

16-67

GLASSBORO STATE COLLEGE

Glassboro, New Jersey

Life Sciences Department

March, 1971

Program Proposal:

A curriculum in Liberal Arts for
students majoring in the Life Sciences
Department.

Sponsored by: Robert Renlund, acting for the Department of Life Sciences

I. IDENTIFICATION OF THE PROPOSAL

- A. Proposal title: A Curriculum in Liberal Arts for Undergraduate Students Majoring in the Life Sciences Department.
- B. Sponsored by: Robert Renlund, acting for members of the Department of Life Sciences.
- C. Administrative responsibility: Chairman of the Department of Life Sciences.

II. ESSENCE OF THE PROGRAM

- A. Type of program: This program will be primarily an instructional program with laboratory and field experience included as required.
- B. Scope and size: This program was first included in the 1967-68 Glassboro State College undergraduate catalog. Five students are scheduled to graduate in 1971 from the curriculum. The Fall, 1970, registration included 37 students as majors in the liberal arts curriculum in the Department of Life Sciences. With the present revision of the curriculum, the introduction of new courses, revision of presently-offered courses, and the possibility of developing additional courses, it is anticipated that enrollment will continue to increase.

The curriculum is comparable to similar liberal arts programs offered by many colleges throughout the United States.

- C. Location in current and/or projected college structure: This curriculum is currently being offered at the undergraduate level, but has been revised during an evaluation of the progress of the curriculum. The courses included are not restricted to Liberal Arts majors, and are also elected by students of other curricula.
- D. Degree Awarded: Bachelor of Arts.
- E. Basic need for the program: The curriculum will:
 - 1. implement preparation of students desiring to enter professional or graduate schools.
 - 2. provide a broad understanding of the place of life sciences in the totality of knowledge, thus equipping the individual with some of the information and understanding which citizens need in our society.

III. DETAILS OF THE PROGRAM

- A. Program objectives:
 - 1. Departmental objectives:
 - a. To provide a broad basis for understanding the various levels of organization which are included among the areas of enquiry pursued in the life sciences.
 - b. To provide sufficient variety of courses so that individual areas of student interest may be pursued in detail.
 - c. To provide stimulus for acquisition of intellectual techniques involved in gathering information and the development of concepts held by life scientists.
 - d. To provide opportunity for students to develop manual dexterity for investigations participated in by life scientists.
 - e. To provide opportunity for taking the courses requisite for entry into professional schools.
 - f. To prepare students for entry into graduate schools.

2. General Objectives:

- a. To educate students by helping them learn to discipline themselves for the acquisition of factual information.
- b. To educate students by helping them use the abilities required for understanding and developing concepts.
- c. To stimulate students so that they will seek to see the relationships between the materials and ideas traditionally included in the life sciences and the materials and ideas traditionally included in other academic disciplines.
- d. To illustrate to students that "everything is related to everything else", and that, as citizens, decisions supposedly affecting only a few individuals or a small part of nature may ultimately affect much larger segments of society or areas of nature

B. Structure:

1. Curriculum:

The proposed curriculum will include courses presently being offered by the Life Sciences Department, the Physical Sciences Department, and Mathematics Department. Courses offered by other departments of Glassboro State College will be selected to satisfy general college requirements and as free electives. Two new courses have been initiated to broaden selection of Life Sciences department courses. Additional undergraduate courses may be developed and offered in the near future. At the present time, students may petition for permission to enroll in selected graduate courses. It is recommended that candidates for the liberal arts degree majoring in Life Sciences be required to register for and successfully pass the following science and mathematics courses:

Inorganic Chemistry I, II	8 s.h.
Organic Chemistry I, II	8 s.h.
Physics I, II	8 s.h.
College mathematics	sufficient to assure competency equivalent to mastery of content of Calculus I
Biology I, II	8 s.h.
Genetics	4 s.h.
History of Biology	2 s.h.
other biology courses	18 s.h.

2. Life Sciences course offerings:

The courses listed below are offered in the Department of Life Sciences. Students will select from them as needed to satisfy requirements of the curriculum, following suggestions offered under III,F.

