Miami Dade College
Office Associate Provost, Academic Affairs

April 14, 2011

M E M O R A N D U M

TO: Rolando Montoya

FROM: Michael Reiner

SUBJECT: APPROVAL OF CURRICULUM REPORT #80

Attached for your approval is the approved curriculum presented at the April 12, 2011, CASSC meeting.

The information in Curriculum Report #80 includes the following items:

1. **Mathematics**
   - **Proposed New Course**
     MAT0029 Developmental Mathematics for Statistics

2. **Natural, Health and Wellness**
   - **Proposed New BS**
     BS in Biological Sciences

If I can be of further assistance, please do not hesitate to contact me.

Attachment

Miami Dade College
College-wide CASSC Meeting – APRIL 12, 2011
CURRICULUM REPORT #80

1. Mathematics

Proposed New Course

Course No.	Course Title	Credits	Campus	Eff. Term
MAT0029	Developmental Mathematics for Statistics	3	1,2,3,5,6,7,8	2011-1

Course Description: Students will investigate ratios, proportions, scaling, modeling with equations and inequalities, tables, graphs, linear functions, and exponential functions, in preparation for Statistics. Students will learn the language of mathematics and mathematical symbols, procedural fluency, strategic competence, adaptive reasoning, quantitative investigative techniques, and questioning and solution-building skills. Prerequisites: Co-requisites: STA2023, Special Section of STA2023 as part of the Statway Project is required (48 hr. lecture)

Proposed Fee: **$20.00**

APPROVE_____OPPOSE_____ MORE INFORMATION_____

2. Natural Science, Health and Wellness

Proposed New BS

Program Title:	B.S. with a major in Biological Sciences
Department:	Biological Sciences
Start Term:	2011-1 Fall Semester
Degree Type:	Bachelor of Science
Affected Campuses by this request:	1,2,3,5,6,7,8

MIAMI DADE COLLEGE
BIOLOGY DEPARTMENTS

Proposal for a Bachelor of Science with a major in Biological Sciences

Introduction

The principal goal of the Miami Dade College (MDC) Biology Departments is to offer a Bachelor of Science with a major in Biological Sciences degree (BS-BS) as a preparation for three workforce specialties along with a strong foundation in biology. Miami Dade College students will receive the hands-on skills necessary in one of two Biological/Life Science fields, biotechnology and biopharmaceutical sciences, or may select a specialty in Biological/Life Science education that will prepare them to apply for the Florida Department of Education Eligibility Statement in teaching. The blend of skills gained during the program, as well as completion of the required senior specialty internship will help meet local workforce demand by providing students with immediate employment opportunities.

Planning Process

Based on original data obtained from focus group, employer and student surveys, and workforce data, MDC determined that the conventional, theory-based learning programs offered by traditional biology programs did not adequately prepare students to enter the workforce directly after graduation. The curriculum takes a different approach by focusing on developing broad-based technical laboratory, writing, and mathematical skills that are necessary for students to obtain immediate employment in-field. Subsequently, a committee was formed in June, 2010 to begin proposal development for the BS-BS.

Proposed Program Start Dates

Course and budget development, hiring faculty and staff, student services (including admission criteria, recruitment, placement testing, marketing, and advisement), and library acquisitions will be completed by December, 2011, enabling MDC to offer its first set of classes for the proposed BS-BS degree as per Florida State requirements in January, 2012.

Workforce Needs and Demands

To assess the needs, demands and interest for the proposed BS-BS degree, MDC faculty and staff held meetings with local, state industry and university representatives, conducted employer and student surveys, and evaluated state and national employment trends and education initiatives beginning in June, 2010. MDC analyzed data and collaborated with its local workforce development board, economic development councils, and business and industry partners to determine workforce baccalaureate degree needs as stipulated by the *Baccalaureate Proposal Approval Guidelines*.

The following data support the proposal:

- The bioscience industry sector, which includes agricultural feedstock and chemicals, drugs and pharmaceuticals, medical devices and equipment, and research, testing and medical laboratories, experienced employment growth that greatly outpaced national employment growth from 2001 to 2008. From 2001 to 2008, the bioscience industry added 193,748 jobs nationally, which represented a growth rate of 15.8 percent (15.8%). This rapid rate of job growth was 4.5 times as much as the overall growth rate for the national private sector (3.5%). [1]
- According to the United States Department of Labor website, employment of biological scientists is projected to grow 21 percent (21%) during the 2008—18 decade, much faster than the average for all occupations, as biotechnological research and development continues to drive job growth.[2] People with bachelor's and master's degrees are expected to have more opportunities in nonscientist jobs related to biology, in fields like sales, marketing, publishing, and research management. Non-Ph.D.s also may fill positions as science or engineering technicians or as medical health technologists and technicians. Some become high school biology teachers.
- The State of Florida's Agency for Workforce Innovation reports that Miami-Dade/Monroe Counties (Workforce Region 23) have an average of **1072** openings in the life science sectors requiring baccalaureate degree (or higher) in the biological sciences.[3] Further, the area's graduate schools continue to expand their pipelines; awarding **156** biology-related Masters and **68** biology-related Doctorates in 2010, an increase of 26% over the 2009 graduate data.[4]

