LEHMAN COLLEGE
OF THE
CITY UNIVERSITY OF NEW YORK

DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

Name of Program and Degree Award: Biology B.S.
Hegis number: 0401.00
Program code: 34022
Effective term: Fall 2024

1. **TYPE OF CHANGE:** Degree Requirements

2. **FROM:**
Biology, B.S. (~~39~~-~~78~~ credit major)

The required courses and credits are distributed as follows:

Prerequisites * (~~34~~-~~38~~ credits):

		credits
BIO 166	Principles Of Biology: Cells And Genes	4
BIO 167	Principles Of Biology: Organisms	4
CHE 166	General Chemistry I	4
CHE 167	General Chemistry Laboratory I	1.5
CHE 168	General Chemistry II	4
CHE 169	General Chemistry Laboratory II	1.5
PHY 166	General Physics I	5
PHY 167	General Physics II	5
~~MAT 175~~	~~Calculus I~~	~~4~~
~~MAT 155~~	~~Calculus I Laboratory~~	~~1~~

**Bio 166 And Bio 167 Can Be Used To Fulfill General Education Requirements. Both Are Prerequisites To All Other Biology Courses.*
~~Mat 175: Depending On Mathematics Placement, Students May Need To Complete The Pre-Requisite Mat 172, 4 Credits.~~
Students Who Complete Any Or All Of The Pre-Requisite Courses Before Declaring The Major May Complete The Major In Less Than 7~~7~~

Foundation (Required) Courses (~~19~~ Credits):
Biology (~~7~~ Credits):

		Credits
BIO 238	Genetics	4
BIO 240	Biostatistics	3

Organic Chemistry (12 Credits):

		Credits
CHE 232	Organic Chemistry Lecture I	4
CHE 233	Organic Chemistry Laboratory I	2
CHE 234	Organic Chemistry Lecture Ii	4
CHE 235	Organic Chemistry Laboratory Ii	2

At Least 2~~0~~-2~~1~~ Credits In One Of The Following Tracks:

Biomedical Sciences At Least 21 Credits

Select Courses From Lists: A, B, And C
At Least 12 Credits From List A:

		Credits
BIO 228	Mammalian Physiology	4
BIO 267	Comparative Anatomy Of Vertebrates	4
BIO 331	Experimental Microbiology	4

BIO 333	Endocrine Physiology	4
BIO 350	Introduction To Immunology	4
BIO 400	Biological Chemistry	4
BIO 410	Cell Physiology And Biochemistry	4
BIO 411	Principles Of Virology	2
BIO 415	Medical Microbiology	4
BIO 420	Molecular Biology	4

At Least 8 Credits From List B:

		Credits
BIO 241	Evolution, Species, And Biogeography	3
BIO 268	Vertebrate Embryology	4
BIO 311	Parasitology	3
BIO 312	Parasitology Laboratory	2
BIO 320	Neural Development: From Genes And Cells To Brains	3
BIO 321	Neural Development Laboratory	2
BIO 330	Plant Physiology	4
BIO 336	Marine Biology Lectures	3
BIO 338	Genetics Of Man	4
BIO 339	Ecology	4
BIO 340	Human Body And Brain	3
BIO 341	Human Body And Brain Laboratory	2

~~BIO 401~~	~~Biological Systematics~~	~~4~~
BIO 406	Biochemistry of Differentiation	3
~~BIO 431~~	~~Comparative Animal Physiology~~	~~4~~
BIO 435	Neurophysiology	3
BIO 465	Microbial Physiology And Genetics	4

At Least 1 Credit From List C:

		Credits
BIO 450	Biology Seminar	1
BIO 489	Introduction To Experimental Biology	1 (May Be Repeated For A Maximum 3 Credits).
BIO 490	Honors In Biological Sciences	3

Organismic Sciences At Least 21 Credits

Select Courses From Lists A, B, And C
At Least 12 Credits From List A:

		Credits
BIO 241	Evolution, Species, And Biogeography	3
BIO 268	Vertebrate Embryology	4
BIO 311	Parasitology	3
BIO 312	Parasitology Laboratory	2
BIO 320	Neural Development: From Genes And Cells To Brains	3
BIO 321	Neural Development Laboratory	2