58.100 Biology I. 4 s.h. Brief survey of the different kinds of plants and animals, distinguishing characteristics and relationships; physical and chemical properties of protoplasm; cell structure, cellular division; plant and animal tissues and organs. Lecture and laboratory. No prerequisites.

58.101 Biology II. 4 s.h. Metabolic processes in organisms, including photosynthesis, respiration, the roles of hormones and enzymes; tropisms; growth and development; principles of genetics, including Mendelian laws; evolution; ecological relationships of organisms. Lecture and laboratory. Prerequisite: Biology I.

58.102 Botany I. 4 s.h. The biology of non-flowering plants. A survey of prokaryotic, thallophytic and primitive vascular plants. Emphasis on phylogenetic comparisons regarding reproduction and development, evolution, and plant ecology. With laboratory. Prerequisites: Biology I, II.

58.103 Botany II. 4 s.h. Survey of anatomy and physiology; principles of plant physiology and metabolism; structural and functional aspects of plant anatomy with respect to support, transport, reproduction, development, growth. With laboratory. Prerequisites: Biology I and II.

58.150 Zoology I. 4 s.h. Anatomy and physiology of invertebrate animals; the value and significance of non-chordate animals and understanding of their life processes. Lecture and laboratory. Prerequisites: Biology I and II.

58.151 Zoology II. 4 s.h. Intensive comparative study of the gross and microscopic anatomy of vertebrate animals. Lecture and laboratory, including dissection of representative chordates. Prerequisites: Biology I and II.

54.307 Influence of Scientific Thought on the Development of Man. 3 s.h. Emphasis on the fundamental thoughts of the philosophers Plato, Aristotle, Thomas Aquinas, Descartes, the British empiricist, Kant, and recent thinkers. The essentiality of these thoughts as essential parts of Western intellectual traditions. Prerequisites: 3 s.h. in Biology, 3 s.h. in History or Philosophy.

58.310 Ecology. 3 cr. Emphasis on the living systems at all levels of interaction. Special emphasis on populations, communities and ecosystems. Aspects of energy flow, species diversity and population dynamics studied in a variety of ecosystems. Required field work may involve extended hours. Prerequisites: one course in Botany, one course in Zoology.

54.310 Independent Study in Life Sciences. 1-3 s.h. Initiation of independent work on a project concerned with biological science with the supervision of a selected faculty member; development and execution of the proposed work, including preparation of an acceptable report of work completed. Prerequisites: 16 s.h. in Life Sciences or permission of instructor.

58.330 Microbiology 4 s.h. Morphology and physiology of unicellular organisms, with emphasis upon bacteria; culture methods; growth parameters; isolation, identification and characterization of organisms; microbial syntheses. Lecture and laboratory. Prerequisites: Biology I, II; Organic Chemistry I or consent of instructor.

58.335 Genetics 4 s.h. Mendelian principles of heredity, linkage, cross-over, chromosomal mapping, chromosomal and genetic mutations, multi-allelic inheritance, biochemical and population genetics. Lecture, laboratory experimentation with *Drosophila*; statistical analyses; project. Prerequisites: Biology I and II.

58.400 Limnology. 3 s.h. Study of standard procedures whereby the physical, chemical, geological and biological aspects of aquatic environments are synthesized in order to develop understanding of fresh water habitats. Field investigation of lentic and lotic environments. Qualitative and quantitative classification of organisms as a means of trophic evaluation. Prerequisites: Botany I, II or Zoology I, II.

58.410 Biological Techniques. 3 s.h. Development of laboratory skills in cytological and histological techniques. Theory and practice involving smear preparations, microtomy, differential staining. Prerequisite: Biology I, II.

58.420 General Taxonomy. 3 s.h. Study and classification of animals and plants with emphasis on organisms indigenous to Northeastern United States, especially those of the local tristate area. Zoological and Botanical Principles and Laws governing classification. Lecture and laboratory involving use and construction of keys. Prerequisite: Zoology II, Botany II or equivalent.