  The area's public institution, Florida International University, produced **217** biology-related baccalaureate degrees, while area private institutions, including Barry University, Florida Memorial, St. Thomas University, and the University of Miami awarded an additional **404** degrees in 2010.[4]

  Collectively, between the graduate pipeline data and the annual workforce openings, area institutions are meeting **only half** (621of 1296 positions and graduate pipeline needs) of the demand for baccalaureate degree holders in the biological sciences annually.
- According to the National Association of Colleges and Employers (NACE), beginning salary offers in September 2010 averaged **$34,908** a year for baccalaureate degree recipients in biological/life sciences, up 3.6 percent (3.6%) from the prior year.[5]
- A fall 2010 employer focus group of seven participants (**Appendix A**) and an employer survey of thirty-two participants (**Appendix B**) were conducted by MDC's Institutional Research office and the members of the Retooling Science Grant Team, respectively. Eight-one percent (81%; n=25) of the survey respondents and one hundred percent (100%; n=7) of the focus group participants indicated that a BS degree in the biological sciences was necessary for employment consideration in research or technical positions within their organizations. The respondents also indicated that the proposed BS degree would positively affect career growth and advancement once hired. Focus group participants and survey respondents indicated that they were observing a gap between the available applicant pools in South Florida and their organization's need for skilled workers, particularly at the BS level and beyond.[6]
- In fall 2010, MDC's Institutional Research Office conducted a survey of 7,200 STEM (science, technology, engineering, and math) majors at the college to assess interest in a potential BS with a major in Biological Sciences degree (**Appendix C**). The overall response rate was 12% or eight hundred and eighty-nine respondents (889). When queried as to interest in pursuing a baccalaureate degree upon graduation ninety-four percent (94%; n=613) of six hundred fifty-four (654) respondents expressed interest in continuing their education. Moreover, fifty percent (50%; n=418) of eight hundred thirty-nine respondents (839) were "interested" in pursuing a BS with a major in biological sciences at MDC, while eighteen percent (18%; n=151) said that they were "not sure". Overall, the data suggests strong student support for the proposed BS with a major in Biological Sciences (BS-BS) degree at Miami Dade College.[7]

Academic Content & Curriculum

The proposed BS-BS degree is a one hundred and twenty (120) credit-hour program, and incorporates the AA lower division coursework as its foundation. The degree program will be housed primarily at the MDC North, Wolfson, and Kendall Campuses, utilizing the renovated state of the art and new laboratory facilities.

The proposed BS-BS degree program is designed to meet workforce need by offering three workforce specialty areas (biotechnology, biopharmaceutical sciences, and science education) and will include:

- Thirty-six (36) credit hours of General Education courses. The following twelve (12) credit hours are also common pre-requisites for CIP 26.0101:
  - STAT 2023-Statistics (3 credit hours)
  - BSC 2010-Principles of Biology 1 (3 credit hours)
  - CHM1045-General Chemistry/Quality Analysis 1 (3 credit hours)
  - BSC 2011-Principles of Biology 2 (3 credit hours)
  - Twenty-four (24) credit hours of lower division common pre-requisites for CIP 26.0101 courses, which include the following courses:
  - BSC 2010L-Principles of Biology 1 Lab (2 credit hours)
  - CHM 1045L-General Chemistry/Quality Analysis 1 Lab (2 credit hours)
  - BSC 2011L-Principles of Biology 2 Lab (2 credit hours)
  - CHM 1046-General Chemistry/Quality Analysis 2 (3 credit hours)
  - CHM 1046L-General Chemistry/Quality Analysis 2 Lab (2 credit hours)
  - CHM 2210-Organic Chemistry 1 (3 credit hours)
  - CHM 2210L-Organic Chemistry 1 Lab (2 credit hours)
  - CHM 2211-Organic Chemistry 2 (3 credit hours)
  - CHM 2211L-Organic Chemistry 2 Lab (2 credit hours)
  - MAC 2242- Life Science Calculus (3 credit hours)
- Eight (8) credit hours of lower division Science requirements
- Twenty-five (25) credit hours of upper division Biological Sciences Core requirements
  - Includes a Senior Specialty Internship (3 credit hours)
- Eighteen-nineteen (18-19) credit hours of required Specialty Area (one of three choices):
  - Biotechnology, Biopharmaceutical Sciences, or Science Education
- Eight to Nine (8-9) credit hours of General Electives
  - Students may use this block to complete the foreign language requirement.

