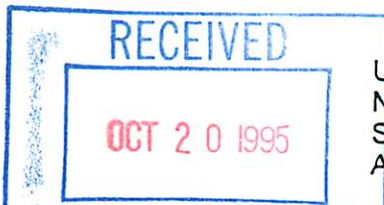


LSC Use Only  
Number: \_\_\_\_\_  
Submission Date: \_\_\_\_\_  
Action-Date: \_\_\_\_\_



UWUCC USE Only  
Number: 95-401  
Submission Date: \_\_\_\_\_  
Action-Date: App 12/12/95  
Senate App 2/6/96

**CURRICULUM PROPOSAL COVER SHEET**  
University-Wide Undergraduate Curriculum Committee

**I. CONTACT**

Contact Person Karen Rose Cercone Phone 5623  
Department Geoscience

**II. PROPOSAL TYPE (Check All Appropriate Lines)**

**COURSE** Oceans and Atmospheres  
Suggested 20 character title

**New Course \*** GS 103 Oceans & Atmospheres / GS 104 Oceans & Atmos. I  
Course Number and Full Title

**Course Revision** \_\_\_\_\_  
Course Number and Full Title

**Liberal Studies Approval +** GS 103 Oceans & Atmospheres / GS 104 Oceans & At  
for new or existing course Course Number and Full Title Lab

**Course Deletion** \_\_\_\_\_  
Course Number and Full Title

**Number and/or Title Change** \_\_\_\_\_  
Old Number and/or Full Old Title  
\_\_\_\_\_  
New Number and/or Full New Title

**Course or Catalog Description Change** \_\_\_\_\_  
Course Number and Full Title

**PROGRAM:**  Major  Minor  Track

**New Program \*** \_\_\_\_\_  
Program Name

**Program Revision \*** \_\_\_\_\_  
Program Name

**Program Deletion \*** \_\_\_\_\_  
Program Name

**Title Change** \_\_\_\_\_  
Old Program Name  
\_\_\_\_\_  
New Program Name

**III. Approvals (signatures and date)**

Karen Rose Cercone 4-7-95 Stutts 4/7/95  
Department Curriculum Committee Department Chair

[Signature] [Signature]  
College Curriculum Committee College Dean

+ Director of Liberal Studies (where applicable) \*Provost (where applicable)

## II. DESCRIPTION OF THE CURRICULUM CHANGE

### 1. New Syllabi of Record

Two syllabi of record are attached for the new course sequence GS 103/104 Oceans and Atmospheres, part of a new non-major sequence entitled Introduction to Geoscience

#### GS 103 Oceans and Atmospheres

##### I. Catalog Description:

GS 103 Oceans and Atmospheres

3 credits

3 lecture hours

Prerequisites: No Geoscience Majors/Minors

(3c-0l-3sh)

The Earth's oceans and atmosphere play a crucial role in determining the pace and extent of changes occurring to our global environment. This course will examine the composition and character of these components and their interaction with other major components of the Earth system.

##### II. Course Objectives:

1. Students will learn about the composition of the ocean environment and how physical, chemical, geological, and biological changes interact to cause important changes this important component of the Earth's system.
2. Students will learn what causes and controls weather phenomena and how these changes influence and are influenced by human interaction.
3. Students will learn how the atmospheres and oceans interact to create the present-day pattern of global climates and the possibility for further changes in the future.

##### III. Course Outline:

###### A. Origin of the Earth, Oceans, and Atmosphere (6 hours)

###### 1. The blue planet

Making the Earth

Making the Moon

The origins of water

###### 2. The early Earth

Geological evolution of the planet

Mantle and crust origin

Plate tectonics

###### B. Marine provinces and sedimentation (6 hours)

###### 1. Seafloor topography

Shelves and slopes  
Trenches and ridges  
Seamounts and banks

2. Coastal and pelagic sediments
  - Processes of marine sedimentation
  - Distribution of marine sediments
  - Marine sedimentation, past and present

**C. Seawater properties and ocean chemistry (4 hours)**

1. Ocean composition
  - The major salts
  - What else is in there?
2. Ocean properties
  - Sound and light
  - Salinity and pressure

