

On-line news brief of  
**Global Metrology Academy**  
*since Dec 2012*



# GREETINGS!

FROM THE EDITOR-IN-CHIEF



Dear Readers and GMAsers:

It's been more than a couple of years since GMA set out its service of HRD in metrology early 2013. The great success we have enjoyed to date is beyond expectation. More than 200 people have come to KRISS for group and individual programs organized by GMA. They covered almost every corner of the globe. The most pleasant for GMA was that all of the metrology HRD services offered by GMA have been proved to be highly satisfactory to the participants. I feel happy and grateful to all of you as I am sure that it was made possible thanks to kind support and valuable advice that we've received from partners, readers, participants and lecturers in the GMA courses. I would like to take this chance to express our most profound thanks and appreciation to everyone of our partners and customers for such precious cooperation offered to GMA.

**GMA Talk** in this issue #3 presents you what we have achieved in the year 2015. In addition to its ordinary programs of group courses, a special course was organized upon request of the GULFMET/GSO covering the subjects of thermometry and radiometry. GMA has come into a partnership with PTB sharing resources for participants from the APMP member economies. When it comes to its metrology HRD service for local customers in Korea, around 300 people attended group and tailored individual courses, coming from industry, academia, and metrology community in Korea. More details are described in the next pages. Your continued advice and comments are welcome!

Yours sincerely,

**Gyeong-Hee Nam, Ph.D.**  
Head of GMA, Editor-in-Chief







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## Achievements for Foreign customers in 2015

**52 people** in  
4 group courses  
in metrology

**32 people** for  
tailored individual/  
graduate studies

IN 2015, the third year of its operation, GMA has kept offering and expanding its service of HRD in metrology. As of September 2015, around 80 people from abroad enjoyed the GMA's group and individual programs.

AS an effort to widen the scope of its HRD service, GMA offered a course named "Metrology in General." Its main target audience was heads of

metrology laboratories and high-officials on government who are in charge of management and making policies on their national measurement system. Besides, three (3) technical courses were offered covering the themes of flow measurement, thermometry, and ionizing radiation. More details are described in next pages.

[as of Sept 2015]

Group courses	Individual courses	Graduate studies	Total
52 Participants	7 Participants	25 In progress	84 participants
22 Countries	6 Countries	11 Joined in 2015	28 countries

## Achievements for LOCAL customers in 2015

**244 people** in 11 group courses (ordinary program)

**45 people** for tailored courses

To enhance measurement capabilities of industries including SMEs & calibration laboratories in particular

**WHEN** it comes to our services for local customers in Korea, GMA received 289 participants in its ordinary and tailored courses offered in 2015. In addition, GMA organized 2015 KRISS Summer Metrology School, where 25 science teachers attended from 22 middle and high schools in Korea.

GMA's service of HRD in metrology operated in Korea puts growing emphasis on customers from small and medium industries. To help them better enhance their

measurement capabilities plays an underpinning role in promoting their competitiveness in the global market. For the sake of creating better value for our customers, GMA makes every effort to develop new approaches with more substantial programs that are available in different forms of services in metrology HRD. Pages 14 and 15 present you more details of what GMA has done for the local customers in 2015.

[as of Sept 2015]

Ordinary Group courses	Tailored courses	Outreaching services (on-site)	Summer Metrology School for Science Teachers	Total
244 Participants	36 Participants	9 Participants	25 Participants	314 participants
110 organizations	19 organizations	1 organization	22 Middle/high schools	152 organizations