The proposed BS-BS curriculum was developed utilizing input from faculty and industry professionals including scientists, human resource managers, chief information officers, development officers, project directors and research/compliance administrators. The proposal was developed and approved in accordance with the *Florida Common Prerequisite Manual* requirements by a committee comprised of faculty and staff of the MDC Biology Departments and was submitted and approved through the MDC curriculum approval process.

MDC Institutional Research is responsible for the collection of data regarding enrollment, completions and other performance measures for the purpose of state and accreditation agency reporting. In addition, assessment data gathered throughout the program will be used for continuous review, revisions, and improvements.

Assessment of Current and Anticipated Resources and Budget to Deliver the Program

The projected expenditure for academic years 2010 through 2014 averages $285,858 per year for the academic years 2010 through 2014 (**Appendix D**). These include: laboratory materials and supplies, ($260,200); faculty professional development travel ($13,500); laboratory communication/technology resources including instructional software ($39,000); professional services/accreditation ($4,000); support services ($35,500) plus library support salaries ($20,000). Instructional support requires two instructors with terminal degrees, one at North Campus and one at both Kendall by 2014, and three (1.5 FTE) additional adjunct instructors and laboratory instructional assistants for each of the three campuses ($354,164 for instructional support). Other staffing needs include part-time student advisors at North, Kendall, and Wolfson ($45,000).

Enrollment projections are based on 25 students (9.2 FTEs) beginning in January 2012 and increasing to 175 students (931 FTEs) by 2013-2014, assuming an annual attrition rate of 25%. Revenue from student fees and other sources is projected to be $1,163,313 for the 4-year start-up period, based on the 2010-2011 state tuition and technology fee rate of $105.22 per upper division credit hour for in-state residents and $538.18 per upper division credit hour for out-of-state residents; and an average course user fee of $20.00 per upper division credit hour. It is estimated that beginning in 2013-14, twenty-five (25) students will graduate from the program and secure jobs in the industry with projected starting salaries of approximately $35,000 or higher.

The proposed BS-BS degree has an estimated initial capital outlay cost of $372,068, through 2013-2014, which includes the purchase of capital equipment for the development of research-grade infrastructure at each of the three largest campuses ($200,000) and additional library resources including journal subscriptions, 800 new book titles, and 200 new media titles ($172,068). The program is expected to be self-sustaining by 2013-2014, with $19,881.00 funds carried forward.

References

[1] Battelle/BIO State Bioscience Initiatives 2010 report. This report is available on the Internet at http://bio.org/local/battelle2010/main.asp

[2] Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2010-11 Edition, Biological Scientists, on the Internet at http://www.bls.gov/oco/ocos047.htm (Visited September 27, 2010)

[3] State of Florida Agency for Workforce Innovation Employment Projections Statistics for Workforce Area 23 Miami-Dade and Monroe Counties and Workforce Area 22 Broward County: http://www.labormarketinfo.com/library/EP.htm; State of Florida Agency for Workforce Innovation Employment Projections Resources—Training and Education Codes: http://www.labormarketinfo.com/library/ep/resources/doe_training_codes_(1-6).htm; Bureau of Labor Statistics Standard Occupational Classification and Coding Structure User Guide: http://www.bls.gov/soc/soc_2010_class_and_coding_structure.pdf (visited February 15, 2011)

[4] NCES College Navigator- http://nces.ed.gov/collegenavigator (visited March 15, 2011). Please note: survey results did not include exercise physiology graduates as a biology-related degree holders since this is a specialized sports medicine degree program.

[5] NACE Salary Survey, A study of 2009-2010 beginning offers, Fall 2010, Volume 49, Issue 4.