**D. Air and sea interactions (4 hours)**

1. Fluids in motion
  - Atmospheric circulation
  - Waves
2. Ocean circulation
  - Surface circulation and currents
  - Thermohaline (deep) currents

**E. Life in the oceans (6 hours)**

1. Primary productivity
  - Photosynthesis
  - The base of the food chain
2. Marine food resources
  - Availability of nutrients
  - Upwelling zones
3. Marine communities
  - Coral reefs: the oceans' rain forests
  - A whole new world: hydrothermal vent communities

**F. The Earth's gaseous envelope (4 hours)**

1. What's up there?
  - Atmospheric structure
  - Atmospheric composition
2. Energy makes the world go around
  - Solar energy
  - Energy from the earth

**G. Weather and major weather phenomena (6 hours)**

1. The daily forecast
  - Mid-latitude storms
  - The jet stream
2. Weather as a destructive force
  - Severe thunderstorms
  - Tornados and hail
3. Rain, clouds and fog

**H. Climate and climatic changes (6)**

1. Climate distribution
  - Koppen classification
  - Zonal climate distribution
2. Local climate variation
  - Urban climates
  - Microclimates
3. Human influences on climate
  - Carbon dioxide and the greenhouse effect
  - Ozone destruction and pollution

**IV. Evaluation Methods**

The final grade for this course will be determined as follows:

- 85% Tests. Four tests, consisting of multiple choice, true-false and matching questions, worth 100 points each. Tests will be computer-graded and adjusted to a mean of 75% so that 90-100%=A; 80-89%=B; 70-79%=C; 60-69%=D; below 60%=F. The same scale will be used for the final point score.
- 15% Non-text book review. A four to five page book review of the non-text reading is due the last day of class. Worth 75 points.

**V. Required textbooks, supplemental books and readings:**

Textbook: Thurman, INTRODUCTION TO OCEANOGRAPHY (6th ed). New York:

Non-text: May vary with instructor, but will include choices such as:

Michael Crichton SPHERE

John Barnes MOTHER OF STORMS

WHAT LIGHT THROUGH YONDER

WINDOW BREAKS

SECRETS OF THE SEAS

**VI. Special resource requirements: None**

**VII. Bibliography**

Ahrens, C.D., 1994, METEOROLOGY TODAY: AN INTRODUCTION TO WEATHER, CLIMATE AND THE ENVIRONMENT (5th Ed.) New York: West Publishing 591 p.

Anthes, R.A., 1992, METEOROLOGY (6th Ed.). Columbus: Merrill Publishing, 218 p.

Lutgens, F.K. and Tarbuck, E.J., 1995, THE ATMOSPHERE (6th Ed.). Englewood Cliffs NJ: Prentice Hall, 461 p.

Gross, M.G., 1990, OCEANOGRAPHY (6th Ed). Columbus: Merrill Publishing, 190 p.

Ingmanson, D.E. and Wallace, W.J., 1993, OCEANOGRAPHY: AN INTRODUCTION (5th Ed.). New York: Wadsworth Publishers, 493 p.

Lutgens, F.K. and Tarbuck, E.J., 1995, THE ATMOSPHERE (6th Ed.). Englewood Cliffs NJ: Prentice Hall, 461 p.

Pickard, G.L. and Emery, W.J., 1990, DESCRIPTIVE PHYSICAL OCEANOGRAPHY: AN INTRODUCTION (5th Ed.) New York: Pergamon Press, 320 p.

Skinner, B.J. and Porter, S.C., 1995, THE BLUE PLANET: AN INTRODUCTION TO EARTH SYSTEMS SCIENCE. New York: John Wiley & Sons, 493 p.

Suckling, P.W. and Doyon, R.R., 1991, STUDIES IN WEATHER AND CLIMATE (3rd Ed.). Raleigh: Contemporary Publishing Co., 202 p.

**GS 104 Oceans and Atmosphere Lab**

**I. Catalog Description**

GS 104 Oceans and Atmospheres Lab	1 credit
	2 lab hours
Prerequisites: No Geoscience Majors/Minors	(0c-2l-1sh)
Corequisites: Enrollment in GS 103	

Introduces students to the techniques oceanographers and meteorologists use to study the earth's oceans and atmospheres and reconstruct their evolution. Labs cover seawater processes, oceanic circulation, marine life, atmospheric structure and weather.