# SERVICE FOR FOREIGN CUSTOMER 2015

## BENEFICIARIES OF GROUP COURSES

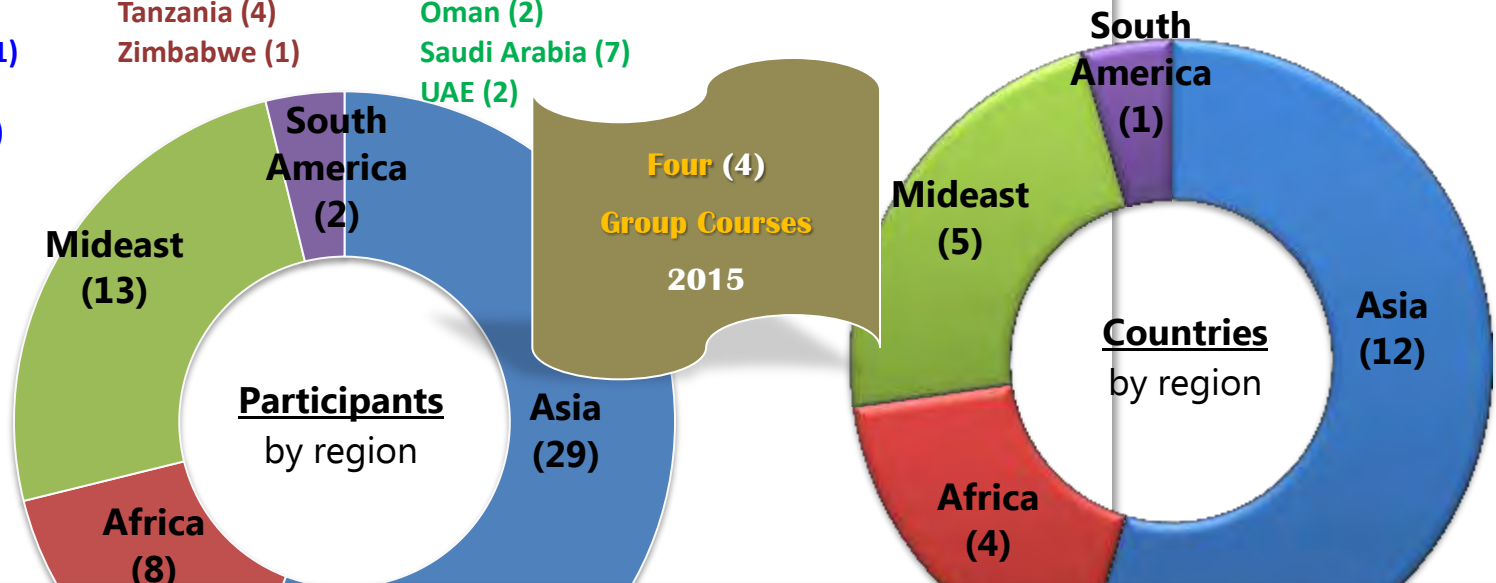
Asia	Africa	Mideast	South America	Total
12	4	5	1	22 countries
29	8	13	2	52 participants

**Bangladesh (2)**  
**Cambodia (4)**  
**China (3)**  
**Hong Kong (1)**  
**India (1)**  
**Indonesia (5)**  
**Korea (1)**  
**Malaysia (1)**  
**Mongolia (4)**  
**Pakistan (1)**  
**Sri Lanka (1)**  
**Vietnam (5)**

**Kenya (1)**  
**South Africa (2)**  
**Tanzania (4)**  
**Zimbabwe (1)**

**Egypt (1)**  
**Iran (1)**  
**Oman (2)**  
**Saudi Arabia (7)**  
**UAE (2)**

**Colombia (2)**



GMA offered four (4) group courses in 2015. Under a selected theme of metrology for each course, there were 52 participants coming from 22 countries of Asia, Africa, Mideast, and South America. As was for the past two years, its beneficiaries come mostly from the developing countries of Asia. It is noteworthy that a growing number of participants were coming from the Mideast region. **Iran**

and **Oman** have added their names in the list of participating countries along with **Tanzania**.

**IN** close partnership with regional and international metrology communities, GMA endeavors to promote its programs and to find new resources such as APMP and PTB of Germany. It will enable GMA to accommodate as many beneficiaries as possible from all over the globe.

## Group courses for Foreign customers in 2015

Four (4) group courses 2015 receiving **52 participants**

Three(3) technical courses plus one (1) strategic course

Lectures and hands-on exercises effectively combined

**DIFFERENT** from the previous years, GMA has developed one group course with the theme of “Metrology in General, MiG.” It was a new stride as an effort to widen the scope of our services beyond the existing arena of technical issues of metrology. The target audience of the MIG course was set primarily for the management of metrology laboratories and high-level government officials. As they are in charge of management and policy-making in their national measurement system, the MiG course pursues to share with

them better understanding of the significant role of metrology that it plays in promoting the economic performance and the quality infrastructure of their countries.

**THE** selected themes of the technical courses were thermometry, flow measurement and calibration (FMC) and ionizing Radiation (IR). FMC and IR courses were also newly listed in the themes of group courses that GMA has been offering since 2013.