BIO 330	Plant Physiology	4
BIO 336	Marine Biology Lectures	3
BIO 338	Genetics Of Man	4
BIO 339	Ecology	4
BIO 340	Human Body And Brain	3
BIO 341	Human Body And Brain Laboratory	2
~~BIO 401~~	~~Biological Systematics~~	~~4~~
BIO 406	Biochemistry of Differentiation	3
~~BIO 431~~	~~Comparative Animal Physiology~~	~~4~~
BIO 435	Neurophysiology	3
BIO 465	Microbial Physiology And Genetics	4

At Least 8 Credits From List B:

		Credits
BIO 228	Mammalian Physiology	4
BIO 267	Comparative Anatomy Of Vertebrates	4
BIO 331	Experimental Microbiology	4
BIO 333	Endocrine Physiology	4
BIO 350	Introduction To Immunology	4
BIO 400	Biological Chemistry	4
BIO 410	Cell Physiology And Biochemistry	4

BIO 411	Principles Of Virology	2
BIO 415	Medical Microbiology	4
BIO 420	Molecular Biology	4

At Least 1 Credit From List C:

		Credits
BIO 450	Biology Seminar	1
BIO 489	Introduction To Experimental Biology	1 (May Be Repeated For A Maximum 3 Credits).
BIO 490	Honors In Biological Sciences	3

Brain Sciences At Least ~~2~~0 Credits

Select Courses From Lists: A, B, And C
At Least ~~1~~3 Credits From List A:

		Credits
BIO 228	Mammalian Physiology	4
BIO 320	Neural Development: From Genes And Cells To Brains	3
BIO 321	Neural Development Laboratory	2
BIO 340	Human Body And Brain	3
BIO 341	Human Body And Brain Laboratory	2
BIO 435	Neurophysiology	3

At Least 1 Credit From List B:

		Credits

BIO 450	Biology Seminar	1
BIO 489	Introduction To Experimental Biology	1 (May Be Repeated For A Maximum 3 Credits).
BIO 490	Honors In Biological Sciences	3

~~6-9~~ Credits From List C:

		Credits
PSY 166	General Psychology	3
PSY 308	Motivation And Emotion	3
PSY 310	Psychology Of Learning	3
PSY 312	Psychology Of Memory	3
PSY 314	Cognitive Psychology	3
PSY 317	Psychology Of Sensation And Perception	3
PSY 366	Clinical Neuropsychology	3

Psy 166 Can Be Used To Fulfill General Education Requirements And Is A Prerequisite To All Other Psy Courses. Students Who Complete Psy 166 Before Declaring The Major Only Need To Complete 6 Credits In This Area.

~~Bioenvironmental Sciences~~ At Least ~~21~~ Credits

Select Courses From Lists: A, B, And C ~~Or D~~
At Least ~~14~~ Credits From List A:

		Credits
BIO 241	Evolution, Species, And Biogeography	3
~~BIO 246~~	~~Growth And Development Of Higher Plants~~	~~4~~

BIO 270	Invertebrate Zoology	3
BIO 271	Invertebrate Zoology Laboratory	2
BIO 330	Plant Physiology	4
BIO 331	Experimental Microbiology	4
BIO 336	Marine Biology Lectures	3
BIO 339	Ecology	4
BIO 400	Biological Chemistry	4
BIO 420	Molecular Biology	4

At Least 1 Credit~~s~~ From List B:

		Credits
BIO 450	Biology Seminar	1
BIO 489	Introduction To Experimental Biology	1 (May Be Repeated For A Maximum 3 Credits).
BIO 490	Honors In Biological Sciences	3

~~Either At Least 6 Credits In Geospatial Sciences From List C:~~

		~~Credits~~
~~GEP 204~~	~~Basic Mapping: Applications And Analysis~~	~~3~~
	~~Or~~	
~~GEO 101~~	~~Dynamic Earth~~	~~3~~
	~~Or~~	

~~GEH 101~~	~~An Introduction To Geography~~	~~3~~
	~~And~~	
~~GEP 205~~	~~Principles Of Geographic Information Science~~	~~3~~
	~~And~~	
~~GEP 321~~	~~Introduction To Remote Sensing~~	~~4~~
	~~Or~~	
~~GEP 3750~~	~~Data Acquisition And Integration Methods For Gis Analysis~~	~~3~~