**II. Course Objectives**

1. Students will learn methods of oceanic and atmospheric data collection and observation.
2. Students will examine and interpret simple data sets to better understand oceanographic, meteorologic and climatologic processes.

**III. Course Outline**

- A. The global environment (1 labs)
  1. Geography & plate tectonics
- B. Marine geology (2 labs)
  1. Marine provinces & ocean bathymetry
  2. Marine sediments
- C. Seawater properties and oceanic circulation (2 labs)
  1. Seawater chemistry
  2. Thermohaline circulation
- D. Life in the oceans (1 lab)
  1. Food resources and the food chain
- E. Midterm Exam (1 lab)
- E. Composition and structure of the atmosphere (2 labs)
  1. Temperature, pressure and chemical changes in the atmosphere
  2. Using meteorological instruments
- F. Weather and weather events (2 labs)
  1. Clouds and precipitation

2. Mid-latitude storms

G. Climate and climate change (2 labs)

1. Global climate distribution
2. Climate changes through time: natural versus human-induced

H. Final exam (1 lab)

**IV. Evaluation Methods**

- 33% Quizzes. Ten ten-point quizzes will cover previous week's lab or field trip.
- 67% Two non-cumulative lab exams, worth 100 points each. Exams will consist of sample identification, short essay and map or cross-section-based questions. Tests will be adjusted to a mean of 75% so that 90-100%=A; 80-89%=B; 70-79%=C; 60-69%=D; below 60%=F. The same scale will be used for the final point score.

**V. Required textbooks, supplemental books and readings:**

The IUP Oceans and Atmospheres Lab Manual (Course Packet). This lab manual was locally developed to take advantage of the unique local weather conditions and weather station facilities of IUP. Nationally published lab manuals were consulted during the development process to ensure quality, parity and relevance to national trends in earth systems science.

**VI. Special resource requirements: None**

**VII. Bibliography:**

Lutgens, F.K. and Tarbuck, E.J., 1995, THE ATMOSPHERE (6th Ed.). Englewood Cliffs NJ: Prentice Hall, 461 p.

Gross, M.G., 1990, OCEANOGRAPHY (6th Ed). Columbus: Merrill Publishing, 190 p.

Lutgens, F.K. and Tarbuck, E.J., 1995, THE ATMOSPHERE (6th Ed.). Englewood Cliffs NJ: Prentice Hall, 461 p.

Suckling, P.W. and Doyon, R.R., 1991, STUDIES IN WEATHER AND CLIMATE (3rd Ed.). Raleigh: Contemporary Publishing Co., 202 p.

## COURSE ANALYSIS QUESTIONNAIRE

### Section A: Details of the Course

A1. The new sequence Introduction to Geoscience of which GS 103/104 Oceans and Atmospheres is a part is designed to be the primary department offering for non-major students who are fulfilling their Liberal Studies science requirement. Students may take any two of the three Introduction to Geoscience lecture/lab sequences to fulfill their Option I science requirement, or they may take all three lectures and one of the three labs to fulfill their Option II science requirement.

The new three-semester Introduction to Geoscience sequence functionally replaces the old two-semester Earth Science sequence. Earth Science is being simultaneously renumbered and converted to an introductory course for science education majors only. Introduction to Geoscience also functionally replaces the non-major portions of GS 121/122 Physical Geology and GS 131/132 Historical Geology. These course sequences are being renumbered and converted to introductory courses for department majors and minors only.

A2. This course does require changes in several department courses and programs. Accordingly, course revisions for the new GS 111-114 Earth Science, GS 121/122 Physical Geology and GS 131/132 Historical Geology are being submitted in conjunction with this new course proposal. In addition, the old non-lab General Astronomy (GS 110) will be dropped from the department course offerings. All science education programs which formerly required GS 101-104 Earth Science will now be changed to require GS 111-114 Earth Science. These minor program revisions have also been submitted as part of the total Geoscience Curriculum packet.

A3. The complete Introduction to Geoscience course sequence has never been offered at IUP. The lecture portion of GS 105 General Astronomy will draw heavily on the former GS 110 General Astronomy. All other components of the course sequence will be new.

A4. This is not a dual-level course.