GMA Courses 2015	Subjects/Modules	Dates	Participants
<a href="#"><u>GMA-GT-2015-01</u></a> <b>MiG</b>	<b>Metrology in General</b> National standards system (metrology, standardization, legal metrology, conformity assessment), QMS for ISO/IEC 17025, KC-CMC-Traceability, Measurement Uncertainty	March 23-27, 2015 (1 week)	<b>14</b>
<a href="#"><u>GMA-GT-2015-01</u></a> <b>GULFMET-T</b>	<b>Thermometry</b> Thermometry in general, Resistance and Radiation thermometry, Thermocouple, IPRT, SPRT	April 20-24, 2015 (1 week)	<b>7</b>
<a href="#"><u>GMA-GT-2015-03</u></a> <b>FMC</b>	<b>Flow Measurement and Calibration</b> Air speed, Low/High pressure gas flow, Liquid flow, Flow meters	June 1-12, 2015 (2 weeks)	<b>18</b>
<a href="#"><u>GMA-GT-2015-04</u></a> <b>IR</b>	<b>Ionizing Radiation</b> Dosimetry, Radioactivity, Neutron measurement and calibration	Aug 31-Sept 11, 2015 (2 weeks)	<b>13</b>

\* GULFMET: Gulf Association for Metrology



# GROUP COURSES 2015: PROGRAM OVERVIEW



**THE** group course of **MiG, Metrology in General**, was the first attempt that GMA has made with a view to raising awareness of metrology in developing economies. Offered for a week of March 23–27, 2015, the MiG course presented what Korea has done for innovating science and technology that took a significant part in advancing its economic performance over decades. Economic impacts created by KRISS and metrology in Korea attracted deep attention of the **14 participants coming from eight (8) countries**. Of interest to the participants was the Korean

government's strategic and financial support for science, technology and metrology: it was one of the key success factors that has made it possible for KRISS to stand as it is.

**GMA** will continue to elaborate its programs and presentations to be more enriched so that participants from developing economies could obtain substantial knowledge and information and take it into practice in their countries. Your advice and comments in this regard are much more than welcome.

GMA-GT-2015-01-MiG Metrology in General	Subjects of Presentation	Time slots allocated
<b>Session-01</b> STI Policy and National Standards System in Korea	Korea's Strategy for STI Development and Role of Standards, National Standards System in Korea (* Metrology, Conformity Assessment and Legal Metrology, Standardization)	1 day
<b>Session-02</b> Quality Management System and CIPM MRA	(Management Requirements, Technical Requirements), CIPM MRA-Prerequisite for Sustainable Economic Development	1 day
<b>Session-03</b> Traceability and Uncertainty	KC-CMC-Traceability, Uncertainty in Measurement (including exercises for uncertainty evaluation)	1 day
<b>Wrap-up and others</b>	<b>Country Report Presentation</b> <b>Lab Tour</b> (Selected key laboratories of KRISS)	1 day
	Evaluation of the Course, <b>Technical Visit to Industry</b>	1 day
	<b>Cultural Experience in Seoul</b>	1 day (weekend)





# GROUP COURSES 2015: PROGRAM OVERVIEW



**WITHIN** the framework of an MoU between **GULFMET** and **KRISS** concluded in 2014, GMA organized a group course on **thermometry** for a week of April 20-24, 2015. It was a short course tailored to meet the needs of the member laboratories of the **GULFMET**, Gulf Association of Metrology.

in the Gulf area, **GULFMET** pursues to improve the metrology capabilities of its member countries. In harmony with the **GULFMET**'s effort for establishing metrological infrastructure of the region, GMA will continue to offer such group training courses for the **GULFMET** members in the years to come.

AS a new born regional metrology organization (RMO)

GMA-GT-2015-02- GULFMET-Thermometry	Subjects of Presentation	Time slots allocated
<b>Session-01</b> Resistance & Radiation Thermometry	Introduction of temperature, Mise en Pratique of Kelvin, Resistance thermometry, Radiation thermometry in general	1 day
<b>Session-02</b> Thermocouple Thermometry	Thermocouple thermometry, Uncertainty in the thermocouple, Hands-on exercises	1 day
<b>Session-03</b> IPRT	Calibration of IPRTs, Uncertainty in the IPRT calibration, Hands-on exercises	1 day
<b>Session-04</b> ITS-90 and SPRT	ITS-90 and Calibration of SPRT, Hands-on exercises	1 day
<b>Session-05</b> Fixed-points and SPRT	Fixed-point realization, Practical applications in thermometry, Hands-on exercises	0.7 day
Wrap-up	Wrap-up, Evaluation, Closing	0.3 day



# GROUP COURSES 2015: PROGRAM OVERVIEW



**FLUID** flow finds its applications over different industrial sectors such as energy, climate, the environment, etc. GMA has organized a group course of **flow measurement and calibration (FMC)** for the two weeks of June 1-12, 2015 in response to increasing demand for the metrological capabilities in this field for developing countries.

