



General introduction to the course content

Chingis Kuanbayev

BIPM

Bureau
♦ **I**nternational des
♦ **P**oids et
♦ **M**esures



BIPM Capacity Building & Knowledge Transfer Programme (CB&KT)

CB&KT Programme goals

- ♦ To reinforce the international metrology system and to “balance the load” amongst the NMIs.
- ♦ To promote efficient operation of the system.
- ♦ To aid NMIs from Countries and Economies with Emerging Metrology Systems (CEEMS) to engage appropriately and effectively with the international measurement system.

Voluntary sponsor based programme delivered in consultation with the RMOs and NMIs



A 'Menu' of activities



Focused capacity building opportunities (typically) at the BIPM



Engagement with the Global QI capacity building community



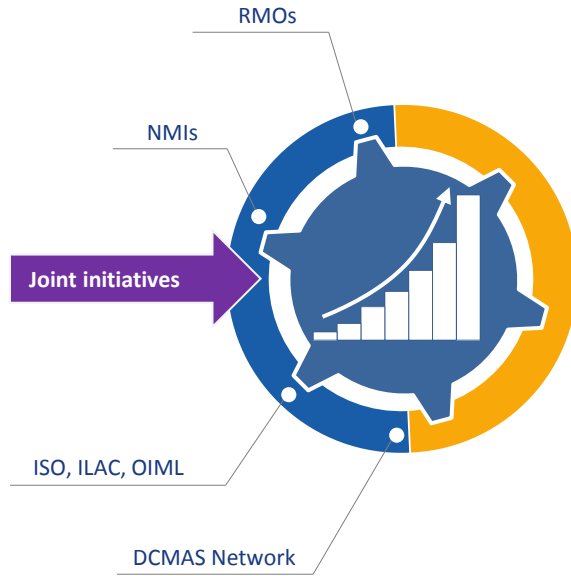
Scientific comparisons of particular interest to Member States that are developing countries

Focused capacity building



- Engagement in the international system
- Improving the efficiency and effectiveness of the CIPM MRA
- Encouraging future pilot laboratories for comparisons
- Developing Calibration and Measurement Capabilities (CMCs) for the first time (and for those less experienced)
- Visits by RMO secretariat staff

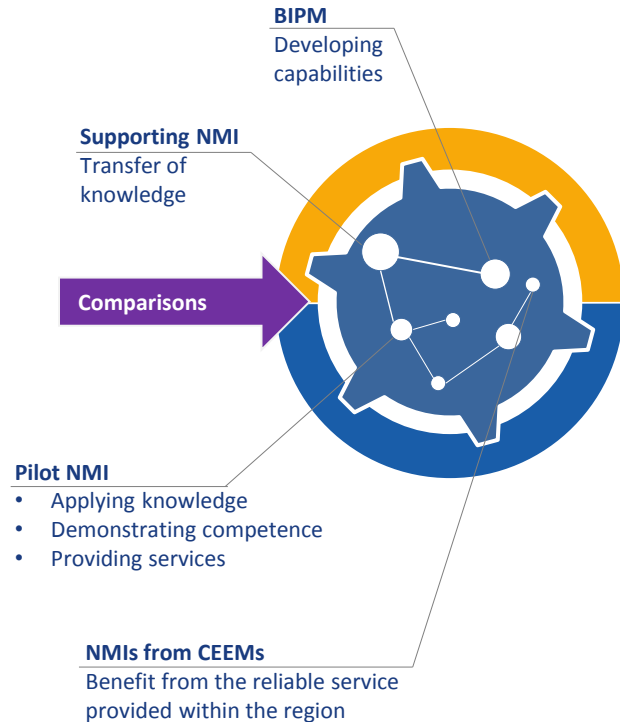
Engagement with the Global QI



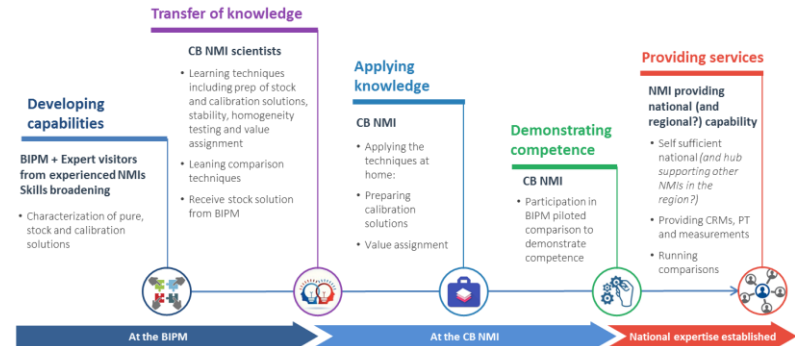
- Enhanced BIPM engagement in the DCMAS Network (network of International Organizations that liaise regarding their capacity building activities)
- Enhanced engagement with potential Member States and Associates
- Promoting 'awareness raising' and providing information for decision makers
- Specific engagement with states immediately after they first become involved with the BIPM as Member States or Associates
- Metrology school activities and placements



Scientific comparisons



- Additional BIPM relevant scientific/technical project(s) of interest to developing countries
- Knowledge transfer to scientists developing capabilities in the interested area, including periods as visiting scientists at the BIPM



CB&KT Initiatives

COMPLETED



- 2016 BIPM-IPS joint Varenna Metrology School and METAS project
- 2016 "Leaders of Tomorrow" course
- 2016 "BIPM-GULFMET TC Workshop"
- 2017 BIPM-EURAMET TC leadership course
- EURAMET - BIPM Training on review of QS

Around 90 participants from 35 countries participated in various training courses!