A5. This is not a variable-credit course.

A6. Almost every institution with a geoscience department offers some type of introductory geology, oceanography and/or astronomy course. Several examples are given in Section D.

### Section B: Interdisciplinary Implications

B1: Each component of the Introduction to Geoscience sequence (ie, GS 101, GS 102, etc) will be taught as a separate course by a single instructor.

B2: No other departments on campus offer courses in these three areas.



B3: Seats in this course will be made available to students from Continuing Education.

### **Section C: Implementation**

C1: No additional faculty resources are required to teach this course sequence. As shown in the overview discussion of faculty resources, the faculty contact hours needed to teach GS 101/102, as well as GS 103/104 and GS 105/106, will be obtained primarily from the conversion of our existing introductory science courses to majors only (ie, much smaller) sections. The two additional hours needed to teach the new schedule will be obtained from alternate-year rotation of upper-level majors courses. The number of class preps in the department does increase, but will be accommodated through careful scheduling.

Please note that while the number of lecture seats for non-majors will be increased by this change, the number of lab seats will be decreased slightly. Please see the course package overview for a detailed discussion of this change.

C2: The department has sufficient lecture and lab space to accommodate this new course. Lecture and lab space previously used for the non-major portions of the old Earth Science and Physical/Historical Geology sequences will now be transferred to Introduction to Geoscience

The department also holds sufficient samples and equipment for the lab component of these new courses. Specimens, maps, student equipment and lab supplies previously designated for use by the non-major labs of Earth Science and Physical/Historical Geology will simply be transferred to use by Introduction to Geoscience.

Funds exist in the department for normal replacement of specimens, maps and equipment parts worn out or broken by student usage.

No additional library resources or travel funds are required for this class.

C3: No grant funding exists or is needed for this class.

C4: Two Introduction to Geoscience courses (usually GS 101/102 and GS 103/104) will be offered in both the Fall and Spring semesters. Courses will also be offered in each of the Summer sessions.

C5: In Fall and Spring, we anticipate offering two lecture sections with four corresponding lab sections for each lecture (ie, eight total). In summer, we will probably offer one lecture section with one or two corresponding lab sections.

C6: In Fall and Spring, lecture sections will accommodate 120 students each (the maximum number of students that can be scheduled in the newly- remodeled Weyandt Room 32 auditorium). Lab sections will always accommodate 25 students each.

C7: No professional society recommendations exist for a course like this.

**Section D: Course descriptions from other universities**

**220 The Atmosphere and Ocean in Motion**

Spring |

The time-averaged atmospheric and oceanic motion, which determines the Earth's climatic zones, and the variability of that motion, which includes weather. Topics will include atmospheric circulation and location of jungles and deserts; weather, its predictability, cyclones, fronts, and hurricanes; thermally and wind-driven oceanic circulation; waves; tides; and interactions between ocean and atmosphere that lead to climate fluctuations such as El Niño. Three lectures, one three-hour laboratory. *S. G. H. Philander*

# Liberal Studies Course Approval Form

## Instruction Sheet

Use this form only if you wish to have a course included in a Liberal Studies Learning Skill or Knowledge Area category. Do not use this form for synthesis or writing-intensive sections; different forms are available for these. If you have questions, contact the Liberal Studies Office, 352 Sutton Hall, telephone 357-5715.

This form is intended to assist you in developing your course to meet IUP's Criteria for Liberal Studies and to arrange your proposal in a standard order for consideration by the Liberal Studies Committee (LSC) and the University-wide Undergraduate Curriculum Committee. When you have finished, your proposal will have these parts:

- Standard UWUCC Course Proposal Cover Sheet, with signatures (one page)
- Completed copy of LS General Information Check-List--Parts 1-3 of this form (one page)
- One sheet of paper for your answers to the four questions in Part IV of this form (one page)
- Completed check-list for each curriculum category in which your course is to be listed--e.g. Non-Western Cultures, Fine Arts, etc. (one page each) [Check-lists are found in the appendix to this Handbook.]
- Course syllabus in UWUCC format.

**Note:** If this is a new course not previously approved by the University Senate, you will also need answers to the UWUCC Course Analysis Questionnaire. These are not considered by the LSC but will be forwarded to the UWUCC along with the rest of the proposal after the LSC completes its review. For information on UWUCC procedures for new courses or course revisions, see appropriate sections of this Handbook.