~~Or 6 Credits From List D:~~

		~~Credits~~
~~POL 3600~~	~~Political Demography~~	~~3~~
~~POL 366~~	~~Global Political Economy~~	~~3~~
~~POL 368~~	~~Global Environmental Politics~~	~~3~~
~~POL 343~~	~~International And Regional Organizations~~	~~3~~

3. **TO:**
Biology, B.S. (33-79 Credit Major)

The Required Courses And Credits Are Distributed As Follows:
Prerequisites * (33 - 35 Credits):

		Credits
BIO 166	Principles Of Biology: Cells And Genes	4
BIO 167	Principles Of Biology: Organisms	4
CHE 166	General Chemistry I	4
CHE 167	General Chemistry Laboratory I	1.5

CHE 168	General Chemistry II	4
CHE 169	General Chemistry Laboratory II	1.5
PHY 166	General Physics I	5
PHY 167	General Physics II	5
MAT 172 or MAT 171 (4) and MAT 108 (2)	Precalculus 4-6	4

**BIO 166 and BIO 167 can be used to fulfill general education requirements. Both are prerequisites to all other biology courses.*
Students can complete MAT 172, 4 credits or the combined substitute (MAT 171 (4) and MAT 108) (2)
** BIO 240 has MAT 175 and MAT 155 as prerequisites. MAT 328 has MAT 128 as a prerequisite.
Students who complete any or all of the pre-requisite courses before declaring the major may complete the major in less than 77 credits.
A grade of C or higher is recommended for all courses in the prerequisite list.

Foundation (Required) Courses (23-24 Credits)
Biology (11-12 Credits):

		Credits
BIO 238	Genetics	4
BIO 240	Biostatistics	3
OR		
MAT 328	Techniques in Data Science	4

** BIO 240 has MAT 175 and MAT 155 as prerequisites. MAT 328 has MAT 128 as a prerequisite.

Organic Chemistry (12 Credits):

		Credits

CHE 232	Organic Chemistry Lecture I	4
CHE 233	Organic Chemistry Laboratory I	2
CHE 234	Organic Chemistry Lecture II	4
CHE 235	Organic Chemistry Laboratory II	2

At Least 21-22 Credits In One Of The Following Tracks:

Biomedical Sciences At Least 21 Credits

Select Courses From Lists: A, B, And C
At Least 12 Credits From List A:

		Credits
BIO 228	Mammalian Physiology	4
BIO 267	Comparative Anatomy Of Vertebrates	4
BIO 303	Molecular Genetics	4
BIO 331	Experimental Microbiology	4
BIO 333	Endocrine Physiology	4
BIO 350	Introduction To Immunology	4
BIO 400	Biological Chemistry	4
BIO 410	Cell Physiology and Biochemistry	4
BIO 411	Principles Of Virology	2
BIO 415	Medical Microbiology	4
BIO 420	Molecular Biology	4
BIO 431	Comparative Animal Physiology	4

At Least 8 Credits From List B:

		Credits
BIO 229	Astrobiology	4
BIO 241	Evolution, Species, And Biogeography	3
BIO 268	Vertebrate Embryology	4
BIO 311	Parasitology	3
BIO 312	Parasitology Laboratory	2
BIO 317	Drugs, Brain and Behavior	3
BIO 320	Neural Development: From Genes And Cells To Brains	3
BIO 321	Neural Development Laboratory	2
BIO 330	Plant Physiology	4
BIO 336	Marine Biology Lectures	3
BIO 338	Genetics Of Man	4
BIO 339	Ecology	4
BIO 340	Human Body And Brain	3
BIO 341	Human Body And Brain Laboratory	2
BIO 406	Biochemistry of Differentiation	3
BIO 425	Ichthyology	3
BIO 426	Ichthyology Laboratory	2
BIO 435	Neurophysiology	3

BIO 465	Microbial Physiology And Genetics	4

At Least 1 Credit From List C:

		Credits
BIO 440	Biology Journal Review	2
BIO 450	Biology Seminar	1
BIO 489	Introduction To Experimental Biology	1 (May Be Repeated For A Maximum 3 Credits).
BIO 490	Honors In Biological Sciences	3