A number of other ideas under development.

We are open for suggestions!

Welcome new Sponsors!

ONGOING



- 2016 - 2018 "Metrology for Safe Food and Feed in Developing Economies" project
- 2016 - 2019 Metrology for clean air: capabilities in gas metrology
- 2017–2018 "Support for GULFMET key comparison of Zener voltage standards" project

FUTURE



- **2017 Sound beginning in the CIPM MRA course - TODAY**
- 2017 APMP-DEC "Leadership training" course
- 2018 BIPM- TÜBİTAK UME project placements
- 2017 Effective participation in Universal Coordinated Time (UTC)
- 2018 BIPM – COOMET CEEMS Workshop
- 2019 BIPM – COOMET TC Workshop

Under development

Feedback from participants



Dennis Mkhize, South Africa

"I gained numerous skills upon completion of my training, such as linking metrological traceability to the quantitative analysis of..."

Valnei Smarcaro da Cunha, Brazil

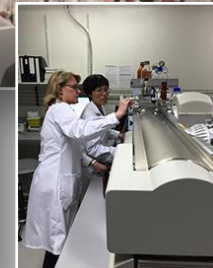
"...course was a highly positive experience that went beyond the technical aspects, as I could interact with colleagues from different areas, from different countries and cultures. A very pleasant and fruitful experience."

Katharina Zellhofer, Austria

"I got a much better understanding [of the work as TC-Chair] and therefore will be able to support my colleagues and may implement relevant information where needed. I am very grateful for this participation."

The course will be useful in my work!

The course contents is excellent!



ONGOING INITIATIVES



2016 - 2018 "Metrology for Safe Food and Feed in Developing Economies" project

Sponsors:

- NIM, China
- PTB, Germany
- UME, Turkey
- NMISA, South Africa

8 participants from
7 countries so far

2016 - 2019 Metrology for clean air: capabilities in gas metrology

Sponsors:

- NPL, UK
- PTB, Germany

5 participants from
5 countries so far

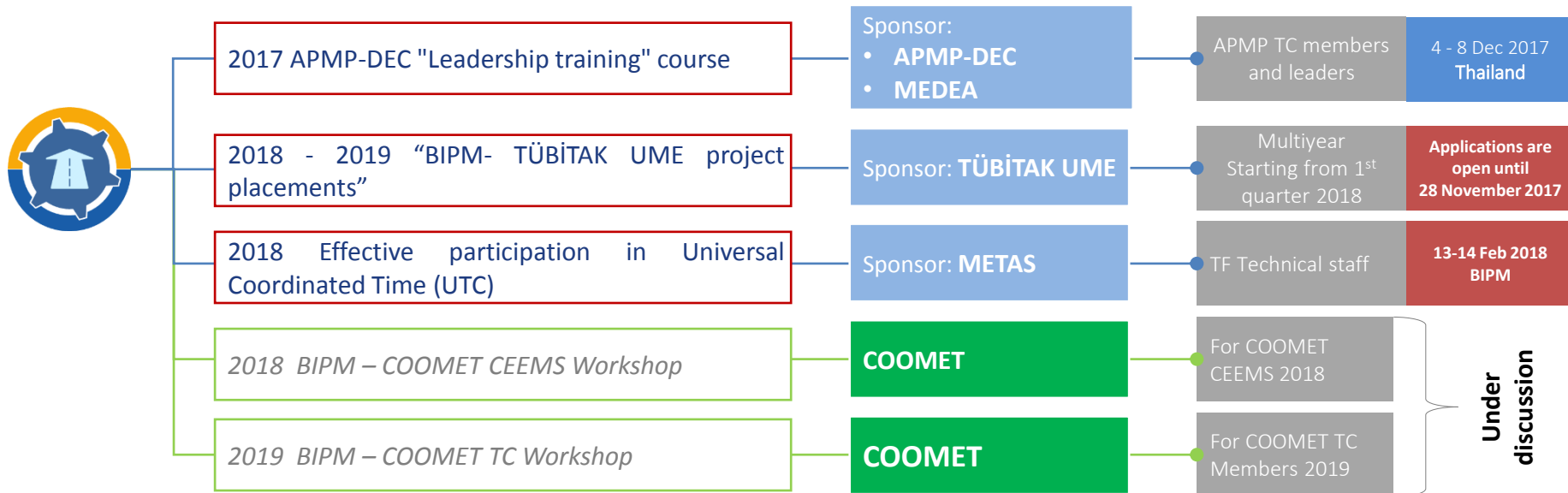
2017–2018 "Support for GULFMET key comparison of Zener voltage standards" project

Coordinator:

- SCL, Hong Kong

3 leading NMIs + BIPM
supporting
2 GULFMET countries

FUTURE INITIATIVES



FUTURE INITIATIVES: 2017 APMP-DEC "Leadership training" course

The project

- ✓ *Designed to provide new or future leaders of APMP-DEC NMIs who have shown potential for leadership, with the skills, knowledge and tools to help them participate in the mechanisms of the CIPM MRA.*

Programme highlights:

- *Global quality infrastructure and role of metrology*
- *The Metre Convention and the BIPM*
- *CIPM MRA: mechanisms, outcomes and benefits*
- *APMP structure, functions and capacity building*
- *Roles of DIs within the CIPM MRA: APMP perspective*
- *Roles and responsibilities in the comparison/CMC process*
- *CMC review process: interregional and intraregional*
- *Guidance on review of CMC files*
- *Getting the most from the KCDB, KCDB search engines and accessing KCDB statistics for analysis*
- *Strategic plan and focus group*
- *Results-based management and case studies*

**Covered by
the BIPM**



Course dates and venue:

4-8 December 2017, at NIMT, Thailand.

