**CARIBBEAN INSTITUTE FOR METEOROLOGY AND HYDROLOGY**



**ANNUAL MEETING OF DIRECTORS OF METEOROLOGICAL SERVICES Doc.3 VIRTUAL MEETING, 18 NOVEMBER 2020**

**TRAINING**

(Submitted by the Principal)

**Introduction**

1. There was no change in the meteorological teaching compliment for the reporting period. During the early stages of the reporting period, the Meteorological Section of the Caribbean Institute for Meteorology and Hydrology (CIMH) was initially focused on the completion of the transition of the University of the West Indies (UWI), Cave Hill Campus meteorology courses to the 3-credit format, re-evaluating the Senior-level Meteorological Technician (SLMT) course, the operations of the 2020 Entry-level Meteorological Technician (ELMT) course, Mid-level Meteorological Technician (MLMT) and providing in-country training, in Cayman Brac in January.

2. In March, everything including teaching was dominated by effects brought on by the COVID-19 pandemic. As Barbados shutdown and the Institute closed to face to face training the CIMH lecturers at every level quickly transitioned to online training while dealing with personal adjustments brought on by the pandemic.

3. Due to the pandemic all lectures had to be converted to PowerPoints, there was also the need to engage with the myCIMH Moodle platform, converting a home space to a teaching space, all while dealing with family issues. Years of conducting classes online made the process easier.

4. Like training institutions worldwide, COVID-19 has invariably changed the methods of teaching, and virtual training is and will be part of the methodology of teaching at CIMH. It has to be noted that the CIMH curriculum is heavily practical and it was challenging in a virtual format. It has forced the lecturers to be innovative and utilize technology to convey the knowledge. However, it was clear that to ensure the required competencies, practical classes and class assessments needed to be conducted in face to face fora.

**A. UWI Credit Restructuring**

5. The draft transition plan to the new 3- credit UWI Meteorology department programme was completed and submitted to the UWI Academic Qualify Assessment Council (AQAC) on time and it has been accepted. While the programme reduces the number of teaching hours of the courses, care was taken to ensure that the programme still addresses the need for qualified meteorological, climate and environmental scientists in the region. It still adheres to the World Meteorological Organization definition of a meteorologist as:

*“a person who has successfully completed the Basic Instruction Package for Meteorologists (BIP-M) requirements at university-degree level;”,[[1]](#footnote-1)*

6. The Bachelor of Science Major in Meteorology is designed to fulfil the academic requirements, basic competencies and training requirements needed for students to become internationally recognised meteorologists. The programme is structured so that the Level 1 courses introduce the fundamental topics of theoretical and practical meteorology and climate, with the introductory courses in physical, synoptic and dynamic meteorology. Students must take the Level 1 calculus courses which are essential for progression through the advanced meteorology courses. Given the growing use of computer technology in atmospheric sciences, students are also advised to take a course in computer science in order to gain exposure to computer programming and to fulfil the prerequisite requirement for the new Numerical Weather Prediction course offered in Level 3.

7. At Level 2, the core courses of *Atmospheric Thermodynamics, Synoptic Meteorology,* and *Dynamic Meteorology* build on the introductory course work and pave the way for the final year. These courses are all mathematically based, they explain the atmospheric processes, and seek to develop the building blocks of understanding weather systems. In the final year, the concepts are merged and, while the courses have very different foci, they combine to enable students to develop a well-rounded understanding of the physical, dynamic and synoptic characteristics of the atmosphere, the weather, and the weather systems that dominate our global sphere. An important aspect of meteorology is the various methods of weather and chart analyses, which are critical in visualizing weather systems, their patterns, their atmospheric dynamics, and development thus*,* lab periods, had to be secured under the new programme. In this revised format, the *Synoptic Meteorology Lab* courses are introduced as individual courses at Levels 2 and 3. This is advantageous for students as it allows them more time to explore manual and computer-based analysis.

8. Due to the 3-credit change a large subject area had to be removed from Dynamics Meteorology. This permitted the introduction of the new course *Numerical Weather Prediction* (NWP) *and Computational Methods* to be introduced at Level 3, which allows the inclusion of progressive computer programming and explores data assimilation into NWP models; NWP forecast models, the strengths and weakness of NWP and monthly and seasonal models. This course will require some knowledge of computer programming.

9. The *Weather* *Radar and Satellite Meteorology* course has been separated to allow better coverage of the growing technologies in these areas of meteorology. *Weather Radar* and *Satellite Meteorology* are essential requirements for any student wishing to pursue further studies in weather forecasting and aeronautical meteorology. The other electives in the programme remain the same. *Hydrometeorology* introduces students to a growing field of hydrology: the study of surface and groundwater flows, and the relationships between weather and terrestrial water flows. It should be noted that experts in hydrology and hydrometeorology are few in the region. It is hoped that this can fuel further interest in hydrology and fulfil the growing need for hydrologists regionally.

10. *A Climate, Biosphere and Ecosystems* course has been introduced and it allows for the examination of the role of climate in the distribution of natural vegetation across the globe as well as its role in the development and function of crops, animals and aquatic life.

11. Further there is a need to add more courses to the programme to cover topics that had been removed from the Dynamics Meteorology course. There is also an immediate need to create a Mathematics for Meteorology course to replace the Calculus A and B courses at UWI.