Organismic Sciences At Least 21 Credits

Select Courses From Lists A, B, And C
At Least 12 Credits From List A:

		Credits
BIO 229	Astrobiology	4
BIO 241	Evolution, Species, And Biogeography	3
BIO 268	Vertebrate Embryology	4
BIO 317	Drugs, Brain and Behavior	3
BIO 311	Parasitology	3
BIO 312	Parasitology Laboratory	2
BIO 320	Neural Development: From Genes And Cells To Brains	3
BIO 321	Neural Development Laboratory	2

BIO 330	Plant Physiology	4
BIO 336	Marine Biology Lectures	3
BIO 338	Genetics Of Man	4
BIO 339	Ecology	4
BIO 340	Human Body And Brain	3
BIO 341	Human Body And Brain Laboratory	2
BIO 406	Biochemistry of Differentiation	3
BIO 425	Ichthyology	3
BIO 426	Ichthyology Laboratory	2
BIO 435	Neurophysiology	3
BIO 465	Microbial Physiology And Genetics	4

At Least 8 Credits From List B:

		Credits
BIO 228	Mammalian Physiology	4
BIO 267	Comparative Anatomy Of Vertebrates	4
BIO 303	Molecular Genetics	4
BIO 331	Experimental Microbiology	4
BIO 333	Endocrine Physiology	4
BIO 350	Introduction To Immunology	4
BIO 400	Biological Chemistry	4

BIO 410	Cell Physiology and Biochemistry	4
BIO 411	Principles Of Virology	2
BIO 415	Medical Microbiology	4
BIO 420	Molecular Biology	4
BIO 431	Comparative Animal Physiology	4

At Least 1 Credit From List C:

		Credits
BIO 440	Biology Journal Review	2
BIO 450	Biology Seminar	1
BIO 489	Introduction To Experimental Biology	1 (May Be Repeated For A Maximum 3 Credits).
BIO 490	Honors In Biological Sciences	3

Brain Sciences At Least 21 Credits

Select Courses From Lists: A, B, And C
At Least 14 Credits From List A:

		Credits
BIO 228	Mammalian Physiology	4
BIO 320	Neural Development: From Genes And Cells To Brains	3
BIO 321	Neural Development Laboratory	2
BIO 340	Human Body And Brain	3

BIO 341	Human Body And Brain Laboratory	2
BIO 400	Biological Chemistry	4
BIO 420	Molecular Biology	4
BIO 435	Neurophysiology	3

At Least 1 Credit From List B:

		Credits
BIO 440	Biology Journal Review	2
BIO 450	Biology Seminar	1
BIO 489	Introduction To Experimental Biology	1 (May Be Repeated For A Maximum 3 Credits).
BIO 490	Honors In Biological Sciences	3

At least 6 Credits From List C:

		Credits
PSY 166	General Psychology	3
PSY 308	Motivation And Emotion	3
PSY 310	Psychology Of Learning	3
PSY 312	Psychology Of Memory	3
PSY 314	Cognitive Psychology	3
PSY 317	Psychology Of Sensation And Perception	3

PSY 366	Clinical Neuropsychology	3

Psy 166 Can Be Used To Fulfill General Education Requirements And Is A Prerequisite To All Other Psy Courses. Students Who Complete Psy 166 Before Declaring The Major Only Need To Complete 6 Credits In This Area.

Bio-Data Sciences At Least 22 Credits

Select Courses From Lists: A, B, And C
At Least 12 Credits From List A:

		Credits
BIO 241	Evolution, Species, And Biogeography	3
BIO 242	Flowering Plants	4
BIO 270	Invertebrate Zoology	3
BIO 271	Invertebrate Zoology Laboratory	2
BIO 303	Molecular Genetics	4
BIO 330	Plant Physiology	4
BIO 331	Experimental Microbiology	4
BIO 336	Marine Biology Lectures	3
BIO 339	Ecology	4
BIO 400	Biological Chemistry	4
BIO 420	Molecular Biology	4
BIO 425	Ichthyology	3
BIO 426	Ichthyology Laboratory	2
BIO 503	Topics In Urban Ecology	4

