

5-5-1980

Proposal Major in Meteorology

The College at Brockport, College Senate

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Routing #41 79-80
Re

Resolution #39
1979-1980

Proposed Major in Meteorology

TO: PRESIDENT ALBERT W. BROWN

FROM: THE FACULTY SENATE

Meeting on 4/28/80
(Date)

RE: X I. Formal Resolution (Act of Determination)
II. Recommendation (Urging the fitness of)
III. Other (Notice, Request, Report, etc.)

SUBJECT: Proposed Major in Meteorology

(see attached)

Signed Robert G. Kemmerling Date Sent 5/6/80
(For the Senate) *(mad)*
Robert G. Kemmerling, President, Faculty Senate

TO: THE FACULTY SENATE

FROM: PRESIDENT ALBERT W. BROWN

RE: I. DECISION AND ACTION TAKEN ON FORMAL RESOLUTION

- a. Accepted. Effective Date _____
- b. Deferred for discussion with the Faculty Senate on _____
- c. Unacceptable for the reasons contained in the attached explanation

- II., III. a. Received and acknowledged
- b. Comment:

*tabled to Sept mtg
noted Budget Committee*

DISTRIBUTION: Vice Presidents: Douglas

Others as identified:

*Approved 9.25.80
PWB*

Distribution Date: 5/22/80

Signed: Albert W. Brown
(President of the College)

Date Received by the Senate: _____

*9/25/80 xc Douglas, Sell, Faculty Senate
then file*

Outline of Proposed Major
in
METEOROLOGY

Department of the Earth Sciences
State University College at Brockport
Brockport, New York 14420
March 1980

RATIONALE

The impact of weather on New York State and its people has become increasingly obvious in recent years. The State's productivity, economy, energy utilization, health and safety, transportation, recreation, and environmental quality are inextricably tied to weather. Due to the pervasiveness of weather effects on human activity, a need exists to produce trained persons who can interpret the workings of the atmosphere and apply scientific understandings of weather and climate to problems facing society.

SUC Brockport has for a number of years offered the most extensive instructional program in the atmospheric sciences in western New York. Recently, the program evolved because of student demand and interest to the level of a de facto major. In the meantime, SUC Brockport has gained the reputation in the College's service area as the authoritative source of weather and climate-related information through the publication of a Monthly Climatic Summary and a Solar Radiation (Insolation) Summary, community service, research, and National School Weather Project activity. A number of students completing the existing meteorology track in the established Earth Science Major have successfully entered graduate school or employment situations in meteorology or weather-related areas. Others, seeking a degree in meteorology, have transferred to other schools which offer such a degree rather than completing their undergraduate studies at Brockport.

The purpose of this proposal is to formally recognize as a registered major a program which is adequately staffed and supported. At the same time, it will allow interested and qualified students to focus more directly on coursework relevant to their goals which might be direct employment or graduate study. Other students, interested in the atmospheric environment, but not particularly in a meteorology degree, will continue to have the Earth Science Major as an alternative.

REQUIREMENTS FOR THE MAJOR

The major in Meteorology requires a minimum of 30 hours of approved courses in the atmospheric sciences, and in addition, specific requirements in terms of supportive courses. The following courses will compose a core of 23 credit hours required of all majors: ESC 211 Weather, ESC 311 Synoptic Meteorology, ESC 312 Synoptic Laboratory, ESC 412 Hydrology and its laboratory (ESC 411), or ESC 413 Environmental Climatology and its laboratory (ESC 414), ESC 415 Physical Meteorology, ESC 416 Dynamic Meteorology-Thermodynamics, and ESC 417 Dynamic Meteorology-Hydrodynamics. To complete the major, courses may be selected from ESC 411, 412, 413, 414, ESC 200 Introduction to Oceanography, ESC 420 Meteorological Instruments, ESC 421 Air Pollution Meteorology, ESC 422 Air Pollution Control, ESC 423 Air Control Technology, ESC 460 Meteorological Internship, and appropriate courses in the natural sciences and mathematics with written prior Departmental approval. PHS 207, Mathematical Methods in Physics, is strongly recommended for students intending to do graduate study.

Supporting courses for the major include the Calculus sequence--MTH 201, 202, 203, and MTH 455 Differential Equations; PHS 201, 202 College Physics, CHM 205 Principles of Chemistry, and CSC 201 Introduction to Computer Programming. Also, additional mathematics, computer science and/or sciences courses are recommended depending on individual goals.

