WMO OMM

World Meteorological Organization
Organisation météorologique mondiale
Organización Meteorológica Mundial
Всемирная метеорологическая организация
المنظمة العالمية للأرصاد الجوية
世界气象组织

Secrétariat
7 bis, avenue de la Paix – Case postale 2300
CH 1211 Genève 2 – Suisse
Tél.: +41 (0) 22 730 81 11
Fax: +41 (0) 22 730 81 81
wmo@wmo.int – public.wmo.int

Our ref.:	13963/2021/MS/ETFD/FEL	25 June 2021
Annexes:	3 (available in English only)	

Subject:	Blended Group Training on Numerical Weather Prediction at the Regional Training Centre of the Egyptian Meteorological Authority, Egypt, from 4 October to 4 November 2021
Action required:	For information and appropriate action, as necessary

Dear Sir/Madam,

I wish to refer to the World Meteorological Organization's (WMO) circular letter, dated 28 January 2021, ref. 00597/2021/MS/ETFD about the WMO Education and Training Opportunities (2021), which announced that in 2021 and 2022, WMO will organize blended group training on Numerical Weather Prediction (NWP) in different WMO Regions and official languages.

The course is aimed at personnel whose work relates to NWP as it will equip participants with knowledge and practical skills in this field. The blended courses will be composed of two parts, namely, the online phase and the follow-up on-campus phase in the Regional Training Centre (RTC) premises. The online part will focus mainly on theory. The on-campus phase will consolidate the theoretical knowledge and conduct the practical curricular which are difficult to instruct online.

I am pleased to inform you that after intensive discussions with RTC, the online part of blended group training on NWP at RTC Egypt hosted by the Egyptian Meteorological Authority (EMA) will be held from 4 October to 4 November 2021. The course will be conducted in English.

WMO Members of Regional Association I and Arabic speaking Members in Regional Association II are invited to nominate candidates for the tailored courses to build the capacity of service delivery personnel. To ensure the teaching quality, Members are invited to kindly nominate up to three candidates. Applications from women and men are equally sought. The nomination will commit to guaranteeing that participants will be available to attend all live sessions, and have sufficient time allocated for the completion of all self-study modules. The time commitment for each participant is expected to be around 20 hours per week for attending live sessions and completing self-study modules and exercises. Each participant needs to have access to an individual computer or laptop, with a reliable internet connection, which allows streaming of video and sound, as well as connection to remote servers to complete self-study modules.

To:	Permanent Representatives of Members of Regional Association I and II (limited distribution)
cc:	Hydrological Advisers

Please note that the on-campus participants will only be selected from the online session participants. The on-campus session will be announced to the selected participants in due course.

Candidates should first apply to RTC Egypt with the RTC Egypt Nomination Form (Annex III) and send the form to mohamedtawfik99@hotmail.com no later than **18 September 2021** to acquire the admission letter, then send to WMO the Fellowship Nomination Form (FNF) (https://community.wmo.int/fellowships-applications) and the admission letter to fel@wmo.int no later than **28 September 2021**. Detailed course plan and related information are in Annexes I and II.

I would like to express my appreciation for your continued support to the WMO activities.

Yours faithfully,

Prof. Petteri Taalas
Secretary-General

Egyptian Meteorological Authority, Egypt

1	**Host Member**	**Egypt**
2	Host institution(s)	WMO Regional Training Centre Egyptian Meteorological Authority (EMA)
3	Website	www.nwp.gov.eg (temporary out of service for upgrade)
4	Location(city) of Institution(s)	Cairo
5	Address of Institution	Koubri El-Ouobba, PO Box 11784, Cairo, Egypt
7	Course type	Online course
8	Main course content	• Atmospheric observing system; • Numerical methods and forecasting models; • Meteorological data format and processing; • Data assimilation and NWP parameterization.
9	Duration of study	Online phase: 5 weeks Possible follow-up on-campus course: 6 weeks
10	Course start date	Online phase: 4 October to 4 November 2021 Possible follow-up on-campus course in 2022
11	Target Region and Members	RA I Members RA II Arabic Developing Members
12	Basic Requirements	Meteorologist with BSc degree or equivalent, with 2-year working experiences
13	Language	English
14	Number of awards	30 Follow-up on-campus course: 15
15	Institution Online application	Optional
16	Admission from Institution	Mandatory
17	Application forms send to WMO	1. WMO FNF 2. Pre-admission letter from host institution
18	Applications close date	RTC: 18 September 2021 WMO: 28 September 2021
19	Contact info	Mr Mohammed Tawfik Email: mohamedtawfik99@hotmail.com

_____

Interpretation and Use of Numerical Weather Prediction (NWP) products in operational weather forecasting

Course Description

The course gives the participants the ability to deal with the components of the Numerical Weather Prediction (NWP) cycle and provides them with the ability to analyse the outputs of the model and use them in operational weather forecasting.

Target Audience

Meteorologists who use NWP models or want to enhance their skills in NWP models usage in weather forecasting.

Participant Qualifications for Admission

Participants are required:

(1)   To have a BSc in mathematics or physics; and a meteorologist course or a BSc in meteorology.

(2)   To have worked as a meteorologist for at least two years in weather forecast or related.

(3)   To have the experience to operate Linux and have programming skills (Shell Script – Fortran).

Language

Both teaching and course documents will be in English.

Format

Lectures, lab sessions, group discussions, participants' presentations etc.

Instructors

Academic staff and numerical weather prediction senior staff at EMA will teach and train the participants.