**PARTICIPANTS** in the two-week course of FMC included **18 people from 10 countries** from Asia, Africa, Mideast, and South America. Almost all of the key elements of FMC were presented in five sessions, every one of which was composed of introductory

lectures followed by hands-on exercises offered at laboratories. It has helped participants to get better familiarized with the theory and practical skills on a more effective manner.

**JUST** like in all other GMA courses, the FMC course served as the place for communications between the participants and KRISS concerning further exchanges and collaborations in forms of individual training, on-site advice, and donation of measuring equipment. KRISS looks for opportunities and resources available for expanding its official development assistance in metrology.

GMA-GT-2015-03-FMC Flow Measurement and Calibration	Subjects of Modules	Time slots allocated
MiG Metrology in General	Fundamentals of Metrology (NQI, QMS, Traceability, Uncertainty)	2 days
<b>FMC: Flow Measurement and Calibration</b> (Intensive Laboratory Sessions: lectures and hands-on exercises effectively combined)		
Module-FMC-01	Air Speed Measurement	1 day
Module-FMC-02	Low Pressure Gas Flow Measurement	1 day
Technical visit	K-water, SAMSUNG Electronics	1 day
Cultural experience	Historical sites and attractions in Seoul	1 day (weekend)
Module-FMC-03	High Pressure Gas Flow Measurement	1 day
Module-FMC-04	Liquid Flow Measurement	1 day
Module-FMC-05	Flow Meters	1 day
Wrap-up	Evaluation Test, Individual lab visits, Action plan development, Closing	1.5 day



# GROUP COURSES 2015: PROGRAM OVERVIEW



**METROLOGY** plays an essential role in providing solutions to the critical global issues such as energy, health, safety, the environment, etc. The theme of **ionizing radiation (IR)** is the key player enabling to find reliable solutions to health and safety among others. The sessions were running for the two weeks of August 31-September 11, 2015. And its modules and programs were quite well aligned with the work package of the CIPM CCRI, namely,

dosimetry, radioactivity, and neutron. Lecturers of the IR course were all professional experts of KRISS having knowledge and long experience in each field.

**AS** only a few NMIs in developing countries are working on services for this field of measurement yet, five (5) people out of **13 participants** came from NMIs, while all others are from the DIs and/or SSDLs.

GMA-GT-2015-04-IR Ionizing Radiation	Subjects/Modules	Time slots allocated
MiG Metrology in General	Fundamentals of Metrology (NQI, QMS, Traceability, Uncertainty)	2 days
<b>IR: Ionizing Radiation Measurement and Calibration</b> (Intensive Laboratory Sessions: lectures and hands-on exercises effectively combined)		
Module-1	Ionizing Radiation <b>Dosimetry</b>	2 days
Technical visit	KINS (Korea Institute of Nuclear Safety), SAMSUNG Electronics	1 day
Cultural experience	Historical sites and attractions in Seoul	1 day (weekend)
Module-2	<b>Radioactivity</b> Standards and Calibration	2 days
Module-3	<b>Neutron</b> Measurement and Calibration	1 day
Wrap-up	Evaluation test, Individual lab visits, Action plan development	1 day





# INDIVIDUAL COURSES 2015: OVERVIEW

## Individual courses for Foreign customers in 2015

### Customized programs

Six (6) courses for  
Seven (7) customers

Orientation to be a metrologist

Building up new CMCs

Collaborative research

Experiments for thesis

WHILE offering group courses which are a sort of ready-made programs, GMA operates individual courses as well. The individual courses of GMA have been developed subject to the request of its customers. Its programs have accordingly been tailored so as to meet the specific needs of the customers. Individual studies allow opportunities for the customers to get orientation to be a professional metrologist, to build up

new calibration and measurement capabilities (CMCs), and to carry out collaborative research and experiments for dissertation.

AS of September 2015, GMA has offered five (5) individual courses for six (6) customers. It is likely that one more individual program will be offered to receive a customer from Singapore in the field of gas analysis to begin in the middle of October.