* Human Physiology. 4 s.h. Comprehensive survey of the basic physiology of the entire human organism. Laboratory use of electronic equipment, including kymographs, physiographs. Prerequisite: Biology I, II, Organic Chemistry I.

* History of Biology. 2 s.h. Correlation of ideas and information in the several areas of biological investigation as afforded through consideration of their historical development. Prerequisite: Senior status, a major in Life Sciences, or consent of instructor.

54.100 Introduction to Natural Resources. 3 s.h. Natural resources and their relationship to man and society. Basic natural resources and their uses; practices of conservation and management; the impact of population growth, human activity, and increased industrial demands; problems developing from environmental deterioration. For science and non-science majors. No prerequisites.

54.200 Introduction to Oceanography. 3 s.h. Introduction to the varied techniques of the oceanographer; emphasis upon all recent developments in the field of Marine Sciences; physical, chemical, geological, and biological aspects of the world's oceans. Field work required, a trip on a research vessel recommended. Prerequisites: one course in Chemistry, one course in Geology or Earth Science.

54.500 Evolutionary Theory. 3 s.h. Historical development of the principles of organic evolution; modern application of genetics and cytology to the understanding of the nature of this process. Prerequisite: 6 cr. in Biology or instructor's permission.

*New course proposal submitted to Glassboro State College Curriculum Committee for approval.

- 58.579 Comparative Morphology of Vascular Plants. 3 s.h. Investigation of vascular plants by comparison of morphological features and reproductive cycles of selected forms in the Psilopsida, Lycopsidea, Sphenopsida, and Pteropsida. Introduction of Plaeobotanical information to provide a background for the origin, evolution, and phylogeny of the surviving types of these groups. Lecture and laboratory. Prerequisite: Botany I, II.
- 58.580 Plant Physiology. 3 s.h. Principles and factors concerned with development of plants. Nutrition, water relationships, photosynthesis, chemosynthesis, reproduction, growth. Prerequisite: Botany I, II, Organic chemistry or consent of instructor.
- 58.587 Animal Physiology. 3 s.h. Physiological control systems of representative invertebrate and vertebrate animals, with emphasis on the cellular mechanisms of regulation; osmoregulation, ionic regulation, temperature regulation. Lecture and laboratory. Prerequisites: Biology I, II, Organic Chemistry I.
- 58.588 Entomology. 3 s.h. Detailed study of the external and internal anatomy of insects; physiology and insect control; historical and economic significance of insects in man's society; methods of collecting, preserving, rearing and mounting of insects; insect classification. Lecture and laboratory. Prerequisite: Zoology I.
- 58.494 and 58.594 Synecology. 3 s.h. The relationships of plants and animals to measurable components of their physical, chemical and biotic environments; Ecology, environmental concepts, physicochemical aspects of the atmosphere, soils and bodies of water, the species and interspecific relationships, community and succession, productivity. Lecture and lab. Prerequisite: Ecology.
- 58.595 Pine Barrens Ecology. 3 s.h. Field-laboratory experience investigating the unique Pine Barrens of New Jersey to understand what it is, how it became what it is and conditions which tend to maintain it. Prerequisite: 58.594 (Synecology)
- 58.597 General Embryology of Animals. 3 s.h. Morphologic and physiological changes occurring in animals during the processes of development; morphogenetic movements, presumptive areas, induction, organogenesis, metabolic gradients. Lecture and laboratory. Prerequisite: Biology I, II, Organic Chemistry I, II or consent of instructor.
- 58.598 Human Genetics. 4 s.h. Inheritance of abnormal physical and mental traits; resistance and susceptibility to disease; sex and sex-associated characters. Emphasis on the genetic aspects of race, population genetics, and genetic evolution of the human organism. Lecture, laboratory sessions or equivalent. Prerequisite: Genetics 58.335 or permission of instructor.

C. Program Administration:

This program will be administered under the direction of the Chairman of the Life Sciences Department and will involve all usual college procedures and regulations.