Support/Sponsor:

APMP-DEC and MEDEA

FUTURE INITIATIVES: 2018 - 2019 “BIPM- TÜBİTAK UME project placements”

The project

- ✓ TÜBİTAK UME laboratory-based training aims to equip **young and inexperienced metrologists with valuable technical skills** whilst pursuing a specific project of interest.
- ✓ The **training programme will be designed individually** for each participant, taking into account participant's research area and the laboratory capabilities at TÜBİTAK UME.
- ✓ **Placements can range from 1 to 3 months** and will be hosted at TÜBİTAK UME's laboratories.
- ✓ The training is scheduled to take place in two cycles during **2018 and 2019**, with the first cycle starting in April 2018.

Applications are open until 28 November 2017!



Training dates and venue:

From 1 to 3 month 2018-2019.

Starts in April 2018, at **TÜBİTAK UME**

Sponsor: TÜBİTAK UME, Turkey

- *Laboratory and the selected candidates' accommodation costs.*

FUTURE INITIATIVES: 2018 "Effective participation in Universal Coordinated Time (UTC)"

The project

- ✓ *Aimed at supporting institutes to improve their contributions to the computation of UTC through participation in BIPM Circular T / Key Comparison CCTF-K001.UTC.*
- ✓ *Focused on:*
 - *characterization and calibration of GNSS time transfer equipment*
 - *data transmission and integration into UTC*
 - *corrections and clock steering*
 - *the link between UTC and other key stakeholders*
 - *the organization and operation of the world reference timescale system.*



Training dates and venue:
13-14 February 2018,
at the BIPM, Sèvres.

Applications are open until 15 December 2017!

Sponsor: METAS, Switzerland

- *Support is available for a limited number of participants covering course participation, air fare and hotel costs.*



TODAY

2017 “Sound beginning in the CIPM MRA” course

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Background

- ♦ The USA National Institute of Standards and Technology (NIST) grant to provide training of metrologists.
- ♦ Training is being conducted in two courses, each for two weeks at the BIPM.
- ♦ Training scheduled in 2016 and 2017:
 - "Leaders of Tomorrow" course and **18 Participants from 15 countries**
 - "Sound beginning in the CIPM MRA" **24 Participants from 20 countries**
- ♦ The 2016 "Leaders of Tomorrow" course was aimed at new, inexperienced and potential RMO TC Chairs and WG Convenors.
- ♦ The 2017 "Sound beginning in the CIPM MRA" course is aimed at scientists and QS managers from NMIs that have signed the CIPM MRA but not yet submitted CMCs (or are early in the process).


Course details

2017 "Sound beginning in the CIPM MRA" course

→ The "Sound beginning in the CIPM MRA" course is aimed at technical staff (those responsible for metrology service development and/or quality systems) from NMIs that have signed the CIPM MRA but not yet submitted CMCs (or are early in the process). Training will aim to help debutant NMIs achieve 'right first time' submissions into the CMC peer review system. Training will also give a deeper understanding of the global quality infrastructure and the role of its key elements. A session on priority setting will provide participants with a tool to set relevant metrology goals for their NMIs. This will help both optimize the NMI success rates and minimize the burden on the wider community that will conduct the reviews.

- **Course dates:**
13-24 November 2017, at the BIPM.

- **Programme:**
Preliminary agenda 

- **Course documents:**
Course materials 

- **Financial support:**
The course is fully funded by NIST. Support is available for selected applicants covering course participation fare, hotel costs and subsistence allowance.

Login information was sent to you



Course dates:

November 13 – 24, 2017

Monday to Friday, 09:00 – 17:00

Location:

BIPM, Pavillon du Mail

The BIPM CB&KT team contact details

Mr Andy Henson
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Email: andy.henson@gbipm.org
Phone: +33 1 45 07 62 72

Mr Chingis Kuanbayev
Office: Nouveau Pavillon, BIPM
Email: chingis.kuanbayev@bipm.org
Phone: +33 1 45 07 62 89

Our participants

Congratulations!

You are awarded a place at the course!!!