Areas (number of participants)	Countries	Employers	Dates
Electricity and Magnetism (1)	Ethiopia	National Metrology Institute, Ethiopia (NMIE)	Feb 9-17, 2015 (2 weeks)
Instrumentation (2)	Indonesia	Metrology Center – Indonesian Institute of Sciences (M-LIPI)	Mar 16-20, 2015 (1 week)
Magnetism (1)	Germany	Ilmenau University of Technology	July 1- Aug 31, 2015 (8 weeks)
Quantum measurement science (1)	Canada	University of Waterloo	Sept 1 – Apr 30, 2016 (8 months)
Length and angle (1)	Lithuania	Vilnius Gediminas Technical University	Sept 16 – Oct 15, 2015 (4 weeks)
Gas Analysis (1)	Singapore	National Metrology Centre, A*STAR (NMC)	Oct 19 – Dec 18, 2015 (9 weeks)

**KRISS** received 11 new students in 2015 who were admitted to the KRISS-UST graduate school of metrology, coming from Indonesia, Pakistan, the Philippines, and Vietnam. Meanwhile, four (4) graduates received their doctoral and master's degrees in 2015. As of September 2015, there are **25 UST students who have been studying at KRISS** for their advanced academic degrees on subjects of fundamental and cutting-edge areas of metrology.

**FOUNDED** in 2002, UST has been jointly operated with the participation of 31 government-funded research institutes of Korea, who offer

excellent faculty members for the unique graduate school of science and technology in Korea.

**SINCE** 2009 when Dr. Ahmed Gamal Abu-Sinna from NIS, Egypt was awarded with his doctoral degree for the first time from the KRISS-UST graduate school of metrology, 18 people have obtained their doctoral and master's degrees to date.

**FOR** information about study and living under the program of the graduate school, please visit [www.ust.ac.kr](http://www.ust.ac.kr). Do not miss a chance to develop career as metrologist under the program of KRISS-UST Graduate School of Metrology.

## Greetings and Congratulations!

Congratulations!  
4 graduates in 2015

Welcoming  
11 new students



James Tshilongo, Ph.D.  
NMISA, South Africa



Dr. Suherlan Abu Hanifa,  
M-LIPI, Indonesia



Dr. Nguyen Thatch  
from Vietnam



Mr. Mulugeta Derebew,  
NMIE, Ethiopia

New Alumni of KRISS-UST Graduate School of Metrology obtained their doctoral and master's degrees in 2015

2009 – Sept. 2015	Doctoral course	Master's course	Total	Remarks
In progress	14	11	25	11 admitted 2015
Graduates	10	8	18	
<b>Total</b>	<b>24</b>	<b>19</b>	<b>43</b>	



# SERVICE FOR LOCAL CUSTOMERS 2015



**KRISS** has long been offering metrology HRD services in forms of ordinary group course for its local customers in Korea. In the beginning stage of its services that set out early 1980's, it was mostly focused on training for the technical staff of calibration and testing laboratories in Korea.

As industry advances over wide sectors, however, it has been evolved to broaden its horizon of HRD services to encompass advanced industrial measurement technologies. It is to meet ever growing demands of reliability in measurement on global level, in responding to

the rapid progress of cutting-edge industrial technologies.

**CURRENTLY**, its ordinary group courses address subjects of applied measurement technologies such as materials characterization, surface analysis, dosimetry and radioactivity measurement, high resolution x-ray, NDE, gas analysis, etc. Upon request of customers, tailored courses are also offered.

**GMA** is making its very best effort to help industry to better improve their competitiveness in the global marketplaces by offering its unique metrology HRD services.

**Metrology HRD Services**  
**LOCAL customers**  
**in 2015**

Courses	Number of courses offered	Number of participants
Regular group courses	11 courses	244 (from 110 organizations)
Tailored courses	7 courses	36 (from 19 organizations)
Outreaching services (on-site)	2 courses	9 (from 1 organization)



\* GMA's metrology HRD services are focused on helping Korean industry to better improve their competitiveness in the global marketplaces with internationally recognized measurement capabilities.



# SUMMER METROLOGY SCHOOL FOR SCIENCE TEACHERS IN KOREA 2015

**PEOPLE** is the key to success. Korea has become a living witness that has proved it with its unprecedentedly rapid economic growth. When it comes to the metrological capability of Korea, there is an outstanding achievement that has been made possible by the existence of KRISS. For the past four

decades of history, which is rather quite short compared with those NMIs of advanced industrial countries, KRISS has stood up as one of the leading NMIs of the world. What has brought it in this very small country which used to be the poorest on the globe? It was no other than people, the human resources.