D. Resource Utilization:

1. Special resources:

During the past several years, equipment and instruments have been obtained which permit the performance of laboratory and field observations and experiments currently constituting research and instructional activities of life scientists. Some of the more expensive pieces of equipment obtained include Sherer environmental chambers, Spinco ultra centrifuges, spectrophotometers, fluorescence and phase microscopes and physiographs. The ordinarily available equipment (student microscopes, autoclaves, glassware, etc.) are on hand. Oceanographic equipment available includes bottom grabs, dredges, corers, coarse and fine plankton nets, water sampling and testing kits among the usual course equipment.

2. Inventory of faculty:

Gaetano Bisazza, Assistant Professor

B.A., M.A.

Specialization: Zoology

Leona Brownell, Associate Professor

B.A., M.S., Ph.D.

Specialization: Zoology, Cell Physiology

Samuella Crim, Associate Professor

B.S., M.A.

Specialization: Botany, Anatomy, Taxonomy

Harry Gershenowitz, Professor

B.S., M.S., Ed.D

Specialization: History and Philosophy of Science

Charles H. Green, Professor

B.S., M.S., Ph.D.

Specialization: Genetics

Nellie Hornstein, Instructor

B.A., M.A.

Specialization: Physiology

Syed M. Husain, Professor

I.Sc., B.Sc., M.S., Ph.D.

Specialization: Plant pathology

Elwood D. Lee, Assistant Professor

B.S., M.S.

Specialization: Entomology

Richard J. Meagher, Assistant Professor
B.S., M.S., Ph.D.
Specialization: Animal Physiology

Douglas B. Murphy, Instructor
A.B., M.S.
Specialization: Electron Microscopy

Elwood Nichols, Assistant Professor
E.S., M.A.
Specialization: Microbiology

Roger Raimist, Assistant Professor
A.A.S., B.S., M.S.
Specialization: Marine Biology

Frances M. Regan, Instructor
B.A., M.A.
Specialization: Histology; Parasitology

Robert N. Renlund, Professor
B.S., Ph.D.
Specialization: Limnology

Murl C. Shawver, Professor
B.S., M.Ed., Ed.D.
Specialization: Zoology, Human Biology

Harry N. Stoudt, Professor
B.S., M.Ed., Ph.D.
Specialization: Botany, Microtechnique

Also available:

Thomas J. Rillo, Professor
B.S., M.A., Ph.D.
Specialization: Conservation, Outdoor Education

V. Eugene Vivian, Professor
B.A., M.A., Ph.D.
Specialization: Conservation

3. Inventory of Classroom, Library, and Other Plant Facilities

In Bosshart Hall are included classrooms, an auditorium, and 6 laboratories currently used in the teaching of Life Sciences. Smaller areas designed for faculty research are presently being used by students. A departmental building resource committee is currently operative, considering plans for expansion and modification of existing facilities. This committee works in cooperation with the College facilities committee to implement space needs. A need for a greenhouse to prepare for classroom needs is currently being met by makeshift measures, use of the college greenhouse and utilization of environmental chambers.

The Savitz Library holdings related to Life Sciences are meager and, ideally, should be extended. At the present time, budgetary and space restrictions imposed upon the library limit the usefulness of library. Hopefully, this condition can be corrected as Glassboro State College grows.

E. Impact

It is felt that offering a Liberal Arts curriculum in the Life Sciences Department will have a salutary effect upon Glassboro State College.

This curriculum should serve to attract students who may not primarily desire to become educators, but who intend to pursue work requiring undergraduate emphasis on scientific coursework. The minimum requirements of the curriculum as presented satisfy the requirements for entry into the majority of those professional schools offering training in medicine, veterinary medicine, pharmacology, other paramedical fields, or conservation. Additional requirements for entrance into a specific professional school may easily be met by judicious selection of electives.

The curriculum should also provide an outlet for individual faculty members to extend their interest specialties. As the program continues, new courses will be developed which will utilize the specialized talents of the faculty.

This proposed curriculum in part overlaps the curriculum for preparation for teaching biological science at the secondary school level. Students in both curricula may appear in the same courses. It would serve to enrich the secondary education curriculum, however, by fostering an emphasis on gaining as complete as possible an understanding of the content of any biological enquiry as well as promoting incorporation of currently discovered facts and concepts.