[6] Miami Dade College, MDC Institutional Research, Employer Focus Group (conducted Aug 24, 2010) and Employer Survey (conducted Sept-Oct 2010)

[7] Miami Dade College, MDC Institutional Research, Proposed Baccalaureate in Biological Science

Add Existing Courses
Modify Pre-Reqs./Add Special Fee/
Revise course description/LO

Course No.	Course Title	Credits	Campus	Eff. Term
BCH3023	Introductory Biochemistry	3	1,2,3,5,6,7,8	2011-2

Course Description: This course surveys the fundamental components of biochemistry. In this course, students will learn concepts such as the structure and function of amino acids, proteins, carbohydrates, lipids, and nucleic acids, together with discussions of oxidative metabolism and regulation. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, CHM2200, CHM2200L, CHM2211, CHM2211L, Co-requisites: BCH3023L, (48 hr. lecture)
Proposed Fee: $25.00

Course No.	Course Title	Credits	Campus	Eff. Term
BCH3023L	Introductory Biochemistry Lab	2	1,2,3,5,6,7,8	2011-2

Course Description: This laboratory course complements the lecture corequisite BCH 3023, which involves the study of the fundamental components of biochemistry. In this laboratory course students will learn and will be provided with hands-on experiences with the concepts addressed in the lecture course. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, CHM2200, CHM2200L, CHM2211, CHM2211L, Co-requisites: BCH3023, (; 64 hr. lab)
Proposed Fee: $110.00

Course No.	Course Title	Credits	Campus	Eff. Term
PCB4674	Evolution	3	1,2,3,5,6,7,8	2011-2

Course Description: Students will learn the theory of evolution as it pertains to different fields of modern biology including the theory of natural selection, the evidence for evolution, microevolution, speciation, macroevolution, the origin of life on Earth, major evolutionary trends, and the evolution of humans. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, PCB3060, PCB3060L, (48 hr. lecture)
Proposed Fee: $25.00

Course No.	Course Title	Credits	Campus	Eff. Term
BSC4422	Biotechnology 3	3	1,2,3,5,6,7,8	2011-2

Course Description: This course will explore biotechnology as a science and its implications in modern society. Students will learn how to make well-designed and controlled experiments. Students will also demonstrate knowledge of data acquisition and interpretation. Special fee. Prerequisites: BSC2427, BSC2427L, PCB3060, PCB3060L, BCH3023, BCH3023L, Co-requisites: BSC4422L, (48 hr. lecture)
Proposed Fee: $25.00

Course No.	Course Title	Credits	Campus	Eff. Term
BSC4422L	Biotechnology 3 Lab	2	1,2,3,5,6,7,8	2011-2

Course Description: This course provides students with hands-on laboratory experiences to supplement the BSC4422 lecture course. Students will learn how to perform advanced molecular biotechniques that build on previous knowledge. They will perform diagnostic assays, western blots, purifications, etc and determine how to correlate findings with the basic research or clinical data. Special fee.Prerequisites: BSC2427, BSC2427L, PCB3060, PCB3060L, BCH3023, BCH3023L, Co-requisites: BSC4422, (64 hr. lab)
Proposed Fee: $110.00

Course No.	Course Title	Credits	Campus	Eff. Term
ZOO3021	Survey of Animal Diversity	3	1,2,3,5,6,7,8	2011-2

Course Description: This course presents zoology as a scientific discipline. Students will learn the basic principles of zoological nomenclature, taxonomy, systematics, and the basic understanding of the relationships of animals to one another, to humans, their environment and to society. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, (48 hr. lecture)

Proposed Fee: $10.00

Course No.	Course Title	Credits	Campus	Eff. Term
ZOO3021L	Survey of Animal Diversity Lab	3	1,2,3,5,6,7,8	2011-2

Course Description: This laboratory course provides hands-on experience with the concepts covered in the lecture ZOO 3021. Students will learn the basic principles of zoological nomenclature, taxonomy, and systematic; and the basic understanding of the relationships of animals to other organisms and to one another. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, Co-requisites: ZOO3021, (32 hr. lab)

Proposed Fee: $40.00

Course No.	Course Title	Credits	Campus	Eff. Term
BOT3015	Survey of Plant Diversity	3	1,2,3,5,6,7,8	2011-2

Course Description: This course explores the plant kingdom and gives emphasis on structure, function and genetics of plants. Students will learn the evolutionary relations hips, natural history, ecological adaptations, physiology, morphology and reproductive biology of gymnosperms and angiosperms. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, (48 hr. lecture)

Proposed Fee: $10.00

Course No.	Course Title	Credits	Campus	Eff. Term
BOT3015L	Survey of Plant Diversity Lab	1	1,2,3,5,6,7,8	2011-2

