

UNIVERSITY COLLEGE OF THE FRASER VALLEY

COURSE INFORMATION

DISCIPLINE/DEPARTMENT: Geography

IMPLEMENTATION DATE: Fall 1994

Revised: _____

Geography 201
SUBJECT/NUMBER OF COURSE

Introduction to Climatology
DESCRIPTIVE TITLE

4
UCFV CREDITS

CALENDAR DESCRIPTION: A survey course in introductory climatology. The basic principles of atmospheric energy, moisture, and motion. Topics covered will range from the micro-scale (air pollution) to synoptic-scale (hurricanes) and global-scale (climate change).

RATIONALE:

COURSE PREREQUISITES: Geography 101, Weather and Climate

COURSE COREQUISITES: None

HOURS PER TERM FOR EACH STUDENT	Lecture	45	hrs	Student Directed	
	Laboratory	30	hrs	Learning	hrs
	Seminar		hrs	Other - specify:	
	Field Experience		hrs	_____	hrs
				TOTAL	75 HRS

MAXIMUM ENROLMENT: 25

Is transfer credit requested? Yes No

AUTHORIZATION SIGNATURES:	
Course Designer(s): Ian T. Okabe _____	Chairperson: _____ Curriculum Committee
Department Head: David J. Gibson _____	Dean: J. D. Tunstall Ph.D _____
PAC: Approval in Principle _____ (Date)	PAC: Final Approval: _____ (Date)

Geography 201 - Introduction to Climatology**NAME & NUMBER OF COURSE**

SYNONYMOUS COURSES:

(a) replaces _____
(course #)

(b) cannot take _____ for further credit
(course #)

SUPPLIES/MATERIALS:**TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)**

Ahrens, C.D., 1994: Meteorology Today, an introduction to weather, climate, and the environment, 5th Edition, West Publishing Company, St Paul, Minnesota.

OR

Moran, J.M. and M.D. Morgan, 1989: Meteorology, the atmosphere and the science of weather, 2nd Edition, Macmillan Publishing company, New York.

OBJECTIVES:

This course is intended to provide students with the basic scientific principles that modern climatology is based upon. Physical, dynamical, and applied climatology at all spatial scales will be examined. Upon successful completion of the course the student will be able to demonstrate an understanding of basic atmospheric radiation theory and application to microclimate modification, thermodynamics and moisture, precipitation processes, atmospheric motion, frontal theory, general circulation of the atmosphere, tropical climatology, and global climate change.

METHODS:

The format of the course includes lectures, laboratory sessions and assignments, assigned readings, and out-of-class projects. The lecture topics will emphasize conceptual and theoretical issues and will be supplemented by the use of audio visual aids throughout the course. Laboratory assignments will emphasize advanced techniques in the analysis and interpretation of meteorological and climatological data.

STUDENT EVALUATION PROCEDURE:

Laboratory Exercises	40%
Mid-term Examination	20%
Final Examination	40%

Geography 201 - Introduction to Climatology
NAME & NUMBER OF COURSE

COURSE CONTENT

Lecture Topics

1. Energy and Radiation
Electromagnetic spectrum, radiation laws (Planck, Wien, Stefan-Boltzman, Kirchoff, Lambert), short and long-wave radiation, radiation balance, microclimate modification.
2. Energy Balance and Temperature
Greenhouse effect, ozone in stratosphere, atmospheric temperature profile, heating/cooling, inversions, air pollution.
3. Atmospheric Thermodynamics and Humidity
Equation of state, hydrostatic equilibrium, First Law of Thermodynamics, latent heat, water vapour measures, adiabatic processes, lapse rates, stability, tephigram.
4. Clouds and Precipitation
Condensation, fog, cloud formation and appearance, cloud microphysics, precipitation mechanisms, water balance.
5. Atmospheric Statics and Dynamics
Atmospheric pressure and pressure charts, equations of motion, forces, large scale motions, geostrophic wind, thermal "wind".
6. Global Wind Systems
General circulation of the atmosphere, jet streams, atmosphere-ocean interactions.
7. Air Masses and Fronts
Air mass characteristics and source regions, fronts - stationary, cold, warm, occluded.
8. Middle Latitude Cyclones
Polar front theory, cyclogenesis, cyclones and jet stream, upper level waves, vorticity, tropical cyclones (hurricanes).
9. Global Climate
Temperature variation and controls, climate classification, global patterns.
10. Climate Modification and Change
Earth's changing climate, possible causes of climate change, carbon-dioxide, greenhouse effect and global warming.

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COURSE CONTENT: (contd.)

Laboratory Exercises are an essential component of the course and are designed to complement the lecture material.

1. Dimensional Analysis
2. Solar Radiation
3. Infrared and Net Radiation
4. Energy and Water Budgets
5. Parcel Theory and Stability
6. Layer Theory and Stability
7. Geostrophic Wind
8. Thermal Wind
9. Surface Weather Charts
10. Upper Air Charts