F. Implementation:

Below are given four sample programs. It will be noted:

1. The requirements for admission into many graduate schools can be met in the pursuance of this curriculum.

2. Requirements for entrance into several different kinds of professional schools can be met while satisfying the requirements for the liberal arts curriculum.

3. The requirements for secondary education certification can be met at the same time the breadth of courses related to a liberal arts curriculum are satisfied.

4. A course track emphasizing conservation and ecology can be pursued.

Program 1
A Suggested Program for Liberal Arts Students Majoring in Life Sciences

Freshman Year

Communications I	3	Communications II	3
Humanities (Dev. West. Civ. I suggested)	3	Humanities (Dev. West. Civ. II suggested)	3
*Biology I	4	*Biology II	4
*Inorganic Chemistry I	4	*Inorganic Chemistry II	4
Health and Phys. Ed.	1½	Humanities (Math II)	3
		Health and Phys. Ed.	1½
TOTAL	15½	TOTAL	18½

Sophomore Year

*Calculus I	4	Calculus II	4
Psychology requirement	3	*Bio elect (Ecol. sug.)	3
Elem Foreign Lang. I	3	Elem Foreign Lang. II	3
*Organic Chem. I	4	*Organic Chem. II	4
*Genetics	4	Creative Arts. Req.	3
TOTAL	18	TOTAL	17

Junior Year

*Physics I	4	*Physics II	4
*Bio elect (Zoo. I sug.)	4	*Bio elect (Zoo II sug.)	4
Intermediate Foreign Lang. I	3	Intermediate foreign Lang. II	3
Elective	3	Elective (literature course suggested)	3
		Elective (Microbiology)	4
TOTAL	14	TOTAL	18

Senior Year

*Bio elect (Botany I suggested)	4	*History of Biology	2
Social Science req.	3	*Bio elect (Biological Techniques)	3
*Bio elect (I.S. sug.)	3	*Elective	3
Elective (Human physiology)	4	Social Science req.	3
Elective	3	Elective (Philosophy suggested)	3
TOTAL	17	TOTAL	14

(It is suggested that students interested in graduate study in biology petition to take as a biology elective the graduate level course in embryology) Since background in evolution is also desirable, the student may choose to elect Influence of Scientific Thought.

TOTAL 132 credits

* Life Sciences Department requirements for L.A. degree in Life Sciences

Complete list of Biology electives: (18 hrs)

Botany I, II	4
Independent Study.	3-6
Biological Techniques.	3
Microbiology	4
Introduction to Natural Resources. . .	3
Influence of Scientific Thought. . .	3
General Taxonomy	3
Human Physiology	4
Zoology I, II.	4
Ecology (Field Biology).	3
Limnology	3

Liberal Arts - suggested courses to supplement core

The following courses are strongly urged.

- 1 year beginning foreign language (French or German)
- 1 year intermediate foreign language (French or German)
- Calculus I
- Ecology (Field Biology)
- Zoology I (invertebrate)
- Zoology II (vertebrate - comparative anatomy)
- Botany I
- Biological Techniques
- Independent Study (senior year)
- Human Physiology
- Microbiology
- Embryology
- Influence of Scientific Thought

Recommended courses

- Math II
- Literature
- Philosophy

Program 2

A suggested program (track) for Liberal Arts (in Life Sciences) students desiring to enter Professional Schools (medical, dental, veterinary, or other paramedical)

Freshman Year

Communications I	3	_____	Communications II	3	_____
Humanities (Dev. West Civ. I suggested)	3	_____	Humanities (Dev. West. Civ. II suggested)	3	_____
*Biology I	4	_____	*Biology II	4	_____
*Inorganic Chemistry I	4	_____	*Inorganic Chemistry II	4	_____
Health and Phys. Ed.	1½	_____	Humanities (Math II)	3	_____
TOTAL	15½		Health and Phys. Ed.	1½	_____
			TOTAL	18½	