**Submit one (1) copy of the completed proposal to the Liberal Studies Office (352 Sutton Hall.)** The Liberal Studies Committee will make its own copies from your original; the committee does reserve the right to return excessively long proposals for editing before they are duplicated. (If you happen to have extra copies of the proposal, you are invited to send multiple copies to the LSC to save unnecessary copying.)

**Please Number All Pages**

LIBERAL STUDIES COURSE APPROVAL, PARTS 1-3: GENERAL INFORMATION CHECK-LIST

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I. Please indicate the LS category(ies) for which you are applying:

LEARNING SKILLS:

- First Composition Course       Second Composition Course  
 Mathematics

KNOWLEDGE AREAS:

- Humanities: History       Fine Arts  
 Humanities: Philos./Rel Studies       Social Sciences  
 Humanities: Literature       Non-Western Cultures  
 Natural Sci: Laboratory       Health & Wellness  
 Natural Sci: Non-laboratory       Liberal Studies Elective

GS 103/104  
GS 103

II. Please use check marks to indicate which LS goals are primary, secondary, incidental, or not applicable. When you meet with the LSC to discuss the course, you may be asked to explain how these will be achieved.

Prim Sec Incid N/A

A. Intellectual Skills and Modes of Thinking:

1. Inquiry, abstract logical thinking, critical analysis, synthesis, decision making, and other aspects of the critical process.
2. Literacy--writing, reading, speaking, listening.
3. Understanding numerical data.
4. Historical consciousness.
5. Scientific Inquiry.
6. Values (Ethical mode of thinking or application of ethical perception).
7. Aesthetic mode of thinking.

B. Acquiring a Body of Knowledge or Understanding Essential to an Educated Person

C. Understanding the Physical Nature of Human Beings

D. Collateral Skills:

1. Use of the library.
2. Use of computing technology.

III. The LS criteria indicate six ways that courses should contribute to students' abilities. Please check all that apply. When you meet with the LSC, you may be asked to explain your check marks.

1. Confront the major ethical issues which pertain to the subject matter; realize that although "suspended judgment" is a necessity of intellectual inquiry, one cannot live forever in suspension; and make ethical choices and take responsibility for them.
2. Define and analyze problems, frame questions, evaluate available solutions and make choices.
3. Communicate knowledge and exchange ideas by various forms of expression, in most cases writing and speaking.
4. Recognize creativity and engage in creative thinking.
5. Continue learning even after the completion of their formal education.
6. Recognize relationships between what is being studied and current issues, thoughts, institutions, and/or events.

### **Liberal Studies Approval Parts 4-6**

#### **IV. Liberal Studies Questions**

A. When GS 103 Oceans and Atmospheres is first taught, the lecture section will be handled by a single professor who will be responsible for organizing course content, collecting and documenting visual media, and developing the initial exams and quizzes. In later semesters, this instructor will be responsible for orienting any other faculty who are assigned to teach the course, and will share with them his outlines, notes and library of supporting media. He will also share sample exam questions, to ensure that all sections provide uniform and fair evaluation of the students.

When GS 104 Oceans and Atmospheres Lab is first taught, several faculty members will coordinate and share the work of developing and piloting the labs. These faculty will use a common course-pack, coordinate lab schedules, share lab materials and meet on a biweekly basis to critique and improve lab layouts as the course runs. In subsequent years, lab instructors will continue to coordinate lab schedules and share materials. In a small department such as ours, we have encountered no difficulty using this type of consulting procedure to keep Liberal Studies sections of Earth Science and Physical/Historical Geology equivalent.

B. Wherever possible, lectures and lab material for Oceans and Atmospheres will emphasize the contributions of women and racial & ethnic minorities. Examples will include those currently involved in active research programs (eg. aboard the Ocean Drilling Program vessel Resolution; Susan Solomon, Project Leader for the Ozone-CFC project) and in prominent government and administrative positions (eg. Connie Sancetta, NSF Program Director; Margaret Leinen, URI Dean of Oceanography).

