

Terms of References for Trainers for Professional Short Courses in Biomedical Engineering

I. BACKGROUND AND JUSTIFICATION

Biomedical Engineering is one of the key areas on which the East African Community Regional Centre of Excellence in Biomedical Engineering, E-Health, Rehabilitation and Mobility Sciences (CEBE) is focusing. The CEBE aims to increase the knowledge and skills of Biomedical Engineering workforce in Rwanda and other East African countries for enhanced capacity for Healthcare Technology Systems management, which is currently quite limited. It is expected that with the built capacity, the technical personnel will be able to design, develop, repair, maintain, troubleshoot and calibrate medical equipment and evaluate healthcare equipment systems in the health facilities. The outcome of this endeavour will be an improved healthcare service delivery.

2. Overall Goal of the short course trainings

The purpose of this Biomedical Engineering capacity building trainings is to strengthen the knowledge and skills in Rwanda and in the Region for the development and management Medical equipment and applications and systems in collaboration with different partners such as MoH and RBC.

3. **The specific objectives** of the e-health capacity building trainings are as follows:

3.1 Design teaching materials and upload them on the e-learning platform of the University of Rwanda for any or all of the following five selected e-health short courses:

- i. Healthcare Technology Management
- ii. Hospital Design
- iii. Service, Repair and Maintenance of:
- iv. Respiratory, monitoring and cardiac equipment
- v. Laboratory equipment
- vi. Maternity and neonatology equipment
- vii. Medical imaging equipment
- viii. Dental equipment
- ix. Ophthalmology equipment
- x. Medical gases system
- xi. Hemodialysis Machine

3.2 Deliver any or all of the five short courses as mentioned above and detailed in Annex 1.

ANNEX 1: PROFESSIONAL BIOMEDICAL ENGINEERING SHORT COURSES TO BE DELIVERED

Course and Objectives	Content	Requirements of the trainer
A. Healthcare Technology Management		
<ul style="list-style-type: none"> • Provide advanced skills in Healthcare Technology Management to health care professionals for service delivery and training others. 	<ul style="list-style-type: none"> • Technology assessment • Medical equipment software management • Professional development • Quality management • Advanced planning and budgeting of medical equipment • Purchasing procedures, stores supply and control • Workshops management ,staff development and equipment disposal management 	<p>PhD in Biomedical engineering, Biomechanical Engineering, Bioengineering or Mechanical engineering, Electrical/Electronic engineering, with a minimum of 3 years' experience in Healthcare Technology Management (HTM)</p> <p>Or Master's degree in Biomedical engineering, Biomechanical Engineering, Bioengineering or Mechanical engineering, Electrical/Electronic engineering with 8 years experience in Healthcare Technology Management (HTM).</p>
B. Hospital Design		
<ul style="list-style-type: none"> • Facilitate participants to acquire advanced knowledge in the Hospital design and environment. 	<ul style="list-style-type: none"> • Hospital environment concept, • department connection and building accessibility • Electrical and mechanical ventilation • Hospital furniture infection prevention and control. 	<p>PhD degree in Biomedical Engineering, Environmental Design, Civil Engineering or Architecture with minimum 3 years experience in Hospital design training.</p> <p>Or Master's degree in Biomedical Engineering, Environmental Design, Civil Engineering or Architecture with minimum 8 years' experience in Hospital design training.</p>
C: Service, Repair and Maintenance of Medical Equipment		
<ul style="list-style-type: none"> • Provide advanced skills and competency for biomedical engineers and technicians in management of high-tech medical equipment; • Train participants in servicing, installation, repair and maintenance of the medical equipment 	<p>1.Respiratory, monitoring and cardiac equipment: Patient ventilator, CPAP machines, Nebulizer, defibrillators, Patient monitor, ECG machines, EEG,EMG</p>	<p>Masters holder in Biomedical Engineering and related fields with minimum hands-on experience of 8 years in physiological signal monitoring equipment as a trainer.</p>
	<p>2.Laboratory equipment: Automated laboratory equipment, Biochemistry, Haematology, Parasitology equipment, Serology, Biosafety cabinets, And others</p>	<p>Master's degree in biomedical laboratory sciences or related field with a minimum experience of 8 years as professional trainer in the field of medical laboratory equipment troubleshooting, maintenance and management.</p>
	<p>3.Maternity and neonatology equipment: Infant incubator, Infant warmer, Phototherapy machine, CTG Machine, CPAP machine</p>	<p>Master's degree in biomedical engineering, electrical/electronic engineering with 8 years' experience as professional trainer in maternity and neonatology equipment troubleshooting, maintenance and management.</p>