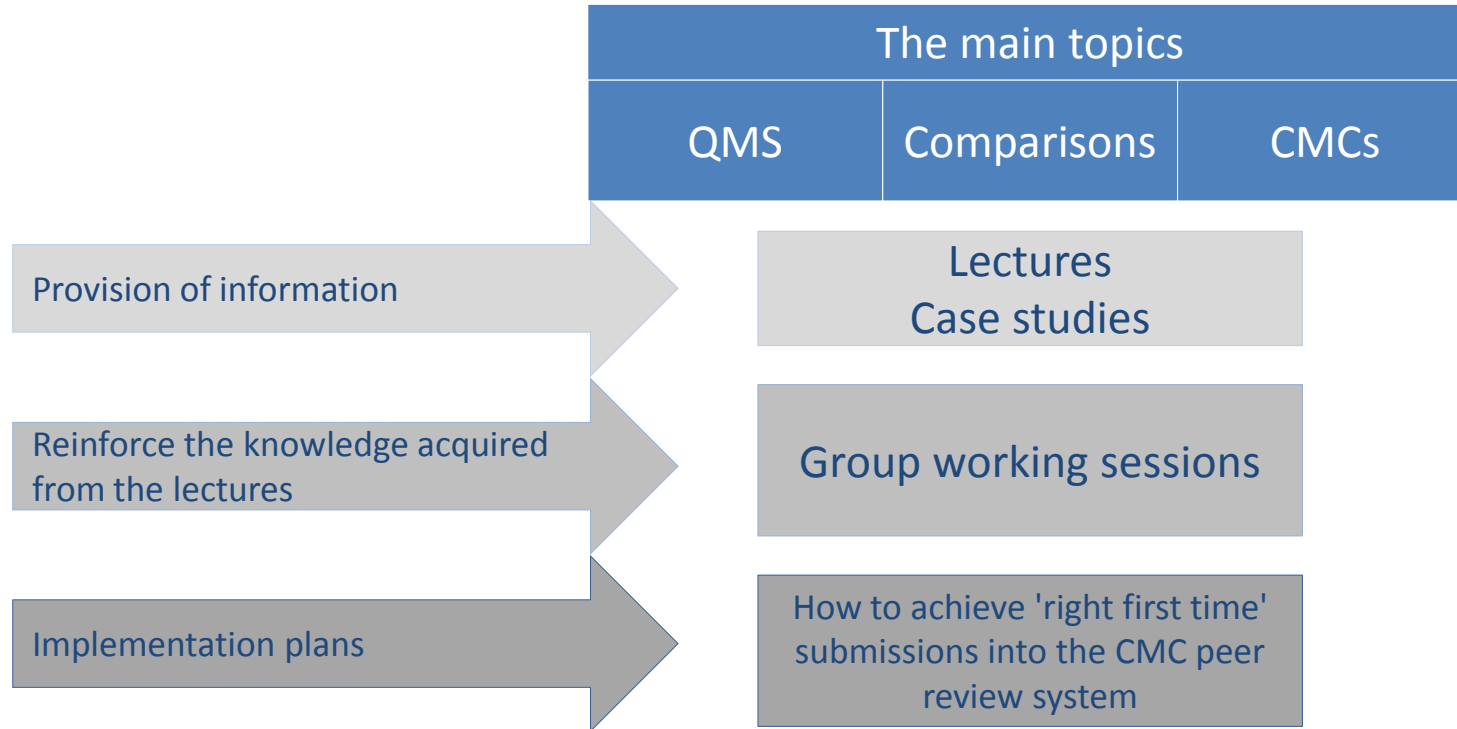
Title	First Name	Last Name	Cou	
1	Mohammed	HELMY Abd EL-RAOUF	Egypt	AFRIMETS - 9
2	Elchin	BABAYEV	Kenya	
3	Blessing	CHIBAYA	Namibia	
4	Richard	LAWRENCE	Tunisia	
5	Salgaduge Dinesh Indika	DIAS	Ghana	
6	María Lourdes	VALENZUELA ALDANA	Zambia	
7	Md. Masud	AL MAMUN	Zimbabwe	
8	César	SIGUENZA JIMÉNEZ	Egypt	
9	Mulugeta Derebew	DAMTEW	Ethiopia	
10	Muriira Geoffrey	KARAU	Bangladesh	APMP - 3
11	Davaa	DAMBASUREN	Mongolia	
12	Anatolii	BESCUPSCHII	Sri Lanka	
13	Robert	MEDFORD	Azerbaijan	COOMET - 3
14	Lassaad	ABENE	Moldova	
15	Ahmed	ALBREIKI	Azerbaijan	GULFMET - 2
16	Leevi	SAKEUS	United Arab Emirates	
17	Prince Nana Yaw	TAWIAH	United Arab Emirates	SIM - 7
18	Bahlul	SALMANOV	Costa Rica	
19	Oلمان	RAMOS	Ecuador	
20	Edison	CONDOR LAICA	Ecuador	
21	Victor Likando	MWAZI	Grenada	
22	Seifelnasr	OSMAN	Jamaica	
23	Majed	ALSENAIDI	Paraguay	
24	Francis	HAMILTON	Trinidad and Tobago	

Our Lecturers

Lecturer	Topic
Dr Clemens Sanetra	Importance of Quality Infrastructure Case study: QI Practical examples & Roles and Responsibilities
Ms Sally Bruce	SIM approach in quality systems and standards Roles of Designated Institutions
Dr Liza Karam	Specific guidelines for comparisons and CMCs in Thermometry
Dr Antonio Possolo	Developing uncertainty budgets including consistency with supporting evidence
Dr Karen Garrity	Specific guidelines for comparisons and CMCs in Thermometry
Prof. Noha Khaled	AFRIMETS approach in quality systems and specifics
Dr Ilya Budovsky	APMP approach in quality systems and specifics Specific guidelines for comparisons and CMCs in Electricity and Magnetism GW Session: Comparisons, CMCs
Dr Andreas Odin	COOMET approach in quality systems and specifics
Mr Mohammed Ahmed Al Mulla	GULFMET approach in quality systems and specifics
Dr Angelique Botha	Specific guidelines for comparisons and CMCs in Chemistry and Biology
Dr Stuart Davidson	Specific guidelines for comparisons and CMCs in Mass and related quantities
Mr Zijad Dzemic	Case study: How to organize a metrological laboratory GW Session: Quality Management System
Mrs Jessica Chavarría Sánchez	Case study: How to establish a quality system acceptable to RMO GW Session: Quality Management System
Mrs Manana Gelovani	Case study: How to participate effectively in comparisons GW Session: Comparisons
Dr Andrew Lewis	Specific guidelines for comparisons and CMCs in Length GW Session: CMCs
Prof. Philip N. Dearden	CIDT "Hitting the target" session
Mr Sean MacCurtain	Role of Standardisation (ISO) and ISO/IEC 17025
Mr Jason Koehn	Case study: Impacts of the CIPM MRA
Mr Ian Dunmill	Role of Legal metrology (OIML)
Mr Laurent Vinson	Role of Accreditation (ILAC)
The BIPM Staff	Metre Convention, BIPM, CIPM requirements...