**EDUCATION** was one of the most significant factors that have made Korea and KRISS as it is today. Almost every country over the world puts emphasis on science and technology education as it serves as the core driving force for its sustainable economic growth.

**DIFFERENT** strategies and action programs are employed and put into practice.

Metrology, the science of measurement and its applications, plays a foundational role in sustaining economic advancement of human society. Like air we breathe every moment, which is indispensable for our life but intangible, metrology can hardly be felt by the general public. What shall metrology do? What's your advice to break it through?

*Delivering metrology deep and widely into the classrooms of middle/high schools*

**ONE** of the ways GMA has taken is to design an educational program in metrology. It is to teach the teachers of science in middle and high schools. **KRISS Summer Metrology School for Science Teachers 2015** began with one full day classes delivering them the basic knowledge of metrology and its value to our daily lives. Two more days followed to present the teachers key components of metrology comprising length, mass, force, thermometry, time, photometry, and

metrology in chemistry. Lectures and hands-on exercises were given to the 25 for the three-day metrology school. **IT** has still much room for improvement of the summer metrology school in terms of effectiveness of delivering metrology into the classroom of middle and high schools. GMA is looking for advice and resources to make it further refined until metrology seeds could be in full blossom in science classes in middle and high schools of Korea.



Science Teachers in front of a Newton's Apple Tree at KRISS

## Program of Summer Metrology School of Science Teachers 2015

<b>Day 1</b>	<ul style="list-style-type: none"> <li>• Measurement and standards</li> <li>• Metrology in our daily lives</li> <li>• SI and length metrology</li> </ul>
<b>Day 2</b>	<ul style="list-style-type: none"> <li>• Light and color</li> <li>• A story of force beyond textbook</li> <li>• Thermometry</li> <li>• Evolving needs for metrology in sectors of food, health, medicine, and the environment</li> </ul>
<b>Day 2</b>	<ul style="list-style-type: none"> <li>• Mass and balance</li> <li>• Time for advancement of science</li> </ul>

## GMA working closely with APMP and PTB through MEDEA Project

TO follow up a decision made by the annual meeting of the Asia-Pacific Metrology Programme (APMP), which was held in September 2014 in Korea, GMA has closely communicated with APMP DEC and PTB of Germany. In April 2015 the three(3) partners have come to an agreement to the procedures of selecting and funding participants from

the APMP DEC member economies to the GMA group courses.

IN 2015 GMA has offered three (3) group courses of metrology in general (MiG), flow measurement and calibration (FMC), and Ionizing Radiation Measurement and Calibration (IR). Thanks to the financial resources provided by KRISS and PTB's MEDEA

project, a total of 17 people from eight (8) APMP member economies were able to participate in the GMA courses offered in 2015. The partnership and co-funding scheme will continue in the years to come so that a lot more of APMP DEC members could come and join in the GMA courses.



GMA Course	Member economy	Institute	Number of participants	Total
MiG	Indonesia	M-LIPI	2	2
	Bangladesh	BSTI	2	
FMC	Cambodia	NMC	2	8
	Mongolia	MASM	2	
	Sri Lanka	MUUSD	1	
	Vietnam	VMI	1	
	Cambodia	NMC	2	
IR	China	NIM	1	7
	Indonesia	BATAN	2	
	Malaysia	MNA	1	
	Vietnam	INST	1	
<b>Total</b>	<b>8 members economies</b>			<b>17</b>

- Financial Arrangements between PTB and KRISS-GMA (April 24, 2015) – left
- Certificate issued for a GMA participant with support of KRISS-PTB-APMP - right

Beneficiaries of Partnership and Co-Funding by APMP-KRISS-PTB 2015

IT is envisaged that GMA will continue offering three – four group courses in 2016. A strategic course of MnQ, Metrology and Quality, will be redesigned with enriched list of presentations to be delivered by professional experts. Speakers will be invited from within and outside KRISS.

**ANNOUNCEMENT** of call for applications will be sent out on the websites of the global and regional metrology communities such as the BIPM, APMP, COOMET, SIM, AFRIMET, and GULFMET. The NMIs and the participants in the previous GMA courses are also on the list of

recipients of the announcement.

**MUCH** more than appreciated would be your cooperation for letting it be known widely over your community of metrology, standards and quality.