Sophomore Year

*Calculus I	4	_____	Calculus II	4	_____
Psychology req.	3	_____	*Bio elect (Micro-biology suggested)	4	_____
Elective (Elem. Foreign Language I suggested)	3	_____	Elective (Elem. Foreign language II suggested)	3	_____
*Organic Chem I	4	_____	*Organic Chem II	4	_____
*Genetics	4	_____	Creative Arts req.	3	_____
TOTAL	18		TOTAL	18	

Junior Year

*Physics I	4	_____	*Physics II	4	_____
*Bio elect (Zoo I suggested)	4	_____	*Bio elect (Zoo II suggested)	4	_____
Intermed. foreign language I	3	_____	Intermed. foreign language II	3	_____
Elective (Quantitative Chem suggested)	4	_____	Elective (literature course suggested)	3	_____
TOTAL	15		Elective (Human physiology suggested)	4	_____
			TOTAL	18	

Senior Year

*Bio elect (Botany I suggested)	4	_____	*History of Biology	2	_____
Social Science req.	3	_____	*Bio elect (Bio Tech. suggested)	3	_____
Elective (Qualitative Chem suggested)	4	_____	*Bio elect (I.S. sug.)	3	_____
Elective (religion or 2nd lit. suggested)	3	_____	Social Science req.	3	_____
Elective	3	_____	Elective (philosophy suggested)	3	_____
TOTAL	17		TOTAL	14	

It is suggested that premedical students petition to take as a biology elective the graduate course in embryology.

Since background in evolution is also desirable, the student may choose to elect Influence of Scientific Thought. Total - 134

* Life Sciences Department requirements for L.A. degree in Life Sciences.

Biology electives (18 hrs.)

Botany I, II	4
Zoology I, II	4
Independent Study	3-6
Biological Techniques	3
Microbiology.	4
Introduction to Natural Resources	3
Influence of Scientific Thought	3
General Taxonomy.	3
Human Physiology.	4
Ecology (Field Biology)	3
Limnology	3

For premedical training a rich background in philosophy, history and especially literature is desirable.

Pre-medical: Suggested courses to supplement core
The following are strongly recommended:

- Math II
- Calculus II
- Zoology II (comp. anatomy)
- Quantitative chemistry
- Literature course
- Human physiology
- Botany I
- Microbiology
- Biological Techniques

The following are recommended:

- 1 year elementary foreign language (French or German)
- 1 year intermediate foreign language (French or German)
- Zoology I (invertebrate biology)
- Qualitative chemistry
- Religion or second literature course
- Philosophy
- Independent Study

Program 3

A suggested program (track) for Liberal Arts (in Life Sciences) students desiring to enter education.

Freshman Year

Communications I	3	Communications II	3
Humanities (Dev. West. Civ I suggested)	3	Humanities (Dev. West. Civ. II Suggested)	3
*Biology I	4	*Biology II	4
*Inorganic Chemistry I	4	*Inorganic Chemistry II	4
Humanities (Math II)	3	*Math req. (Calculus I)	4
Health & Phys. Ed.	1½	Health & Phys. Ed.	1½
TOTAL	18½	TOTAL	19½

Sophomore Year

*Bio elect (Zoo I suggested)	4	*Bio elect (Zoo II suggested)	4
*Organic Chem I (counts as derived study credit)	4	*Organic Chem II (counts as derived study credit)	4
*Physics I	4	*Physics II	4
Derived Study (Calculus II suggested)	4	Elective (Foreign language II suggested)	3
Elective (Foreign language I suggested)	3	Creative Arts req.	3
TOTAL	19	TOTAL	18

Junior Year

*Genetics	4	Practicum & Reading	8
*Bio elect (Botany I suggested)	4	Intro H.S. teaching (counts as derived study)	4
*Bio elect (Ecology suggested)	3	Psych. Fds. of Ed.	3
*Bio elect (Natural Resources suggested)	3		
Social Science Req.	3		
TOTAL	17	TOTAL	15

Senior Year

Student teaching	8	Psychology req.	3
Dev. of Ed. Thought	3	*History of Biology (counts as derived study)	2
Teacher, School and Community	3	*Bio elect	3
		Social Science req.	3
		Humanities req. (literature suggested)	3
TOTAL	14	TOTAL	14

Total - 135

* Life Sciences Department requirements for L.A. degree in Education-Life Sciences.