More than 20 highly respected professional world experts, along with 8 staff from the BIPM, will share experiences on different topics.


Summary of the course



Learning outcomes

General Objectives

will enable to become highly effective and achieve 'right first time' submissions into the CMC peer review system.



♦ Completion of this course will enable you to:

- understand the global quality infrastructure role and its importance for national well-being
- understand the work of international organizations: BIPM, ISO, OIML and ILAC
- understand the international elements and aspects of scientific metrology
- understand the importance of the quality systems and how to implement ISO/IEC 17025
- understand the RMO perspectives on quality system review according to CIPM MRA requirements
- understand the CIPM MRA guidelines for comparisons and CMCs
- understand the specific guidelines for participation/managing comparisons and on how to prepare CMCs and to modify of CMCs in particular metrology areas
- understand the types of technical and quality evidence that underpin CMCs
- understand the inter-regional CMC review process through the JCRB website
- understand the KCDB search facilities and statistics
- implement best practices into your NMI/DI processes
- participate effectively in comparisons
- Even one day...effectively pilot comparisons!

Learning and lecturing activities

Lectures

We will discuss all aspects of metrology as well as its impact on goods and services at the national level, starting from: the global quality infrastructure; the history of the Metre Convention; the BIPM and the CIPM MRA; and finally by practical examples and case studies.

The training content is designed to support the three main aspects of the CIPM MRA: “Quality management systems”; “Measurement comparisons” and “Calibration and measurement capabilities (CMCs)”.

Lecturers will explain procedures and processes, but more importantly, they will give their personal perspective on the context and drivers related to their specific areas.

Topics include:

- **introductory section** - the global quality infrastructure and discussion of its key components (metrology, standardization and accreditation); Metre Convention and interaction with the Member States and Associates; CIPM MRA mechanisms and outcomes; the inter-regional CMCs review process; use of the KCDB.
- **focused topics** – implementation of ISO/IEC 17025, CIPM requirements and documentation on quality systems, measurement comparisons and CMCs. RMOs’ approaches in quality systems and specifics on the intra-regional CMC review process; Consultative Committees’ specific guideline documents on comparisons and CMCs.

Group work

- You will evaluate or review the “good” and “bad” examples of implementation of the requirements of ISO/IEC 17025.
- You will also demonstrate your understanding of the CIPM MRA requirements by participating actively in
 - quizzes*
 - calculation of KCRVs*
 - calculation of comparison results,*
 - preparation and modification of CMCs.*

Group activities will involve within-group discussions and presentations to the other groups.

Group	Title	First Name	Last Name
SB-A	Dr	Mohammed	HELMY Abd EL-RAOUF
	Mr	Elchin	BABAYEV
	Mr	Blessing	CHIBAYA
	Mr	Richard	LAWRENCE
	Mr	Salgaduge Dinesh Indika	DIAS
SB-B	Mrs/Ms	María Lourdes	VALENZUELA ALDANA
	Mr	Md. Masud	AL MAMUN
	Mr	César	SIGUENZA JIMÉNEZ
	Mr	Mulugeta Derebew	DAMTEW
	Dr	Muriira Geoffrey	KARAU
SB-C	Mr	Davaa	DAMBASUREN
	Mr	Anatolii	BESCUPSCHII
	Mr	Robert	MEDFORD
	Mr	Lassaad	ABENE
SB-D	Mr	Ahmed	ALBREIKI
	Mr	Leevi	SAKEUS
	Mr	Prince Nana Yaw	TAWIAH
	Mr	Bahlul	SALMANOV
	Mr	Olman	RAMOS
SB-E	Mr	Edison	CONDOR LAICA
	Mr	Victor Likando	MWAZI
	Dr	Seifelnasr	OSMAN
	Mr	Majed	ALSENAIDI
	Mr	Francis	HAMILTON

Case study



case studies

We will discuss case studies on:

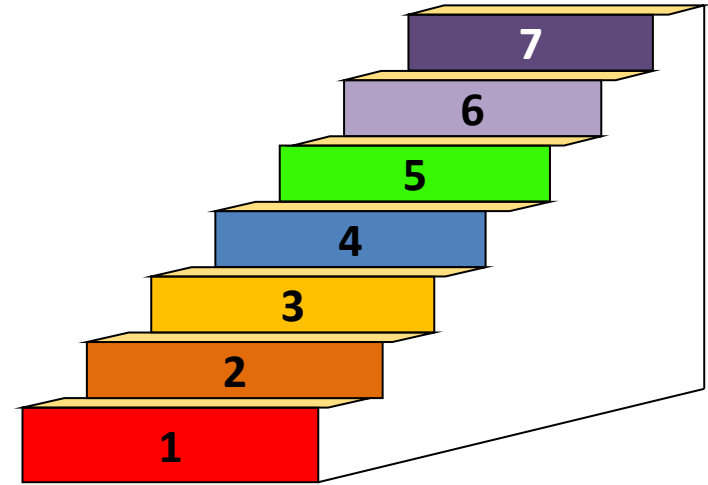
- practical examples of the quality infrastructure
- how a global corporation can benefit from the international equivalence of national measurement standards
- how to organize a metrological laboratory which responds to the needs of industry
- how to develop a quality system acceptable to RMOs
- how the developing laboratory participated in the comparisons and became a pilot
- practical steps from drawing to declaring CMCs