Suggested Student Course Sequence:

	<u>Fall</u>		<u>Spring</u>	
Freshman	GEP 100	1	COM 112	3
	COM 111	3	ESC 311	3
	QNT 112	1	CHM 205	4
	MTH 201	3	Social Sciences	3
	ESC 211	4	Fine Arts	3
	CSC 101	3		<u>16</u>
		<u>15</u>		
Sophomore	MTH 203	3	MTH 455	3
	PHS 201	4	PHS 202	4
	Humanities	3	ESC 312	3
	Social Sciences	3	Humanities	3
	Fine Arts	3	Elective	3
		<u>16</u>		<u>16</u>

Suggested Student Course Sequence (continued):

	<u>Fall</u>		<u>Spring</u>	
Junior	ESC 412*	3	ESC 413*	3
	ESC 411*	1	ESC 414*	1
	ESC 415	3	ESC 421	3
	Electives	9	ESC 422	1
		<u>16</u>	Electives	6
				<u>14</u>
Senior	ESC 416	3	ESC 417	3
	Electives	9	ESC 420	3
	Contemporary Issues	3	Electives	9
		<u>3</u>		<u>15</u>
		<u>15</u>		

*one of these sequences

STAFF

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- Ira W. Geer, Professor, D.Ed., Pennsylvania State University (1966),
Instructor of Weather and General Meteorology courses.
Special interests: Weather education--Chairman, AMS Committee on School
and Popular Meteorological Education, National Weather Service educational
consultant, Consulting Editor, Weatherwise.
- John D. Hubbard, Professor, Ph.D., Colorado State University (1968),
Instructor of Hydrology, Environmental Climatology.
Special interests: Applied climatology--Acid rain, Solar radiation, Heat
islands, Storms and floods. Experience with U.S. Forest Service, Battelle
Pacific NW Labs., Oak Ridge National Laboratories.
- Robert S. Weinbeck, Assistant Professor, Ph.D., Iowa State University (1980),
Instructor of Physical Meteorology, Dynamic Meteorology-Thermodynamics,
Dynamic Meteorology-Hydrodynamics, Meteorological Instruments. Special
interests: Climatic variations, Solar-terrestrial interactions, Ozone
variability.
- John M. Williams, Assistant Professor, B.S., Goshen College (1939),
Meteorologist-in-Charge, U.S. National Weather Service (1947-1972).
Instructor of Synoptic Meteorology, Synoptic Laboratory, Weather and You,
Air Pollution Meteorology, Aviation Meteorology. Special interests: Great
Lakes meteorology, Micrometeorology.
- Arthur Fossa (adjunct), M.S., Tufts (1969),
Professional Engineer, Air Quality, NY Dept. of Environmental Conservation.
- Peter Chaston (adjunct), M.S., University of Wisconsin at Madison (1976),
Meteorologist-in-Charge, Rochester National Weather Service Office.

FACILITIES

The meteorological facilities are housed in Lennon Hall with the College
Weather Center, a roof observation and instrument platform, and weather facsimile
and teletype connections with the National Weather Service. Computer facilities
include a terminal to the College academic computing center's PRIME 400 and
APPLE microcomputers.

Physical facilities for atmospheric study include sophisticated weather
element sensing instruments and recorders for measuring such variables as wind,
temperature, precipitation, dewpoint, pressure, radiation, relative humidity,
and potential gradient.

LIBRARY HOLDINGS

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Periodicals

Agricultural Meteorology
Advances in Hydrosience
Air Pollution Control Association Abstracts
American Geophysical Union Transactions
American Journal of Science
American Meteorological Society Bulletin
American Scientist
Atmosphere - Ocean
Atmospheric Environment
Boundary-Layer Meteorology
Canadian Weather Review
Eastern Snow Conference Proceedings
Energy Research Abstracts
Geophysical Abstracts: Climatology and Hydrology
Geophysics
Journal of Applied Meteorology
Journal of Geophysical Research
Journal of the Atmospheric Sciences
Meteorological and Geostrophysical Abstracts
Monthly Climatic Data for the World
Monthly Weather Review
Nature
Oceanus
Remote Sensing of Environment
Reviews of Geophysics and Space Physics
Science
Solar Energy
Solar Engineering
Tellus
Weather
Weatherwise

The College library contains several hundred books, monographs, and references pertinent to meteorology. The College is a depository for government publications, and includes those of the National Weather Service and NOAA laboratories.

COURSE DESCRIPTIONS

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ESC 200 Introduction to Oceanography (G,L,R)

Fundamental knowledge concerning the oceans; techniques and instruments utilized in the study of the oceans; environmental problems concerning the oceans and their resources. Lecture only. 3 semester hours.

ESC 211 Weather (G,L,R)

Studies of the composition of the atmosphere, motions and forces, energy flow, clouds, precipitation, weather systems, violent weather, and atmospheric electricity, sound and light phenomena. The bases and limitations of scientific inquiry in atmospheric investigations, emphasizing weather study as it demonstrates relationships between directly observed weather conditions and broad scale weather systems as depicted on weather maps. Lecture and laboratory. 4 semester hours.

ESC 214 Aviation Meteorology (G,L)

The composition of the earth's atmosphere, moisture, changes of state, condensation and sublimation processes, turbulence, fronts, aviation weather forecasts, thunderstorms, and the physics of air in relation to flight weather and application of general meteorological theory to an understanding of weather hazards in flight. 3 semester hours.