Biology electives (18 hrs.)

Botany I, II.	4
Zoology I, II	4
Independent Study	3-6
Biological Techniques	3
Microbiology	4
Introduction to Natural Resources . . .	3
Influence of Scientific Thought . . .	3
General Taxonomy.	3
Human Physiology.	4
Ecology (Field Biology)	3
Limnology	3

Biology - Education

The following are strongly urged

Zoology I invertebrate
Zoology II comp. anat.
Botany I
Ecology (Field Biology)
Biological Techniques
Natural Resources

Recommended courses

Calculus II
Foreign language 1 year French or German
Literature course
Earth Science or Astronomy

Program 4

A suggested program (track) for Liberal Arts (in Life Sciences) students desiring to enter ecology or conservation.

Freshman Year

Communications I	3	_____	Communications II	3	_____
Humanities (Dev. West Civ. I suggested)	3	_____	Humanities (Dev. West. Civ. II suggested)	3	_____
*Biology I	4	_____	*Biology II	4	_____
*Inorganic Chem I	4	_____	*Inorganic Chem II	4	_____
Health & Phys Ed	1½	_____	Humanities (Math II)	3	_____
TOTAL	15½		Health & Phys Ed.	1½	_____
			TOTAL	18½	

Sophomore Year

Calculus I	4	_____	Elective (Calculus II suggested)	4	_____
*Psychology req.	3	_____	*Bio elect (Bio Tech sug.)	3	_____
Elementary Foreign language	3	_____	Elem. foreign language II	3	_____
*Organic Chem I	4	_____	*Organic Chem II	4	_____
*Genetics	4	_____	Creative Arts req.	3	_____
TOTAL	18		TOTAL	17	

Junior Year

*Physics I	4	_____	*Physics II	4	_____
*Bio elect (Zoo. I suggested)	4	_____	*Bio elect (Zoo II suggested)	4	_____
Elective (Natural Resources suggested)	3	_____	Elective (Limnology sug.)	3	_____
Bio elect (Botany I suggested)	4	_____	Elective (literature course suggested)	3	_____
TOTAL	15		Elective (Botany II suggested)	4	_____
			TOTAL	18	

Senior Year

*Bio elect (Ecology sug)	3	_____	*History of Biology	2	_____
Social Science req.	3	_____	Elective	3	_____
Elective (Philosophy suggested)	3	_____	*Bio elect (Microbiology suggested)	3	_____
Elective (Geology I suggested)	4	_____	Elective (Geology II suggested)	4	_____
Elective (I.S.)	3	_____	Social Science req.	3	_____
TOTAL	16		TOTAL	15	

It is suggested that students participate in additional field courses during one summer at the New Jersey Marine Sciences Consortium.

Total - 132 credits

* Life Sciences Department requirements for L.A. degree in Life Sciences.

Complete Biology electives related to conservation - ecology. (18 hrs.)

Natural Resources
Ecology
Limnology
Independent Study
Zoology I and II
Botany I and II
Microbiology
Biological Techniques

Other Biology electives
Influence of Scientific Thought
General Taxonomy
Human Physiology

Conservation - Ecology -- suggested courses to supplement core.

The following courses are strongly urged.

Biological Techniques
Microbiology
Zoology I invertebrate
Zoology II vertebrate comp. anat.
Natural Resources
Botany I
Botany II
Limnology
Ecology
Geology I
Geology II
Independent Study

Math II
1 year introductory foreign language (French or German)
Calculus II
Literature course suggested
Philosophy course suggested.

G. Evaluation:

Means of evaluation of the success this curriculum meets in satisfying needs of its students or of satisfying needs of the geographical region are presently being considered by an intradepartmental committee concerned with evaluation. Success of graduates in achieving entrance into professional and graduate schools will be included among items used in this evaluation.