At Least 1 Credit From List B:

		Credits
BIO 440	Biology Journal Review	2
BIO 450	Biology Seminar	1

BIO 489	Introduction To Experimental Biology	1 (May Be Repeated For A Maximum 3 Credits).
BIO 490	Honors In Biological Sciences	3

9 Credits in Geospatial, Environmental and Data Science From List C:

3 credits from:

GEP 205	Principles of Geographic Information Science	3
GEP 3060	Raster Applications	3
GEP 375	Data Acquistion Gis	3
GEO 340	Natural Hazards and Disasters: A Multidisciplinary Approach	3
ENV 235	Conservation of The Environment	3

6 credits from

GEH 245	Introduction to Quantitative Methods of Geography	3
SOC 348	Reasoning with Data	3
DAT 310	Data Visualization	3

Students that take MAT 128, MAT 328 to satisfy the math requirement and take GEH 245, SOC 348, and DAT 310 to satisfy List C for the Bio-Data Sciences track would earn a minor in Data Science.

BS To M.S. Dual Credit Opportunity
Undergraduate Students Majoring In Biology With 90 Or More Credits And A Minimum (3.0) Cumulative Index And (3.5) Index In The Major May Be Permitted To Enroll In Up To 8 Credits Of Graduate Coursework In Preparation For The M.S. Degree In Biology. The Student Must Receive Permission From The Department To Take Graduate Courses Prior To Registration.

4. **Rationale (Explain How This Change Will Impact Learning Outcomes Of The Department And Major/Program):**
1) Changed the prerequisites for the major to replace MAT 175 with MAT 172. MAT 172 is a corequisite for the general chemistry courses. Addition of MAT 172 to the list will clarify that students must take precalculus together with their chemistry courses as prerequisites for the major. 2) Using statistical tools to extract new information is a critical skill for biology majors. Statistics is now a required course for most health-professional schools, but a few schools continue to require calculus. We changed the Foundation courses to give students an option for learning data analysis and representation. Those that require calculus for health-professional schools, can take BIO 240 and its pre and co-requisites calculus courses. Those that do not require calculus can take MAT 328 and its prerequisite to learn data analysis and extraction. 3) The proposed policy permitting those with a 3.5 major GPA to take graduate-level courses will allow eligible students to show their competency for entering the M.S. program in Biological Sciences or other professional training schools. 4) Changed the

electives for list C of the Bioenvironmental track to enable students to earn a minor a Data Sciences and changed the name of the track to better represent the data-focused training that students would receive by completing the coursework. The changes are in line with a request from the SNSS division to incorporate data science minor into NSS majors, so students graduate with a vital skill for the job market. 5) Added new courses to the electives for list A and list B of the Biomedical and Organismic tracks and removed courses that are no longer taught by the department from those lists.

5. **Date of Departmental Approval:** April 3, 2023

LEHMAN COLLEGE
OF THE
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DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of Change:** *description, pre or corequisite, title*

2. **From:** ~~Strikethrough~~ the changes

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 303
Course Title	~~Molecular Genetics~~
Description	Gene structure, organization, and expression. Experimental methods ~~used for studying genes and their products.~~
Pre/ Co Requisites	BIO 166 and BIO 167 ~~and one BIO course at the 200 level or above (NOT BIO 230)~~
Credits	4
Hours	5
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society ____ Scientific World

3. **To:** Underline the changes

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 303
Course Title	Data Mining and Bioinformatics
Description	Gene structure, organization, and expression. Experimental methods with a focus on the principles of biological data mining as it relates to bioinformatics.
Pre/ Co Requisites	BIO 166 and BIO 167 and BIO 238
Credits	4
Hours	5
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable _____ Required _____ English Composition _____ Mathematics _____ Science _____ Flexible _____ World Cultures _____ US Experience in its Diversity _____ Creative Expression _____ Individual and Society _____ Scientific World

4. **Rationale (Explain how this change will impact the learning outcomes of the department and Major/Program):**
The title and description changes will provide more clarity on the focus of the course. Bioinformatics is an important subdiscipline of Biology and essential for any 21st century curriculum. In addition, the course can be included in the newly proposed Data Sciences track, thereby expanding course options for students pursuing that track. BIO 238 (Genetics) has been added as a pre-requisite since it is an essential foundation course and will provide the necessary background for students to learn the material.