Session on priority setting

This session is described in two modules:

- On-line Distance Learning
- Project Design Working Session

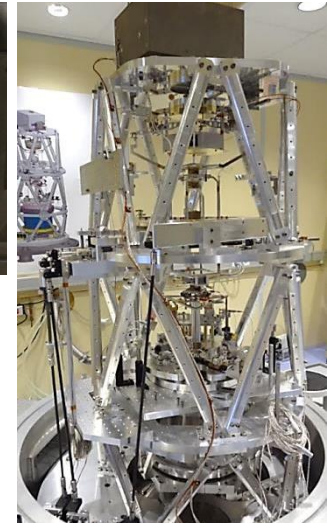
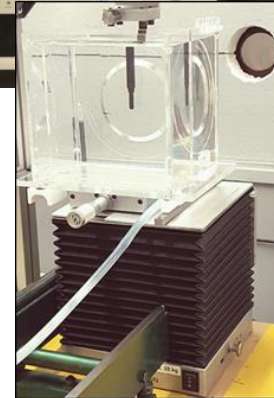
It is essential that you complete an on-line module before the face-to-face module!!!



- A second module will give you the opportunity to design your projects on:
 - quality systems
 - measurement comparisons
 - CMCs
- At the end of the training, your team presentations of the newly-designed projects will be given.

Laboratory visits

- ◆ There will be an opportunity to tour the BIPM laboratories which maintain international reference standards, lead selected comparisons, provide calibrations, and undertake research to contribute to the next generation measurement standards:
 - Time
 - Mass
 - Electricity
 - Ionizing radiation
 - Chemistry



Reading and training materials

The following documents are sufficient to read before the course:

CIPM MRA documents

- CIPM MRA
- The CIPM MRA: 2005 Interpretation Document
- Traceability in the CIPM MRA
- CIPM MRA-D-06 “Designated Institutes participating in the CIPM MRA: Expectations and nomination form”
- CIPM MRA-D-04 “Calibration and Measurement Capabilities in the context of the CIPM MRA”
- Uncertainty contributions of the device under calibration or measurement
- CIPM MRA-D-05 “Measurement comparisons in the CIPM MRA”
- CIPM MRA-G-02 “JCRB guidelines for the monitoring and reporting of the operation of quality systems by RMOs”
- BIPM, OIML, ILAC and ISO: Joint declaration on metrological traceability

CIPM MRA documents are available on the CIPM MRA documents page of the BIPM website at: <http://www.bipm.org/en/cipm-mra/cipm-mra-documents/>

Pupil: Teacher, would you punish me for something I didn't do?

Teacher: Of course not

Pupil: Good, because I didn't do my homework

Ideally participants should read the relevant course materials and documents before the course, which will provide background to the topic areas

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Course materials

File	Title	Author	Latest update	File type/ size
➤ SOUND/SB-01	Agenda		2017/11/03	PDF 631 kbytes
➤ SOUND/SB-02	List of participants		2017/11/03	PDF 397 kbytes
➤ SOUND/SB-03	List of lecturers		2017/11/03	PDF 638 kbytes
➤ SOUND/SB-day2	Readings for Day 2		2017/11/03	ZIP 3080 kbytes
➤ SOUND/SB-day3	Readings for Day 3		2017/11/03	ZIP 207 kbytes
➤ SOUND/SB-day4	Readings for Day 4		2017/11/03	ZIP 1026 kbytes
➤ SOUND/SB-day5	Readings for Day 5		2017/11/03	PDF 3107 kbytes

Presentations will be available on the restricted access CB&KT working page of the BIPM website
(Login information was sent last week)

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Course_materials

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➤	SOUND/SB-03	List of lecturers		2017/11/03	PDF 638 kbytes
➤	SOUND/SB-day2	Readings for Day 2		2017/11/03	ZIP 3080 kbytes
➤	SOUND/SB-day3	Readings for Day 3		2017/11/03	ZIP 207 kbytes
➤	SOUND/SB-day4	Readings for Day 4		2017/11/03	ZIP 1026 kbytes
➤	SOUND/SB-day5	Readings for Day 5		2017/11/03	PDF 3107 kbytes

Participation

Participation

You are expected to attend all sessions. **Session attendance will be recorded and reported to your home NMI.** Please notify the CB&KT team by e-mail if you are not able to attend a session.

At the completion of the course you will be asked to **submit a brief report** (no more than one page) about the course content, materials and your ambitions for applying the ideas in your NMI. These reports will be made public.

You will also be asked to complete the course evaluation form daily.