Course and Objectives	Content	Requirements of the trainer
	4. Medical imaging equipment: Ultrasound machine Magnetic Resonance (MRI), General x-ray and Mammography, Angiograph, PET CT, CT scanner ,Gama camera, Leaners accelerator	PhD in medical imaging technology, biomedical engineering, medical imaging equipment with 3 years of work experience or Master's degree with 8 years' experience as professional trainer in the field of medical imaging equipment troubleshooting, maintenance and management.
	5. Dental equipment Dental chair, Dental x-ray, Orthopantogram, Film processor	Master's degree in biomedical engineering with 8 years of work experience as professional trainer in the field of dental equipment troubleshooting, maintenance and management
	6. Ophthalmology equipment Slit lamp, Eye Scanner machine, Operating microscopy	Master's degree in biomedical engineering with 8 years of work experience in the related as professional trainer in the field of ophthalmology equipment troubleshooting, maintenance and management.
	7. Medical gases system Medical gases codes and standards, Medical gases piping system, Compressed medical gases, Medical oxygen plant, Medical gases storage , system, Oxygen concentrator, Vacuum system	Master's degree in Biomedical engineering or related field of engineering with 8 years' experience as professional trainer in the field of medical gases system troubleshooting, maintenance and management.
	8. Hemodialysis Machine Water treatment system, (OR) dialysis pumping system, maintenance of generator , calibration and testing of the unit	Master's degree in biomedical or electronic engineering, nephrology technology with 8 years' experience as professional trainer in the field of hemodialysis machine troubleshooting, maintenance and management

General Requirements

- Demonstrated experience as a lead person for a minimum of three similar projects including design, develop, implement and evaluate Biomedical Engineering systems.
- Strong data analysis expertise, including software and knowledge of significance testing and high level statistical analysis
- Previous experience working in Rwanda (or similar context) highly desirable
- Cultural sensitivity and strong inter-personal skills essential;

- Demonstrated facilitation and training skills required
- Management, planning, coordination, organization, and facilitation skills
- Flexibility and complete availability for the duration of the assignment
- Spoken and written fluency in English is a requirement; spoken and written French is an advantage
- Flexibility, tenacity and results-oriented approach essential for success.
- Experience of working in low resources settings

II. DESIGN OF TEACHING MATERIALS AND MODE OF COURSES DELIVERY

The training consultant will employ rigorous and varied methods of training and research to achieve this task. The mode of delivery shall ensure that there is transfer of skills to the trainees for sustainability purposes. The trainees should demonstrate the capacity to be future designers, developers, implementers, users and evaluators of e-health systems in Rwanda and the Region.

III. RESPONSIBILITIES

The consultant is expected to undertake the following tasks based on the CEBE approved objectives and content of the short courses:

1. Design teaching materials for the following short courses;
 - Healthcare Technology Management
 - Hospital Design
 - Service, Repair and Maintenance of:
 - Respiratory, monitoring and cardiac equipment
 - Laboratory equipment
 - Maternity and neonatology equipment
 - Medical imaging equipment
 - Dental equipment
 - Ophthalmology equipment
 - Medical gases system
 - Hemodialysis Machine
2. Deliver the short courses mentioned above in collaboration with University of Rwanda lecturers

4. PERIOD OF PERFORMANCE

For each training, the start and the end date will be agreed upon between CEBE and the consultant. The consulting services will start from the date the contract is signed till the end of the agreed period for service provision.

5. REPORTING REQUIREMENTS

A detailed work plan with clear deliverables and milestones must be submitted within 2 weeks of the contract agreement. The consultant will be requested to report the progress and performance according to the contract. The final report for the whole assignment will be given as stipulated in the contract.

6. SKILLS TRANSFER

The consultant will be an experienced expert in e-health like in the design, development, implementation and evaluation of e-health innovations, and therefore will be required to transfer skills during the period of execution of the assigned tasks.