Course Description: This course is designed to provide the necessary laboratory experiments and dissection exercises to supplement/accompany the BOT 3015 Survey of Plant Diversity lecture course. Students will learn about the plant kingdom and with emphasis on structure, function and genetics of plants. Dissections and laboratory exercises are designed to explore the fundamental cell and tissue structures of both vascular and non-vascular plants. Special fee.Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, Co-requisites: BOT3015, (32 hr. lab)

Proposed Fee: $40.00

APPROVE_____OPPOSE_____ MORE INFORMATION_____

Add New Courses

Course No.	Course Title	Credits	Campus	Eff. Term
MAC2241	Life Science Calculus	3	1,2,3,5,6,7,8	2011-2

Course Description: Introductory course in calculus for the Life Sciences. Students will learn Plane Trigonometry, Vectors and Vector Operation, Algebraic and Transcendental Functions, Differential and Integral Calculus, Matrices, and Elementary Statistics with an emphasis in the application of these topics to the life sciences. Prerequisites: MAC1105, (48 hr. lecture)

Course No.	Course Title	Credits	Campus	Eff. Term
BSC3930	Biological Sciences Seminar	1	1,2,3,5,6,7,8	2011-2

Course Description: This course is designed for biological science majors. Students will gain an understanding of the broad range of career options within the biological sciences. Additionally, students will learn how to read, interpret, discuss, and cite selected examples of the scientific literature in different areas of biology. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, (48 hr. lecture)

Proposed Fee: $10.00

Course No.	Course Title	Credits	Campus	Eff. Term
MCB3023	Principles of Microbiology	3	1,2,3,5,6,7,8	2011-2

Course Description: This course offers an introduction to the principles of microbiology. Students will learn the taxonomy, biochemistry, genetics, and ecology of microorganisms and will have an understanding of the impact of microorganisms on the advancement of the biological sciences. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, CHM2211, CHM2211L, Co-requisites: MCB3023L, (48 hr. lecture)

Proposed Fee: $25.00

Course No.	Course Title	Credits	Campus	Eff. Term
MCB3023L	Principles of Microbiology Lab	2	1,2,3,5,6,7,8	2011-2

Course Description: This Laboratory course accompanies MCB3023. Students will learn and have direct experience with fundamental techniques for observation, isolation, cultivation, enumeration, biochemistry, identification, genetics, and control of microbes. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, CHM2211, CHM2211L, Co-requisites: MCB3023, (64 hr. lab)

Proposed Fee: $110.00

Course No.	Course Title	Credits	Campus	Eff. Term
PCB3060L	Genetics Lab	2	1,2,3,5,6,7,8	2011-2

Course Description: This laboratory course is designed to complement PCB 3060 Principles of Genetics. Students will learn hands-on skills with emphasis on laboratory principles, techniques, and instrumentation within the field of genetics. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, Co-requisites: PCB3060, (96 hr. lab)

Proposed Fee: $110.00

Course No.	Course Title	Credits	Campus	Eff. Term
PCB4024	Molecular and Cell Biology	3	1,2,3,5,6,7,8	2011-2

Course Description: This course will provide students with hands-on experience in the biological science workplace by conducting an internship. The experience readies the individual for their first position in-field. Special fee. Prerequisites: (144 hr. lecture)

Proposed Fee: $25.00

Course No.	Course Title	Credits	Campus	Eff. Term
BSC4940	Senior Specialty Internship	3	1,2,3,5,6,7,8	2011-2

Course Description: Students will learn the structure and function of cells and biological membranes, signal transduction pathways, cell cycle and cell division, the flow of genetic information and the regulation of gene expression. Exploration of laboratory techniques and discussion of the cellular basis of human diseases will also occur. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, (48 hr. lecture)

Proposed Fee: $26.00

Course No.	Course Title	Credits	Campus	Eff. Term
PCB4233C	Fundamentals of Immunology	4	1,2,3,5,6,7,8	2011-2

Course Description: Students will learn the immunological processes and concepts as they pertain to human health, disease prevention, development, and treatment. Its primary emphasis is on the cellular and non-cellular components of the immune system, and the ways in which these components interact to provide immunity. This is a combination lecture and lab course. Special fee. Prerequisites: MCB3023, MCB3023L, (48 hr. lecture; 32 hr. lab)

Proposed Fee: $55.00

Course No.	Course Title	Credits	Campus	Eff. Term
PCB4097	Human Physiology	3	1,2,3,5,6,7,8	2011-2

Course Description: The student studies the physiology of organism's major organ systems with emphasis on humans. Student will learn the principles of physics, cell biology, and anatomy in order to explain how the different organs systems work individually and in the context of the whole organism. Special fee. Prerequisites: PHY2054, PHY2054L, BCH3023, PCB4097, (48 hr. lecture)