The faculty members involved will constantly evaluate the achievements of the curriculum as seen from their point of view.

H. Funding

The liberal arts program is currently operating in conjunction with the programs involving preparation of teachers of life sciences in secondary schools and with other curricula of the College which require election of courses in life sciences. At the present time, a small percentage (perhaps 2-3%) of the student enrollment in courses in the Department of Life Sciences is composed of students majoring in Liberal Arts (Life Sciences). It is hoped that this percentage will increase as knowledge concerning the availability of the curriculum is further disseminated. However, no additional faculty or equipment specifically designated for the Liberal Arts curriculum need be obtained. Therefore, no additional needs for funding are anticipated over and above the ordinary concerns of the department as it grows.

An estimate of the state monies allocated to the whole department of Life Sciences in 1970-71 for purposes other than faculty salary is given below. This estimate was obtained by halving the total amount of money allocated to the Science Department as a whole (both Physical Sciences and Life Sciences were included in a single department until spring semester, 1971.)

Educational Supplies	\$ 7,000.00
Educational Equipment	15,000.00
Official Reception	50.00
Printing and Office Supplies	1,000.00
Field Trips	300.00
Travel	300.00
Library Books	<u>3,000.00</u>
	\$ 26,650.00

I. Five-year forecast

1. It has been estimated (by an institutional planning office) that by 1974-75, fulltime student enrollment at Glassboro State College may approximate 7400.
2. It can logically be expected that the number of students majoring in Life Sciences will also increase. Analysis of student enrollment in courses offered by the Department of Life Sciences over the past 10 years shows a trend for increase. If the rate of increase continues as it has in the past, it can be estimated that 4500 students will be enrolled in courses offered by the Life Sciences Department during the academic year 1975-76.

3. The faculty and equipment presently at hand are adequate to offer this program to students at hand. If the schools and program enrollment expand as anticipated, budgetary needs over and above current needs will be requested as required.
4. Space and equipment expansion are being considered by a Departmental Committee on facilities. This committee acts on a continuing basis and is presently developing plans for an additional 20,000 square feet of classroom and laboratory space.

IV. RESULTS OF CONSULTATION

- A. The Panel on Undergraduate Major Curricula of the Commission on Undergraduate Education in the Biological Sciences has recognized: ⁽¹⁾
 1. There is a common body of knowledge to be transmitted to all biologists irrespective of specialization.
 2. Increasing emphasis is being placed upon preparation in mathematics, physics, and chemistry so that a more sophisticated treatment of quantitative material and symbolic analysis is possible at the undergraduate level.
 3. Tendencies exist to extend the scope of instruction in biology to the levels of organization represented by molecular and cellular biology as well as to the levels of biology included in studies of populations and ecosystems.
 4. Each institution (of higher education) seeks its own solution to the needs of its particular situation.
- B. The curriculum proposed here is based upon a "core" program which includes preparation in fundamentals of biological sciences as well as preparation in mathematics, physics, and chemistry. The additional hours to be elected in biological sciences ensure that a student will have pursued one or more areas of biological enquiry beyond the introductory stage. Opportunity is also offered to develop a certain amount of proficiency at any chosen level of biological organization.

The liberal arts curriculum proposed compares favorably with similar curricula being offered at colleges and universities throughout the country. Included among these are the four schools analyzed by C.U.E.B.S.¹, the University of Delaware², as well as many others.
- C. Consultation was had with Dr. Warren Roome and Mr. Paul Dike, chairman respectively of the Departments of Mathematics and Physical Sciences, since the proposed Liberal Arts curriculum requires courses offered in those departments. Both chairmen agreed that such courses were needed by students of biology and would be offered to them.

References Cited

- (1) Content of Core Curricula in Biology - 1967 - Publication No. 18, Commission on Undergraduate Education in the Biological Sciences, Washington, D. C.
- (2) Departmental Planning Conference on Course Reform. 1965. Department of Biological Sciences, University of Delaware, Newark. unpublished memorandum.