



**MASENO UNIVERSITY**  
**UNIVERSITY EXAMINATIONS 2015/2016**

**FOURTH YEAR SECOND SEMESTER EXAMINATIONS FOR THE  
DEGREE OF BACHELOR OF SCIENCE IN CLIMATE CHANGE AND  
DEVELOPMENT WITH INFORMATION TECHNOLOGY**

**MAIN CAMPUS**

**NCA 408: MODELLING FOR CLIMATE CHANGE**

Date: 19<sup>th</sup> April, 2016

Time: 11.00 - 1.00 pm

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**INSTRUCTIONS:**

- Answer question ONE and any other TWO questions.
- Sketch maps and diagrams should be used whenever appropriate.



**NCA 408: Modelling for Climate Change**

1a) Define the following terminologies

- i. Model resolution (5marks)
- ii. Real and Apparent forces in the atmosphere giving an example in each case (6marks)
- iii. Global Circulation Models and Regional Climate Models (5marks)
- iv. Spectral and Grid point model techniques (5marks)

(b) State and discuss the THREE fundamental laws under which the atmospheric motion is governed (9marks)

2. a) Derive the pressure gradient force as represented by climate models

(15marks)

b) Explain the physical significance of your answer in (a) above

(15marks)

3. You are given a climate model of resolution 0.15degrees. Discuss the spatial extent to which you can do a research with such kind of a model (6marks)

(a) (i) Discuss any **TWO** weather/climate signals that such a model can be used to study with reasons (8marks)

(ii) Explain any limitations in using such a model to study seasonal climate variability over East Africa (6marks)

4. Climate Models are known to have limitations in simulating regional and global features necessary for climate change and scenario development. Discuss ANY **TWO** strategies that can be used to bridge this gap (20marks)

5.(i) Discuss any THREE atmospheric processes that any climate models should simulate (10marks)

(ii) Climate change is a blessing in disguise. Discuss . (10marks)

6. You have been given observed rainfall data of 50 years(1961-2010) of a given region by your lecturer. You are asked to show the years that have experienced wet, dry and Normal years as a result of climate variability and change. Discuss the steps that you will follow to accomplish the task stating any assumption made during your analysis. (20marks)