C. As noted in the syllabus, non-text reading material for this course includes a choice of science fiction and adventure novels centering on oceanographic or climate issues (Sphere, Mother of Storms) as well as non-fiction accounts of working geologists and the issues that confront them (What Light Through Yonder Window Breaks; Secrets of the Seas). Past experience with Liberal Studies sections indicates that some students respond enthusiastically to exciting fiction stories, while others prefer fact-based books that relate to real-life. This course will therefore continue to offer the option of both types, to give all students a meaningful non-text reading experience.

D. Far more than in our major's classes, Oceans and Atmospheres will emphasize the social context and ramifications of global ocean resources and human interaction with oceans and climate. Examples to be discussed include 1) Harbor structures and the impact they have on shoreline development (eg. Santa Barbara, Santa Monica) 2) Zebra Mussel infiltration into the Great Lakes ecosystem and efforts to control them 3) the "Law of the Sea" and the Exclusive Economic Zone treaty 4) global ramifications of possible Greenhouse Warming and Ozone Depletion 5) social and economic impact of current weather events. Discussions such as these will probably arise in almost every class meeting of Oceans and Atmospheres.

# CHECK LIST – NATURAL SCIENCES (Laboratory) 13

GS 103 -104

## Knowledge Area Criteria which the course must meet:

- Treat concepts, themes and events in sufficient depth to enable students to appreciate the complexity, history and current implications of what is being studied; and not be merely cursory coverage of lists of topics.
- Suggest the major intellectual questions/problems which interest practitioners of a discipline and explore critically the important theories and principles presented by the discipline.
- Allow students to understand and apply the methods of inquiry and vocabulary commonly used in the discipline.
- Encourage students to use and enhance, wherever possible, the composition and mathematics skills built in the Skill Areas of Liberal Studies.

## Natural Science Criteria which the course must meet:

- Examine a body of knowledge of natural science that will contribute to an understanding of the natural world.
- Provide an understanding of the development of natural science theories and their modification.
- Teach students to formulate and test hypotheses.
- Provide an understanding of some of the "great moments" in the history of natural science and the individuals, including women and minorities, responsible for them.

## Natural Science Laboratory Criteria which the course must meet:

- Provide students with opportunities to learn and apply data-gathering techniques.
- Provide students with opportunities to develop skills in making accurate observations, in formulating concise and appropriate descriptions of natural phenomena, and in producing meaningful systems of classification for natural objects.
- Provide students with opportunities to apply theories to practice in the working world of science.

## Additional Natural Science Criteria which the course should meet:

- Encourage an appreciation of the complex interrelationship of natural science with the life of the individual.
- Develop in students the abilities necessary to cope with the consequences of natural science in the modern world.
- Develop an inquiring attitude consistent with the tenets of natural sciences, an attitude that is willing to expose fallacy on the basis of reason, that demands evidence for scientific assertions, and yet is tolerant of hypotheses in the absence of contradictory evidence.

# CHECK LIST -- NATURAL SCIENCES (Non-laboratory)

GS 103

14

## Knowledge Area Criteria which the course must meet:

- Treat concepts, themes and events in sufficient depth to enable students to appreciate the complexity, history and current implications of what is being studied; and not be merely cursory coverage of lists of topics.
- Suggest the major intellectual questions/problems which interest practitioners of a discipline and explore critically the important theories and principles presented by the discipline.
- Allow students to understand and apply the methods of inquiry and vocabulary commonly used in the discipline.
- Encourage students to use and enhance, wherever possible, the composition and mathematics skills built in the Skill Area of Liberal Studies.

## Natural Science Criteria which the course must meet:

- Examine a body of knowledge of natural science that will contribute to an understanding of the natural world.
- Provide an understanding of the development of natural science theories and their modification.
- Teach students to formulate and test hypotheses.
- Provide an understanding of some of the "great moments" in the history of natural science and the individuals, including women and minorities, responsible for them.

## Additional Natural Science Criteria which the course should meet:

- Encourage an appreciation of the complex interrelationship of natural science with the life of the individual.
- Develop in students the abilities necessary to cope with the consequences of natural science in the modern world.
- Develop an inquiring attitude consistent with the tenets of natural science, an attitude that is willing to expose fallacy on the basis of reason, that demands evidence for scientific assertions and yet is tolerant of hypotheses in the absence of contradictory evidence.