Proposed Fee: $25.00

Course No.	Course Title	Credits	Campus	Eff. Term
BSC4434	Bioinformatics for Biologists	4	1,2,3,5,6,7,8	2011-2

Course Description: The student will be introduced to the basic concepts and tools that scientists use to analyze biological information. Students will learn, through the examination of literature, development of projects and use of available web-based tools, how to store, retrieve and analyze genetic information. Special fee. Prerequisites: BSC2010, BSC2010L, BSC2011, BSC2011L, PCB3060, PCB3060L, (64 hr. lecture)

Proposed Fee: $55.00

Course No.	Course Title	Credits	Campus	Eff. Term
MCB4503	Virology	3	1,2,3,5,6,7,8	2011-2

Course Description: This course will cover general virology, including virus structure, replication cycles, infection and mode of transmission of human diseases. Student will learn the major families of the bacterial (bacteriophages), plant and animal viruses and how they influence infection. Special fee. Prerequisites: CB3023, (48 hr. lecture)

Proposed Fee: $25.00

Course No.	Course Title	Credits	Campus	Eff. Term
BSC4910	Senior Capstone Research Project	3	1,2,3,5,6,7,8	2011-2

Course Description: This course will provide students with a capstone research experience in the biological science discipline. The experience readies the individual for their first position in-field. Special fee. Prerequisites: (96 hr. lab)

Proposed Fee: $265.00

Course No.	Course Title	Credits	Campus	Eff. Term
PHI3633	Biomedical Ethics	3	1,2,3,5,6,7,8	2011-2

Course Description: This is a foundation course in biomedical ethics. Students will be given a basic introduction to ethical theory. Students will use methods of effective reasoning to apply their ethical reasoning skills to topics in biomedical ethics. These topics may include, but are not limited to, genetic engineering, stem cell research, human cloning, euthanasia, and clinical research ethics. (48 hr. lecture)

APPROVE_____OPPOSE_____ MORE INFORMATION_____

Miami Dade College

Bachelor of Science with a major in Biological Sciences **CIP 26.0101**

Total credits required for the degree is 120.

The proposed MDC Bachelor of Science with a major in Biological Sciences degree is designed to provide preparation for three workforce specialties along with a strong foundation in biology, including core skill courses in biochemistry, genetics, molecular and cell biology, microbiology, and chemistry through organic. To complete degree requirements, students will take courses in one of three specialty areas and will receive the hands-on skills necessary to prepare them for direct entry into the workplace in one of three Biological/Life Science fields: Biotechnology, Biopharmaceutical Sciences, or Science Education that will prepare them for the Florida Department of Education Eligibility Statement in teaching. Students may also choose additional upper division science electives to strengthen workforce-based skills.

Course	Course Title	Credits	Pre-/Co-Requisites
General Education – 36 Credits Required			
Communications – 6 Credits Required		6	
Oral Communication – 3 Credits Required		3	
Humanities – 6 Credits Required		6	
Group A – Select 3 Credits			
AND			
Group B – Select 3 Credits:			
Behavioral and Social Science – 6 Credits Required		6	
Group A – Select 3 Credits			
AND			
Group B – Select 3 Credits			
Natural Science – 6 Credits Required			
Group A – 3 Credits			
BSC 2010	Principles of Biology 1(Common Prereq)	3	Pre/Co CHM 1045/L; Co BSC 2010L,
AND			
Group B –3 Credits			
CHM 1045	General Chemistry/Qual Analysis 1 (Common Prereq)	3	Co CHM 1045L
Mathematics – 6 Credits Required			
MAC 1105	College Algebra (recommended)	3	Pre MAT1033 or appropriate testing
STA 2023	Statistical Methods (Common Prereq)	3	Pre MAT1033 or appropriate testing
General Education Elective – 3 Credits Required			
BSC 2011	Principles of Biology 2 (Common Prereq)	3	Pre BSC 2010/L; Co BSC 2011L
LOWER DIVISION COMMON PREREQUISITE REQUIREMENTS – 24 Credits Required			
CHM 1045L	General Chemistry/Qual Analysis 1 Lab	2	Co CHM 1045
BSC 2010L	Principles of Biology 1 Lab	2	Pre/Co CHM 1045/L; Co BSC 2010,
BSC 2011L	Principles of Biology 2 Lab	2	Pre BSC 2010/L; Co BSC 2011
CHM 1046	General Chemistry/Qual Analysis 2	3	Pre CHM 1045/L; Co CHM 1046L
CHM 1046L	General Chemistry/Qual Analysis 2 Lab	2	Pre CHM 1045/L; Co CHM 1046
CHM 2210	Organic Chemistry 1	3	Pre CHM 1046/L; Co CHM 2210L
CHM 2210L	Organic Chemistry 1 Lab	2	Pre CHM 1046/L; Co CHM 2210
CHM 2211	Organic Chemistry 2	3	Pre CHM 1046/L; Co CHM 2210L
CHM 2211L	Organic Chemistry 2 Lab	2	Pre CHM 1046/L; Co CHM 2210
MAC 2241	Life Science Calculus	3	Pre MAC 1105