Certification of completion of the course

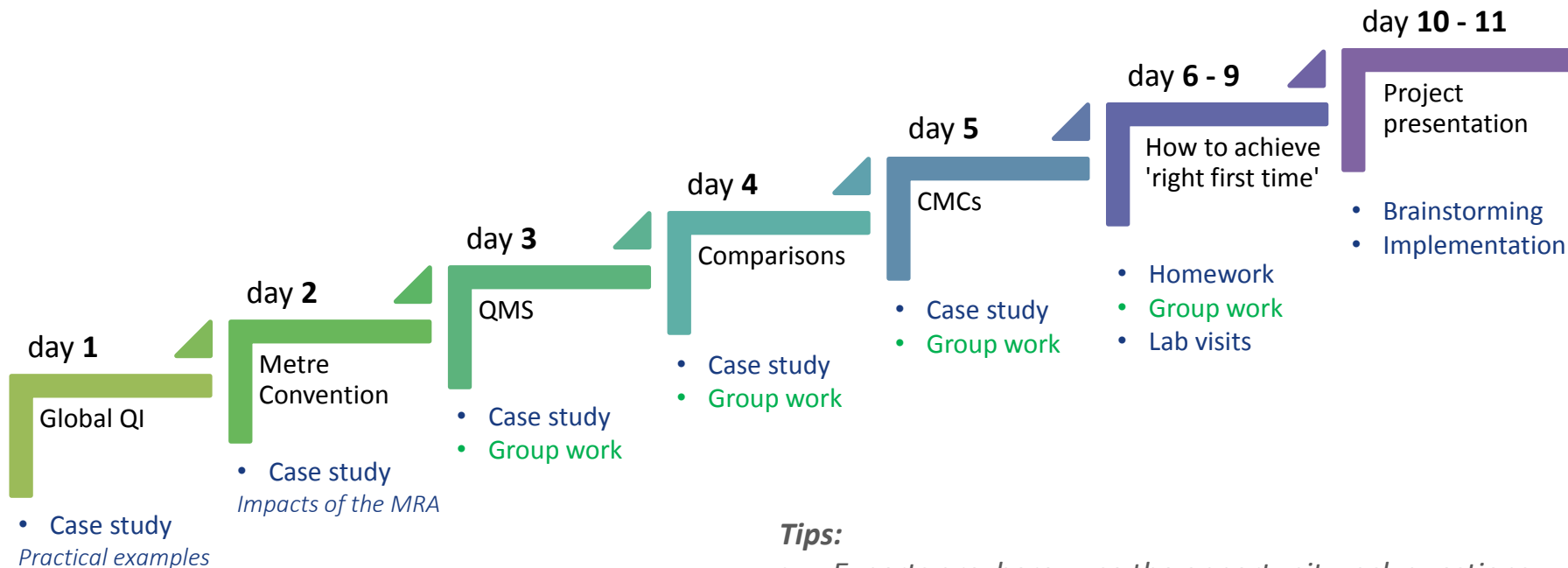
FINAL DAY: - you will be awarded with a Certificate of Completion of the **2017 "Sound beginning in the CIPM MRA" course.**

Effective learning can only take place when everyone actively participates and freely expresses his/her ideas as well as being enthusiastic and well prepared.

Ask, share, and challenge!



Agenda



Tips:

- *Experts are here - use the opportunity, ask questions*
- *Be active at the group working sessions*
- *Behave appropriately – and be here!*
- *On the day 10 start to write your brief report*

Thank you & **GOOD LUCK**

Lecturer: 'Bart, you know you can't sleep in my class.'

Bart: 'I know. But maybe if you were just a little quieter, I could!'

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Agenda: day 1

Date	Topic	Outline of content	Instructors
9:00 am	<i>Registration of the participants</i>		
Day 1 Monday Nov. 13	<i>Global Quality infrastructure and its key components</i>	Welcome and opening	Dr Martin Milton
		General intro to the course content	Mr Chingis Kuanbayev
		Global QI: General overview	Mr Andy Henson
		Importance of Quality Infrastructure	Dr Clemens Sanetra
		Role of Metrology (BIPM)	Mr Andy Henson
		Role of Accreditation (ILAC)	Mr Laurent Vinson
		Role of Legal metrology (OIML)	Mr Ian Dunmill
		Case study: QI Practical examples & Roles and responsibilities	Dr Clemens Sanetra
		<i>Free discussion</i>	Instructors
17:00 pm	<i>End of day 1</i>		

Welcome reception: 17:00 pm

Agenda: day 2

Date	Topic	Outline of content	Instructors
9:00 am	Introduction to the Metre Convention, the CIPM MRA and its role in the wider quality infrastructure	Metre Convention: Interactions with Member States and Associates	Dr Martin Milton
Day 2 Tuesday Nov. 14		CIPM MRA and its role in the QI	Mr Andy Henson
		Roles of Designated Institutes	Ms Sally Bruce
		CIPM Requirements and documentation	Mr Andy Henson
		JCRB: inter-regional CMC review process	Mr Nikita Zviagin
		Introduction of the KCDB	Dr Susanne Picard
		KCDB and Comparisons	Dr Susanne Picard
		KCDB and CMCs	Dr Stephanie Maniguet
		Statistics on the KCDB	Mr Nikita Zviagin
		KCDB 2.0	Dr Susanne Picard
		Case study: Impacts of the CIPM MRA	Mr Jason Koehn
	Free discussion	Instructors	
17:00 pm	End of day 2		

Agenda: day 3

Date	Topic	Outline of content	Instructors
9:00 am	Quality management systems Regional metrology organization approaches and specifics	Role of Standardisation (ISO) and importance of ISO/IEC 17025	Mr Sean MacCurtain
Day 3 Wednesday Nov. 15		CIPM requirements and documentation on quality system	Mr Andy Henson
		AFRIMETS approach in quality systems and specifics	Prof. Noha Khaled
		APMP approach in quality systems and specifics	Dr Ilya Budovsky
		COOMET approach in quality systems and specifics	Dr Andreas Odin
		GULFMET approach in quality systems and specifics	Mr Mohammed Ahmed Al Mulla
		SIM approach in quality systems and specifics	Ms Sally Bruce
		Case study: How to organize a metrological laboratory	Mr Zijad Dzemic
		Case study: How to establish a quality system acceptable to RMO	Mrs Jessica Chavarría Sánchez
		Group work on Quality: Establishing metrology laboratory	Mr Zijad Dzemic Mrs Jessica Chavarría
	Free discussion	Sánchez	
17:00 pm	End of day 3		

Group work

Quizzes and check lists on QS will be given to you!
Please, be active!