**B. Courses Completed**

12. The 2019 - 2020 reporting period saw the completion and graduation of students from the following WMO vocational training courses offered at CIMH:

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| **Aeronautical Continuing Professional Development Course 7/19 (On-line)** |
| **Duration of Cost** | **Number of Students** | **Grades** |
| September 2019 to March 2020 | 2 from Barbados, 2 from the Cayman Islands, 2 from St. Maarten. | All Credits |
| **Entry Level Technicians Course No.90/20** |
| **Duration of Cost** | **Number of Students** | **Grades** |
| March 2020 – July 2020 | 2 from Anguilla, 1 from Barbados, 1 from Dominica, 3 from Grenada, 2 from Guyana, 1 from Montserrat, 1 from St. Kitts; 1 from CIMH  | 5 Credits7 Passes |
| **Operational Aeronautical Forecasting Course No. 07/20** |
| **Duration of Cost** | **Number of Students** | **Grades** |
| June 2020 to July 2020 | 3 from Barbados, 1 from Grenada, 1 from Jamaica, 1 from Saint. Lucia, 1 from Trinidad, 1 from the Turks and Caicos  | 1 Distinction, 5 Credits, 1 Pass, 1 Pass**\***  |
| **University of the West Indies, Cave Hill Meteorology Program - Majors in Meteorology** |
| **Semester** | **Number of Students** | **Grades** |
| January 2020 | 1 from the Bahamas | 2 Upper Second Class Honours, 3 Passes |
| May 2020 | 2 from Barbados, 1 from Dominica, 1 from Jamaica |

 **\*** The person failed the competency component of the course.

**C. Courses in Progress**

13. At the Cave Hill Campus, there are currently there are 75 students registered for the Meteorology courses, with 35 registered as Meteorology majors.

**Mid- Level Technicians Course No.46/20**

**Duration:** March 2020 – November 2020

6 students in total: 1 from Barbados; 1 from Belize; 2 from Jamaica; 1 from Saint. Lucia; and 1 from St. Maarten;

**UWI BSc. Degree Program**:

**Duration**: September to December 2020

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| --- | --- |
| **Course** | **Number of Students** |
| METE1110 Introduction to Oceans & Climate | 46 students - Blended |
| METE1125 Meteorological Observations, Instruments and Basic Analysis | 8 students - Blended |
| METE1130 Introduction to Physical Meteorology | 8 students - Online |
| METE2110 Atmospheric Thermodynamics | 2 students - Blended |
| METE2125 Dynamic Meteorology I | 5 students - Online |
| METE2305 Fundamentals of Hydrometeorology | 0 students |
| METE3110 Advanced Dynamic meteorology | 9 students - Online |
| METE3210 Advanced Synoptic Meteorology | 9 students - Online |
| METE3215 Synoptic Meteorology Lab 1[[2]](#footnote-2) | 9 students - Blended |
| METE3410 Radar Meteorology[[3]](#footnote-3) | 5 students - Online |

14. In addition to some of the above courses which continue into 2020, the following courses will commence the next reporting period:

**UWI BSc. Degree Programme**

**Duration**: January to May 2021

* METE1125 Meteorological Observations, Instruments and Basic Analysis
* METE1135 Introduction to Dynamic Meteorology
* METE1305 Introduction to Climate Change and Society
* METE2120 Physical Meteorology
* METE2210 Synoptic Meteorology
* METE2215 Synoptic Meteorology Lab 2[[4]](#footnote-4)
* METE3310 The Tropics and Tropical Weather Systems
* METE3420 Satellite Meteorology[[5]](#footnote-5)
* METE3505 Climate, Biosphere and Ecosystems
* METE3600 Numerical Weather Prediction[[6]](#footnote-6)

**D.** **Proposed SLMT Structure**

15. The experiences of 2020 COVID -19 pandemic and having to transition to virtual training provided a good foundation to make the proposed modifications to the SLMT course scheduled to start in 2022.  The new SLMT Proposal for the new SLMT which will be a Blended course over an 18-month period. The new course will still cover a period of 18 months and will be essentially in three parts.

* **Pre-assessment** – September to December 2021
* **Virtual Section** – January to July 2022
* **Face to Face Section** – September 2022 to July 2023

16. The proposed new structure will first attempt to ensure more successful SLMT candidates by addressing any gaps in their background knowledge in Mathematics and Physics through the Pre‑Assessment part of the SLMT course, which will address the foundation subjects. Secondly, by maintaining the 15-month teaching period, there is no threat to reducing or rushing the standard curriculum. Finally, with the face to face component now reduced to 11 months, from September (even year) to July (odd year), the cost to National Meteorological Services should be significantly decreased.

17. Candidates who have a BSc in Mathematics or Physics will take an abridged version of the SLMT course. This will be the CIMH *Degree Meteorologist* Course, which will see these candidates join the SLMT course in the Session II (May- even year) during the Virtual Session and continue in the Face to Face sessions from September. Further, for candidates who are holders of a BSc degree in Mathematics or Physics will have to complete and pass a pre-test in advance mathematics and physics, to be accepted into the SLMT course scheduled for 2022.

18. Special thanks to the Directors of Meteorological Services of CMO Member States for allowing the CIMH, the time and opportunity to investigate, develop and implement the new SLMT structure.

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1. WMO-No. 1083, *Guide to the Implementation of Education and Training Standards in Meteorology and Hydrology, Volume I*, (2015) [↑](#footnote-ref-1)
2. New Course – *Synoptic Meteorology Lab 1* – co-requisite to Synoptic Meteorology [↑](#footnote-ref-2)
3. New Course – *Radar Meteorology* – formerly a half semester course [↑](#footnote-ref-3)
4. New Course – *Synoptic Meteorology Lab 2* – co-requisite to Advanced Synoptic Meteorology [↑](#footnote-ref-4)
5. New Course – *Satellite Meteorology* – formerly a half semester course [↑](#footnote-ref-5)
6. New Course – *Numerical Weather Prediction* – covers topics lost in Dynamics and adds Programming [↑](#footnote-ref-6)