ALL SUBSEQUENT LOWER DIVISION COURSEWORK CAN BE TAKEN WITH UPPER DIVISION COURSEWORK

Course	Course Title	Credits	Pre-/Co-Requisites
LOWER DIVISION REQUIREMENTS – 8 Credits Required			
PHY 2053	Physics 1(without Calculus)	3	Pre MAC 2241; Co PHY 2053L
PHY 2053L	Physics 1(without Calculus) Lab	1	Pre MAC 2241; Co PHY 2053
PHY 2054	Physics 2(without Calculus)	3	Pre PHY 2053/L; Co PHY 2054L
PHY 2054L	Physics 2(without Calculus) Lab	1	Pre PHY 2053/L; Co PHY 2054
UPPER DIVISION BIOLOGICAL SCIENCES CORE CURRICULUM – 25 Credits Required			
BCH 3023	Introductory Biochemistry	3	Pre BSC 2010/L, 2011/L, CHM 2211/L; Co BCH 3023L
BCH 3023L	Introductory Biochemistry Lab	2	Pre BSC 2010/L, 2011/L, CHM 2211/L; Co BCH 3023
BSC 3930	Biological Sciences Seminar	1	Pre BSC 2010/L, BSC 2011/L
MCB 3023	Principles of Microbiology	3	Pre BSC 2010/L, BSC 2011/L, CHM 2211/L; Co MCB 3023L
MCB 3023L	Principles of Microbiology Lab	2	Pre BSC 2010/L, BSC 2011/L, CHM 2211/L; Co MCB 3023
PCB 3060	Genetics	3	Pre BSC 2010/L
PCB 3060L	Genetics Lab	2	Pre BSC 2010/L, BSC 2011/L; Co PCB 3060
PCB 4024	Molecular and Cell Biology	3	Pre BSC 2010/L, BSC 2011/L
PCB 4674	Evolution	3	Pre BSC 2010/L, BSC 2011/L, PCB 3060/L
BSC 4940	Senior Specialty Internship	3	Pre Completion of BS-BS core curriculum and approval by BS-BS faculty

BIOLOGICAL SCIENCES SPECIALTY AREA –18-19 Credits Required

Students must complete one of the following Specialty Areas in; Area 1: Biotechnology; Area 2: Biopharmaceutical Sciences; Area 3: Science Education.

AREA 1: BIOTECHNOLOGY – 19 credits

(The following course sequence is recommended for students wishing to pursue careers in the biotechnology fields)

BSC 2426	Biotechnology 1	3	Co BSC 2426L
BSC 2426L	Biotechnology 1 Lab	2	Co BSC 2426
BSC 2427	Biotechnology 2	3	Pre BSC 2426/L; Co BSC 2427L
BSC 2427L	Biotechnology 2 Lab	2	Pre BSC 2426/L; Co BSC 2427
BSC 4422	Biotechnology 3	3	Pre BSC 2427/L, PCB 3060/L, BCH 3023/L; Co BSC 4422L
BSC 4422L	Biotechnology 3 Lab	2	Pre BSC 2427/L, PCB 3060/L, BCH 3023/L; Co BSC 4422
PCB 4233C	Immunology	4	Pre MCB 3023/L

AREA 2: BIOPHARMACEUTICAL SCIENCES – 18 credits

(The following course sequence is recommended for students wishing to pursue a career in biopharmaceutical sciences)

BOT 3015	Survey of Plant Diversity	3	Pre BSC 2010/L, BSC 2011/L
ZOO 3021	Survey of Animal Diversity	3	Pre BSC 2010/L, BSC 2011/L
BOT 3015L	Survey of Plant Diversity Lab	1	Pre BSC 2010/L, BSC 2011/L; Co BOT 3015
or			
ZOO 3021L	Survey of Animal Diversity Lab	1	Pre BSC 2010/L, BSC 2011/L; Co ZOO 3021
PCB 4097	Human Physiology	3	Pre BCH 3023/L, PCB 4024, PHY2054/L
PCB 4233C	Immunology	4	Pre MCB 3023/L
BSC 4434	Bioinformatics for Biologists	4	Pre BSC 2010/L, BSC 2011/L, BSC 3060/L
Or			
MCB 4503	Virology	3	Pre MCB 3023/L
And			
XXX XXXX	General Elective	1	