5. **Date of departmental approval:** 10/11/2023

LEHMAN COLLEGE
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DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of Change:** *Hours, description*

2. **From:** ~~Strikethrough~~ the changes

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 181
Course Title	Anatomy and Physiology I
Description	~~(Open only to students majoring in Nursing; Dietetics, Foods, and Nutrition; Health Education; and Biology. Students majoring in Biology who have completed BIO 181 and BIO 182 can use those courses in place of BIO 228).~~ Study of human anatomy and physiology. Lecture topics include cell structure and function, tissues, and the study of the skeletal, muscular, nervous, and endocrine systems. Laboratory exercises ~~complement the lecture material~~ with the use of a workbook, models, and animal preparations. Note: This course satisfies either Life & Physical Science or Scientific World requirement in the CUNY 2013 Gen Ed requirements at Lehman.
Pre/ Co Requisites	
Credits	4
Hours	~~5~~ (3 lecture, 2 lab)
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	____ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science

	____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society __X__ Scientific World

3. **To:** Underline the changes

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 181
Course Title	Anatomy and Physiology I
Description	Study of human anatomy and physiology. Lecture topics include cell structure and function, tissues, and the study of the skeletal, muscular, nervous, and endocrine systems. Laboratory workshops apply knowledge with the us of a workbook for problem-solving models, and animal preparations. Note: Students majoring in Biology who have completed BIO 181 and BIO 182 can use those courses in place of BIO 228. Note 2: This course satisfies either Life & Physical Science or Scientific World requirement in the CUNY 2013 Gen Ed requirements at Lehman.
Pre/ Co Requisites	
Credits	4
Hours	6 (3 lecture, 2 lab, 1 recitation)
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	____ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science

	____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society __X__ Scientific World

4. **Rationale (Explain how this change will impact the learning outcomes of the department and Major/Program):**
We are proposing to add an hour of recitation to the course. During recitation, students will learn and discuss case studies and practice what they have learned in lecture. In these active-learning sessions, students will be guided to solve problems using their knowledge gained from lecture and the skills they have acquired in the lab. We think that recitation will contribute to engagement and retention as students will have greater opportunities for group learning and discussions of problems.

5. **Date of departmental approval:** March 29, 2023

LEHMAN COLLEGE
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DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of Change:** *Course hours, description, prerequisite*

2. **From:** ~~Strikethrough~~ the changes

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 182
Course Title	Anatomy and Physiology II
Description	Continuation of BIO 181. Lecture topics include the cardiovascular, respiratory, digestive, renal, endocrine, and reproductive systems. Emphasis is given to the physiological functioning of these systems. ~~Note: The course cannot fulfill any requirements within the BIO major or BIO minor.~~ Note: This course satisfies either Life & Physical Science or Scientific World requirement in the CUNY 2013 Gen Ed requirements at Lehman.
Pre/ Co Requisites	BIO 181
Credits	4
Hours	~~5~~ (3 lecture,2 lab)
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	____ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible

	____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society __X__ Scientific World

3. **To:** Underline the changes

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 182
Course Title	Anatomy and Physiology II
Description	Continuation of BIO 181. Lecture topics include the cardiovascular, respiratory, digestive, renal, endocrine, and reproductive systems. Emphasis is given to the physiological functioning of these systems. Laboratory workshops apply knowledge with the use of workbook for problem-solving, models, and animal preperations. Note: Students majoring in Biology who have completed BIO 181 and BIO 182 can use those courses in place of BIO 228. Note 2: This course satisfies either Life & Physical Science or Scientific World requirement in the CUNY 2013 Gen Ed requirements at Lehman.
Pre/ Co Requisites	Prerequisite: Bio 181, Grade of C or higher
Credits	4
Hours	6 (3 lecture, 2 lab, 1 recitation)
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	____ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures

	____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society __X__ Scientific World

4. **Rationale (Explain how this change will impact the learning outcomes of the department and Major/Program):**
1) We are proposing to add an hour of recitation to the course. During recitation, students will learn and discuss case studies and practice what they have learned in lecture. In these active-learning sessions, students will be guided to solve problems using their knowledge gained from lecture and the skills they have acquired in the lab. We think that recitation will contribute to engagement and retention as students will have greater opportunities for group learning and discussions of problems.
2) Data have been provided to show that BIO 181 students with Fs register for BIO 182. With insufficient background in anatomy and physiology, these students are likely to also fail BIO 182. This delays their graduation and prevents them from applying to nursing programs.