ESC 311 Synoptic Meteorology (G,L,R)

Prerequisite: ESC 211 or equivalent.

Fundamental scientific knowledge of the atmosphere, clouds and precipitation, condensation and precipitation processes, heat and temperature changes, radiation and heat exchange, violent weather, laws of motion, air masses, and the physics of the air and air surface interactions. Facility for transmitting meteorological knowledge to laymen and professionals in readily understandable terms. 3 semester hours.

ESC 312 Synoptic Laboratory (G,L,R)

Prerequisite: ESC 311

Forecasting movement, formation and changes of upper-air systems and surface systems, forecasting surface weather elements, severe weather, and flight weather. The basic scientific principles of fluid motion and daily case studies of the atmosphere. The latest thinking in the field of meteorology and the forecast problem. Unusual atmospheric behavior and techniques to anticipate such cases. Communicating knowledge of the atmosphere and its movements to laymen and to professionals in other fields. 3 semester hours.

ESC 411 Hydrology Laboratory (L)

Prerequisite or corequisite: ESC 412

Measurement of water in streams, stream basins, and other parts of the water cycle first hand in field and laboratory. Understanding of hydrologic equipment, measurement techniques and analytical skills through investigations, including stream discharge, dams and reservoirs, evapotranspiration, snow survey, water quality, and sediment yield. 1 semester hour.

ESC 412 Hydrology (L)

Prerequisites: Introductory course in one or more areas of meteorology, physical geology, limnology, and physical geography.

The water cycle, including precipitation, runoff, streams and lakes, ground water, snow, and other hydrologic topics. Water storage and process; analytical skills dealing with hydrologic events; the utilization and conservation of water resources in terms of its distribution, quality, and flow. 3 semester hours.

ESC 413 Environmental Climatology (L) Cross-listed as GCR 342 Climatology

Prerequisites: Introductory course work in one or more areas of meteorology, physical geology, ecology, or physical geography

The physical, chemical and biological factors affecting the climates of various earth environments including meteorological processes affecting forests, soils, and cities. Climatic elements: instruments and observations; controls and typical mesoclimates; physical processes and statistics for describing and analyzing impacts and environmental problems. 3 semester hours.

ESC 414 Environmental Climatology Laboratory (L)

Prerequisite or corequisite: ESC 413

Measurement of climatic elements and field and laboratory description of meso-climates and local climates. Equipment, techniques of measurement and analysis of local climates in team and individual investigations. The observational and analytical skills needed for an understanding of scientific limitations in climatic study of environmental problems. 1 semester hour.

ESC 415 Physical Meteorology (L,R)

Prerequisite: ESC 311 or equivalent, MTH 202, PHS 202

Physical processes of condensation and radiation; electrical, optical, and acoustical phenomena in the atmosphere; uses of weather radar and meteorological satellites; methods of probing the atmosphere. 3 semester hours.

ESC 416 Dynamic Meteorology-Thermodynamics (L,R)

Prerequisite: ESC 311 or equivalent, MTH 202, PHS 201

The equation of state for gases, the first and second laws of thermodynamics, thermodynamics of water vapor, gas mixtures, stability, hydrostatic equation, and special atmospheres. 3 semester hours.

ESC 417 Dynamic Meteorology-Hydrodynamics (L,R)

Prerequisites: ESC 311 or equivalent, MTH 203, PHS 201

Development of the governing equations of motion, simplifications, introduction to concepts of divergence, circulation, vorticity; mid-latitude synoptic scale motions; numerical methods and linear perturbation theory. 3 semester hours.

ESC 420 Meteorological Instruments (L)

Prerequisites: ESC 311 or equivalent, MTH 201

Theory and techniques of conventional meteorological instruments; limitations of specific instruments and systems encountered in field and laboratory measurements; emphasis on use, theory, and calibration of instruments. 3 semester hours.

ESC 421 Air Pollution Meteorology (L)

The relationship of various atmospheric conditions to the spread of airborne pollutants; the administrative planning needed to provide conditions of minimum atmospheric pollution while recognizing economic conditions; the relationship of atmospheric stability winds, and the effects of terrain to the spread of pollutants; the statistical aspects of predicting the transport of airborne pollutants; the use and applicability of source materials in air pollution meteorology. 3 semester hours.

ESC 422 Air Pollution Control (L)

Prerequisites: ESC 211 or a science-oriented background

An introductory overview of the field of air pollution control, bases for setting air quality standards and control regulations, measurement of ambient air quality, and the legal approaches to pollution abatement. 1 semester hour.

ESC 423 Air Control Technology (L)

Prerequisite: ESC 422 or equivalent.

Ambient and special sampling, stack testing implementation plan objectives, legal and technical aspects of air pollution control and abatement, and problem case histories. 1 semester hour.

ESC 460 Meteorological Internship (L)

Prerequisite: instructor's permission.

First-hand knowledge concerning the applications of meteorological training to industrial and governmental requirements. Groupwork in scientific fields. Design and conduct applied meteorological research. 1-3 semester hours.