**GMA Group  
Courses 2016  
(\* To be  
confirmed!)**

## Metrology in Chemistry

(MiC) GMA-GT-2016-01  
March 21-April 1, 2016

## Metrology and Quality

(MnQ) GMA-GT-2016-02  
April 25-29, 2016

## Electricity and Magnetism

(EM) GMA-GT-2016-02  
June 13-24, 2016

For inquiry regarding the GMA courses, please contact:  
Mr. Sangwook Seo  
at  
[swseo@kriss.re.kr](mailto:swseo@kriss.re.kr)

**MnQ course welcomes QS Managers, Heads of metrology laboratories and accreditation bodies, NMI directors, and High-level government officials** in charge of policy-making on national measurement system!!!



## Vision

- To be the global center of excellence for metrology HRD

## Function

- To develop programs of metrology HRD
- To operate education/training courses in metrology
- To promote ODA in metrology for the developing world

## Mission

- To foster competent human resources in metrology

Launched in December 2012, **GMA** has been assigned with a mission of cultivating professional human resources required by customers over wide sectors of metrology community. With its target audience both from local and foreign metrology laboratories, GMA develops and operates education and training programs covering a variety of key subjects in metrology. In pursuit of better performance in delivering quality programs meeting the practical needs of customers, GMA has been making its very best efforts towards a vision to be the global center of excellence for HRD in metrology.



## Courses at KRISS

### Group, Individual

- **Group courses**
  - Duration: Two-week intensive programs
  - Covering fundamental subjects of metrology
  - Lectures combined with hands-on practice
- **Individual courses**
  - Duration: Two weeks to one year
  - Tailored to meet the specific needs of customers

## Outreach Services - on site of customers

### Comprehensive approach

- **A group of metrologists of KRISS visiting customers on site**
  - Offering on-site technical advice, training and lectures
- Capability evaluation, offering recommendations of action plans
- Advice on strategic planning of national standards system, etc.

## Graduate Courses

### Master's, Doctoral

- **UST-KRISS Graduate School of Metrology ([www.ust.ac.kr](http://www.ust.ac.kr))**
  - For master's and doctoral degrees
  - Funded by KRISS

## 27 modules

- 25 technical modules covering key subjects in metrology
- 2 module concerning MiG (Metrology in general)

Technical  
modules

Area	Modules	Area	Modules
AUV	2	PR	3
EM	5	<b>QM</b>	3
L	1	RI	3
<b>MM</b>	2	T	2
MRQ	3	TF	1