5. **Date of departmental approval:** March 29, 2023

LEHMAN COLLEGE
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DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of change:** New Course

2.

Department(s)	Biology
Career	[x] Undergraduate [ ] Graduate
Academic Level	[x] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 471
Course Title	Research In Molecular Microbiology
Description	A project-based laboratory course that trains students in applying their knowledge of biology and chemistry to develop independent research skills used in academia or industry. Students will learn to develop an experimental protocol based on scientific journal articles, carry out experiments, interpret data, and communicate their results.
Pre/ Co Requisites	Prerequisites: BIO166, BIO167, BIO 238, BIO 331, CHE 232, and CHE 233
Credits	2
Hours	4
Liberal Arts	[x] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	

General Education Component	__x_ Not Applicable _____ Required _____ English Composition _____ Mathematics _____ Science _____ Flexible _____ World Cultures _____ US Experience in its Diversity _____ Creative Expression _____ Individual and Society _____ Scientific World

3. **Rationale:**
Although many laboratory techniques are taught in various biology courses, students often display difficulty integrating them. This project-based laboratory course is designed to prepare students for jobs in academia or industry by training them in applying their knowledge and skills from other courses to complete projects like those performed in a research environment.

4. **Learning Outcomes (By the end of the course students will be expected to):**
- Understand and follow common research laboratory protocols and chemical safety rules
- Master basic experimental approaches through repeated practices
- Analyze a biological phenomenon to determine the biological cause
- Conduct background search
- Formulate a testable hypothesis
- Design experimental approaches to test the hypothesis
- Analyze and present data to support the hypothesis
- Create a presentation to communicate study results

5. **Date of Departmental Approval:** 10/11/2023

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DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of Change:** *Course description, pre or corequisite*

2. **From:** ~~Strikethrough~~ the changes

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 230
Course Title	Microbiology
Description	~~(Open only to students majoring in Nursing; Dietetics, Foods, and Nutrition; Health Education; and Physical Education.)~~ A survey of microbes and their structure, chemical composition, cultivation, ecology, and metabolism; special emphasis on applied aspects (infectious diseases and human resistance, food and industrial microbiology, biotechnology) Note: The course cannot fulfill any requirements within the BIO major or BIO minor).
Pre/ Co Requisites	PREREQ: Two semesters of 100-level biology.
Credits	4
Hours	6 (2 lecture, 4 lab)
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures ____ US Experience in its Diversity

	____ Creative Expression ____ Individual and Society ____ Scientific World

3. **To:** Underline the changes

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 230
Course Title	Microbiology
Description	A survey of microbes and their structure, chemical composition, cultivation, ecology, and metabolism; special emphasis on applied aspects (infectious diseases and human resistance, food and industrial microbiology, biotechnology) Note: The course cannot fulfill any requirements within the BIO major or BIO minor).
Pre/ Co Requisites	PREREQ: Two semesters of 100-level biology, Grade of C or higher
Credits	4
Hours	6 (2 lecture, 4 lab)
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society ____ Scientific World

4. **Rationale (Explain how this change will impact the learning outcomes of the department and Major/Program):**
Data have been provided to show that BIO 182 students with Fs register for BIO 230. With insufficient background in anatomy and physiology, these students are likely to also fail BIO 230. This delays their graduation and prevents them from applying to nursing programs.