Agenda: day 4

Date	Topic	Outline of content	Instructors	
9:00 am	Measurement comparisons and Calibration and measurement capabilities (CMCs)	CIPM Requirements and documentation on comparisons	Mr Chingis Kuanbayev	
Day 4 Thursday Nov. 16		Specific guidelines for comparisons and CMCs in Electricity and Magnetism	Dr Ilya Budovsky	
		Specific guidelines for comparisons and CMCs in Chemistry and Biology	Dr Angelique Botha	
		Specific guidelines for comparisons and CMCs in Mass and related quantities	Dr Stuart Davidson	
		Specific guidelines for comparisons and CMCs in Thermometry	Dr Karen Garrity	
		Measurement comparisons (Planning and monitoring)	Dr Carine Michotte	
		Measurement comparisons (Calculation of reference values and associated uncertainties)	Dr Richard Davis	
		Focus on Comparisons	Case study: How to participate effectively in comparisons	Mrs. Manana Gelovani
			Group work on Comparisons: How to participate in comparisons? How to pilot a comparison? Free discussion	Dr Ilya Budovsky Mrs. Manana Gelovani
17:00 pm	End of day 4			

Group work

Questions and equations on comparisons will be given to you!
Please, be active!

Agenda: day 5

Date	Topic	Outline of content	Instructors
9:00 am		CIPM Requirements and documentation on CMCs	Mr Nikita Zviagin
Day 5 Friday Nov. 17	Measurement comparisons and Calibration and measurement capabilities (CMCs)	Specific guidelines for comparisons and CMCs in Ionizing Radiation	Dr Liza Karam
		Specific guidelines for comparisons and CMCs in Length	Dr Andrew Lewis
		Measurement traceability	Mr Andy Henson
		Developing uncertainty budgets including consistency with supporting evidence	Dr Antonio Possolo
		Submission of CMCs for inter-regional review through the JCRB	Mr Nikita Zviagin
	Focus on CMCs	Case study: From drawing CMCs to publication (practical examples)	Dr Ilya Budovsky
		Group work on CMCs: How to prepare CMCs and how to modify it? Free discussion	Dr Andrew Lewis Dr Ilya Budovsky
17:00 pm	End of day 5		
Day 6 Saturday Nov. 18	Homework: projects on Quality Systems, Comparisons and CMCs		Participants

Group work

You will prepare CMCs using CIPM MRA guidelines and specifics of CCs.
Please, be active!

Agenda: day 6-9

Date	Topic	Instructors
9:00 am		
Day 7 Monday Nov. 20	CIDT "Hitting the target" session	Prof. Philip N. Dearden
17:00 pm	End of day 7	
	Lab visits: TAI, Electricity	
9:00 am		
Day 8 Tuesday Nov. 21	CIDT "Hitting the target" session	Prof. Philip N. Dearden
17:00 pm	End of day 8	
	Lab visits: Mass, Kibble balance	
9:00 am		
Day 9 Wednesday Nov. 22	CIDT "Hitting the target" session	Prof. Philip N. Dearden
17:00 pm	End of day 9	
	Lab tour: IR, Chemistry	Dr Steven Judge Dr Robert I. Wielgosz

Design your projects on

- quality systems,
- comparisons and
- CMCs

Please, be active!

Agenda: day 10

Date	Topic	Instructors
9:00 am		
Day 10 Thursday Nov. 23	<i>CIDT "Hitting the target" session wrap up</i>	Prof. Philip N. Dearden
	Overview of the course	Mr Andy Henson
	Project presentation: QS, Comparisons and CMCs (20 min/project)	Group A
	Brainstorming on implementation plans	Mr Andy Henson Prof. Philip N. Dearden
	Project presentation: QS, Comparisons and CMCs (20 min/project)	Group B
	Brainstorming on implementation plans	Mr Andy Henson Prof. Philip N. Dearden
	Project presentation: QS, Comparisons and CMCs (20 min/project)	Group C
	Brainstorming on implementation plans	Mr Andy Henson Prof. Philip N. Dearden
17:00 pm	<i>End of day 10</i>	

Team presentations of the newly-designed projects will be given.

Please, be active!

Please start to write your brief report!!!

Agenda: day 11

Date	Topic	Instructors
9:00 am	Project presentation: QS, Comparisons and CMCs (20 min/project)	Group D
Day 11 Wednesday Nov. 24	Brainstorming on implementation plans	Mr Andy Henson Prof. Philip N. Dearden
	Project presentation: QS, Comparisons and CMCs (20 min/project)	Group E
	Brainstorming on implementation plans	Mr Andy Henson Prof. Philip N. Dearden
	Free discussion, Course wrap up	Mr Andy Henson Prof. Philip N. Dearden
	Diploma ceremony	CIPM Member Mr Luc Erard
17:00 pm	Close of the course	

Team presentations of the newly-designed projects will be given.

Please, be active!

Group photo

Submit your report!