AREA 3: SCIENCE EDUCATION – 18 credits

(The following course sequence is required for students wishing to receive a minor in education; please review additional information regarding this option below)

EDG 2311	Substitute Teacher Training	1	
EDG 3321	General Teaching Skills	3	Departmental Permission
EDG 3443	Classroom Management	3	Pre EDG 3321
EDF 4430	Assessment in Education	3	
EME 3430	Instructional Tech in Math/Science	2	
RED 3013	Foundations of Reading Instruction	3	
XXX 4XXX	Upper Division Biological Science Elective	3	

GENERAL ELECTIVES – 8-9 Credits Required

Students may use this elective block to complete the foreign language requirement. Those who have already completed this requirement are strongly encouraged to take additional upper division science electives selected from the list below or with assistance from a biological sciences advisor:

BOT 3015	Survey of Plant Diversity	3	Pre BSC 2010/L, BSC 2011/L
BOT 3015L	Survey of Plant Diversity Lab	1	Pre BSC 2010/L, BSC 2011/L; Co BOT 3015
BSC 4422	Biotechnology 3	3	Pre BSC 2427/L, PCB 3060/L, BCH 3023/L; Co BSC 4422L
BSC 4422L	Biotechnology 3 Lab	2	Pre BSC 2427/L, PCB 3060/L, BCH 3023/L; Co BSC 4422
BSC 4434	Bioinformatics for Biologists	4	Pre BSC 2010/L, BSC 2011/L, BSC 3060/L
BSC 4910	Senior Capstone Research Project	3	Pre Completion of BS-BS core curriculum and approval by BS-BS faculty
MCB 4503	Virology	3	Pre MCB 3023/L
PCB 3043	Fundamentals of Ecology	3	Pre BSC 2011/L
PCB 4097	Human Physiology	3	Pre BCH 3023/L, PCB 4024, PHY2054/L
PCB 4233C	Immunology	4	Pre MCB 3023/L
PHI 3633	Bioethics	3	
ZOO 3021	Animal Diversity	3	Pre BSC 2010/L, BSC 2011/L
ZOO 3021L	Animal Diversity Lab	1	Pre BSC 2010/L, BSC 2011/L; Co ZOO 3021
XXX XXXX	Foreign Languages	8	

***(green color indicates new course)**

TOTAL CREDITS

General Education Requirements.....36 credits
Lower Division Common Prerequisites (twelve credits within the Gen. Ed. block are also Common Prereqs).....24 credits
Lower Division Requirements.....8 credits
Upper Division Requirements.....25 credits
Biological Sciences Specialty Area..... 18-19 credits
Additional Electives.....8-9 credits

Total.....120 credits

Computer Competency: By the **16th earned** college level credit (excluding EAP and college preparatory courses), a student **must take** the Computer Competency Test and pass

Or

By the **31st earned** college level credit (excluding EAP and college preparatory courses), a student **must pass** CGS 1060, an equivalent continuing education or vocational credit course or retest with a **passing score on the Computer Competency Test**.

Foreign Language: Students admitted to the baccalaureate degree program without meeting the foreign language admission requirement of at least 2 courses (8-10 credit hours) of sequential foreign language at the secondary level or the equivalent of such instruction at the postsecondary level must earn such credits prior to graduation.

Additional Information:
Students entering with an AS or AAS degree may have more than 24 elective credits and may need additional General Education credits to meet the 36 General Education credits required for the baccalaureate degree. Students entering with an AA degree may need additional electives to provide appropriate background for the baccalaureate program.

A minimum cumulative grade point average of 2.0 is required for graduation.

Students must successfully complete 30 semester hours of 3000-4000 level course work.

Students should check their individualized Degree Audit Report to determine the specific graduation policies in effect for their program of study for the year and term they entered Miami Dade College. This outline includes current graduation requirements.

The final responsibility for meeting graduation requirements rests with the student.

A minor in education is not a Florida Department of Education state certification to teach. Upon completing 18 credits and obtaining their baccalaureate degree, students will have to apply to the Florida Department of Education for a Statement of Eligibility and comply with the requirements stated therein.