014

- **Metrology in General (MiG)**
  - Early 2015
  - (* to be confirmed)
GMA pursues to be a most productive & friendly partner for HRD in metrology in the spirit of sharing the fruits of shared efforts!