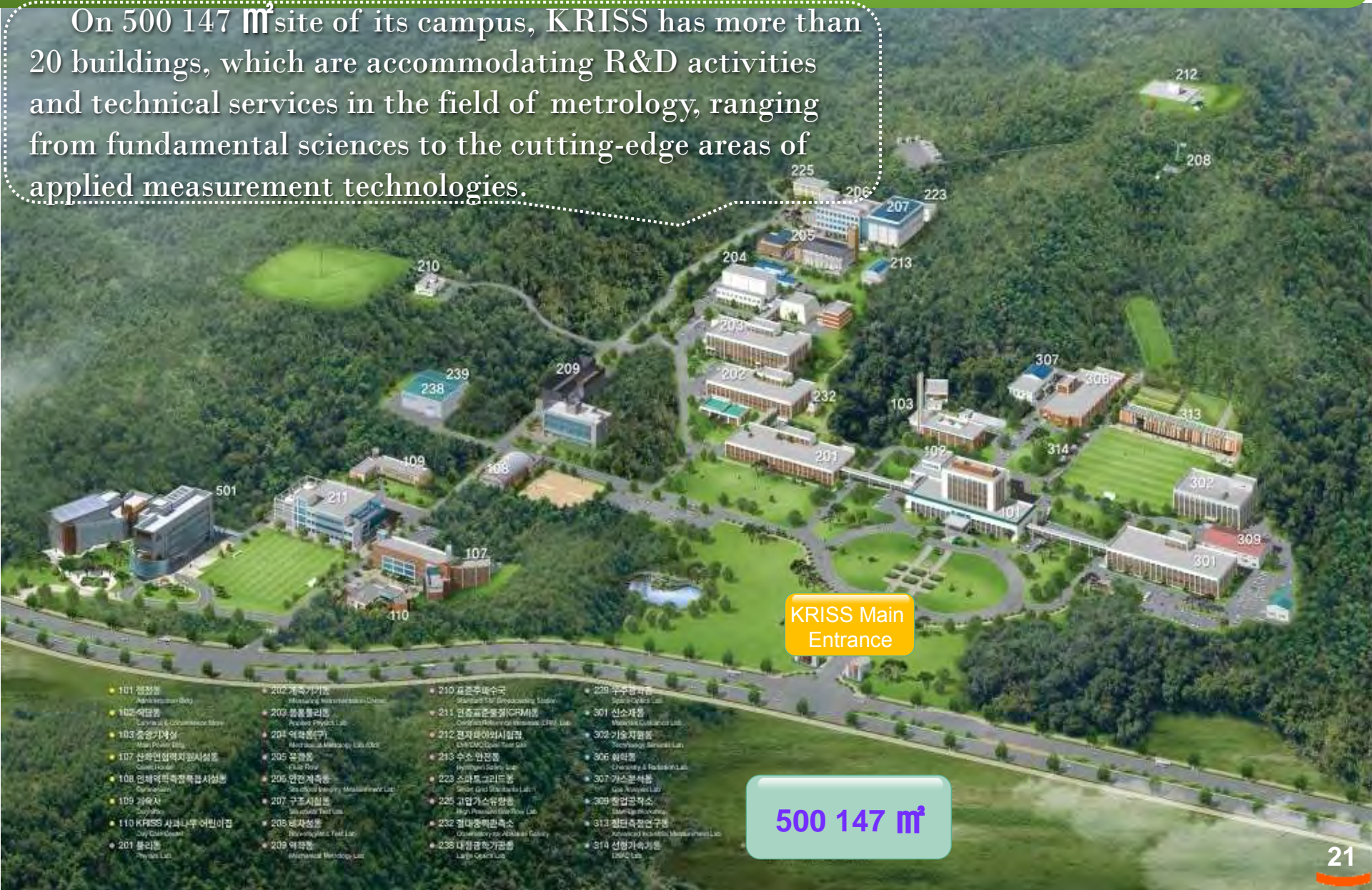
Metrology in  
General

National standards system, economic impact of metrology,  
QMS, Traceability and uncertainty in measurement



# MAP OF KRISS CAMPUS

On 500 147 m<sup>2</sup> site of its campus, KRISS has more than 20 buildings, which are accommodating R&D activities and technical services in the field of metrology, ranging from fundamental sciences to the cutting-edge areas of applied measurement technologies.



KRISS Main Entrance

500 147 m<sup>2</sup>

- 101 행정동  
Administration Bldg.
- 202 계측기개발  
Measuring Instrumentation Unit
- 210 표준추진수국  
Standard Unit Development Unit
- 228 우수정리동  
Superior Office Bldg.
- 102 예단동  
Lecture & Colloquium Room
- 203 응용물리동  
Applied Physics Lab.
- 211 인증공조동(CRM)동  
Certificate Review of Metrology (CRM) Lab.
- 301 신소재동  
Material Center of Lab.
- 103 중공기대실  
Main Power Bldg.
- 204 역학동(연구)  
Metrology & Metrology Lab. (R&D)
- 212 전자대위성시험관  
CHC/MCO Quantum Test Site
- 302 기술지원동  
Technology Services Lab.
- 107 산학연협력지원시설동  
Collab. Center
- 205 플랫폼동  
Club Room
- 213 우수 안전동  
Hygiene Safety Lab.
- 306 원리동  
University & Research Lab.
- 108 민체위험측정특검시험동  
Specialized Laboratory
- 206 안전제작동  
Standard Integrity Measurement Lab.
- 223 소마트로그리드동  
Smart Grid Standards Lab.
- 307 가스분석동  
Gas Analysis Lab.
- 109 관측사  
Observatory
- 207 구조시험동  
Structural Test Lab.
- 225 고급가스유량동  
High Precision Gas Flow Lab.
- 308 정밀공작동  
Precision Machining
- 110 KRISS 사과나무 어린이집  
Soyul Childcare
- 208 전자정밀동  
Precision Electronic Test Lab.
- 232 열대중형반죽소  
Dough Mixing Top-400kcal Bakery
- 309 정밀공작소  
Precision Machining
- 201 물리동  
Physics Lab.
- 209 역학동  
International Metrology Lab.
- 238 대량정밀기기동  
Large Optical Lab.
- 313 첨단측정연구동  
Advanced Metrology Measurement Lab.
- 314 선형가속기동  
LINAC Lab.



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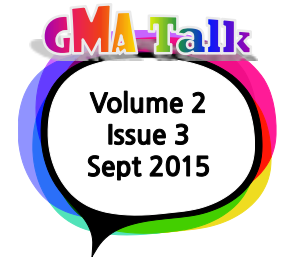


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