Resources

Reputable textbooks in mathematics, numerical weather modelling and weather forecasting will be used in teaching.

Course Fees

The course will be free of charge for participants from African countries and developing countries.

1.   Online Course: 5 weeks - 100h

The course will be a 4 hour live session every day from Sundays to Thursdays. The web discussion session contains study materials.

Expected Learning Outcomes

At the end of this course, the participants:

(1)   Gain sufficient knowledge of the fundamentals of NWP;

(2)   Are able to:

    (a)   Interpret models' output and how to use them in issuing weather forecasts;

    (b)   Perform post-processing of model output;

    (c)   Install the NWP model and configure it (for face-to-face part);

(3)   Have the ability to perform model verifications and validations and calibrating different models over particular geographical domains.

Online Course Outline

Atmospheric observing system (20h)

- Surface weather observation (4h)

- Upper air, satellite observation, and weather radar (4h)

- Earth-System reanalysis (4h)

- Accuracy and errors in meteorological observations (4h)

- Homogeneity and statistical analysis of data (4h)

Numerical Methods and forecasting models (32h)

- Review of dynamical meteorology (4h)

- Finite difference and Truncation errors (4h)

- Iterative methods (relaxation techniques, etc.) (4h)

- Special methods for NWP (4h)

- Overview of NWP models (Global, Regional, and local) (4h)

- Ensemble Forecasts and Extreme events (4h)

- Statistical procedures for NWP Evaluation and verification (4h)

- Shortcomings and sources of error in NWP models (4h)

Meteorological Data Format and Processing (28h)

- Data Formats (netCDF, HDF, GRIB, Binary and ASCII) (4h)

- Data Visualization tools (Grads, NCL, etc.) (8h)

- Data analysis and operational tools (CDO, NCO, etc.) (8h)

- Visualize of NWP models outputs (8h)

Data assimilation and NWP parameterizations (20h)

- Data assimilation methods (4h)

- NWP parameterizations (Physical, Convective, Radiation, etc.) (16h)

Online course assessment

This will be during the lectures and activities with a final exam at the end of the online course.

The first fifteen participants who succeed in the online course will be allowed to attend the course face to face.

2.   Face to Face Course Outline: 6 weeks - 150h

The course will be 5 hours every day and can be extended to 7 hours depending on the status of the participants

Linux OS and FORTRAN (25 h)

- Linux systems and Core (2h)
- Installing and configuring a Linux Operating system (OS) and Basic Commands (10h)
- Shell Scripting and Linux editor (Vim, etc.) (3h)
- FORTRAN Programming Language and exercises (10h)

Weather Research and Forecasting (WRF) Model (75h)

- Introduction to WRF Model and Application (5h)
- WRF Model structure, Dynamical cores, and Physical schemes (5h)
- WRF-ARW configuration and compilation (8h)
- WRF Initial and lateral boundary conditions (5h))
- WRF Pre-Processing System (WPS) and WRF name lists options and domain (10h)
- Performing a WRF model simulation and forecasting procedures (10h)
- Compiling WRF for nesting domains (one-way and two-way options) (8h)
- Building a WRF model forecasting system (Automatic Scripts) (8h)
- WRF Portal and Domain Wizard compilation and run (8h)
- WRF-Solar configuration and compilation (8h)

WRF Post-Processing Application and Visualization (25h)

- ARW post Configuration and Compilation (3h)
- ARW post Name list options for pressure levels interpolation and extrapolation (2h)
- ARW post driving fields (5h)
- Building a display system for WRF model output (Grads, NCL scripts) (5h)
- Interpreting WRF Products to identify weather parameters (5h)
- Different operations on WRF model output using CDO, NCO, NCL, etc. (5h)

Projects

- Divided the participants into five groups
- From the second week, an additional hour every week for the project
- The last week to complete projects and evaluations.

Assessment (Projects: (10 hours) (Week no. 6))

Participants' involvement and contribution will be continuously assessed during lectures and lab sessions. Before the end of the course, participants will be divided into five groups; each group will work on a project that will reflect their understanding of the course. Each group will be asked to prepare a presentation of their work on the respective projects.

_____

Ref.: 13963/2021-1.1 MS/ETR

RTC Egypt
Application form

personal photo
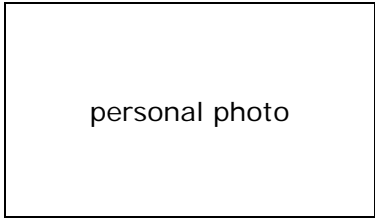
Type of applicant:	Organization ☐	Individual ☐

Programme: From: To:

Applicant's information

Name ....

Nationality ....

Date of birth: ....

Gender: Male ☐   Female ☐☐Female

Educational background

....
....

Job Title / description: -

....
....
....

Organization / company information

Name ....
....

Address ....
....

Tel.:   Fax: email:

Type of organization

Manufacturing ☐	Serviced ☐	Government corporation ☐
Private Co ☐	NGO ☐	☐

Ref.: 13961/2021-1.1 MS/ETR

Other Specify: ....
English Proficiency: Excellence ☐   Very Good   ☐   Good ☐
What are the topics/constraints you would be interested in discussing during the programme?
1- ....
2- ....
Payment method ☐   Cash with application form   ☐   Cheque with application form ☐   Before the programme starts , when ....
This Application form is approved by:

Name:	Signature :	Date :

This application form has to be returned not later than **27 July 2021**

_____