5. **Date of departmental approval:** April 3, 2023

LEHMAN COLLEGE
OF THE
CITY UNIVERSITY OF NEW YORK

DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of Change:** Course description

2. **From:**

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 489
Course Title	Introduction to Experimental Biology
Description	Individual laboratory investigation for advanced students, under the guidance of a faculty member. Sponsorship of a faculty member is required. ~~Students are required to create and present a poster describing their work at annual meetings that are held either within or outside of Lehman College.~~ Sponsorship of a faculty member is required. 1 Credit (may be repeated for a maximum 3 credits).
Pre/ Co Requisites	Pre-requisites: Departmental permission and 15 BIO credits
Credits	1
Hours	1
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society ____ Scientific World

3. **To:**

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 489
Course Title	Introduction to Experimental Biology
Description	Individual laboratory investigation for advanced students, under the guidance of a faculty member. The course will provide cognitive and technical skills to prepare students for independent laboratory investigation. Sponsorship of a faculty member is required. (may be repeated for a maximum 3 credits).
Pre/ Co Requisites	Pre-requisites: Departmental permission and 15 BIO credits.
Credits	1
Hours	1
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_Not Applicable _____ Required _____ English Composition _____ Mathematics _____ Science _____ Flexible _____ World Cultures _____ US Experience in its Diversity _____ Creative Expression _____ Individual and Society _____ Scientific World

4. **Rationale (Explain how this change will impact the learning outcomes of the department and Major/Program):**
Production of data to render a final poster is not a realistic goal within the time limit for the course.

5. **Date of departmental approval:** 02/01/2023

LEHMAN COLLEGE
OF THE
CITY UNIVERSITY OF NEW YORK

DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of Change:** Prerequisites and Description

2. **From:**

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 490
Course Title	Honors in Biological Sciences
Description	Independent laboratory investigation for advanced students, under the guidance of a faculty member (minimum of 90 hours). Students are required to create and present a poster of their research at annual meetings that are held either within or outside of Lehman College. ~~Sponsorship of a faculty member is required.~~ Note: Required for Honors in Biological Sciences
Pre/ Co Requisites	Pre-requisites: GPA of 3.0 or better, ~~completion of at least one semester of BIO 489~~, and department permission
Credits	3
Hours	3
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society

	____ Scientific World

3. **To:**

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 490
Course Title	Honors in Biological Sciences
Description	Independent laboratory investigation for advanced students, under the guidance of a faculty member (minimum of 90 hours). Students are required to create and present a poster of their research at annual meetings that are held either within or outside of Lehman College. Note: Required for Honors in Biological Sciences, Sponsorship of a faculty member,
Pre/ Co Requisites	Pre-requisites: GPA of 3.0 or better, 18 BIO credits, and department permission
Credits	3
Hours	3
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society ____ Scientific World

4. **Rationale (Explain how this change will impact the learning outcomes of the department and Major/Program):**
The prerequisite of BIO 489 makes it harder for students interested in getting research experience to enroll in BIO 490. By removing BIO 489 as a prerequisite, we will enable more students who meet the GPA eligibility to demonstrate that they qualify for graduating with honors.

5. **Date of departmental approval:** 02/01/2023

LEHMAN COLLEGE
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DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of change:** *New Course*

2.

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 174
Course Title	Scientific Problem-Solving
Description	Understanding how the human brain works and learning how to train it for solving problems and making decisions.
Pre/ Co Requisites	
Credits	3
Hours	3
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable _____ Required _____ English Composition _____ Mathematics _____ Science _____ Flexible _____ World Cultures _____ US Experience in its Diversity _____ Creative Expression _____ Individual and Society _____ Scientific World

3. **Rationale:**

Offered as a pathway course in the Scientific World category, the course is designed to teach Lehman students of any major how to think through problems by a developing and applying a strategy commonly used in consulting firms for solving complex problems. Students have difficulty solving scientific problems. The goal is to train them on how the brain works to strategize solving personal problems, then teach them how to use the same strategy for solving scientific problems.

4. **Learning Outcomes (By the end of the course students will be expected to):**
   - Learn to gather, interpret, and assess information from a variety of sources and points of views to solve personal and scientific problems.
   - Demonstrate the ability to think critically and analytically by using probabilities to make decisions.
   - Create e-portfolios to show a strategy for working through a personal or scientific problem.

5. **Date of Departmental Approval:** 02/01/2023

LEHMAN COLLEGE
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DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of Change:** *Pre/Co Requisites*

2. **From:**

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 311
Course Title	Parasitology
Description	The study of parasitic organisms, their life cycles, the diseases thecause, and the treatments of these diseases in humans.
Pre/ Co Requisites	Prerequisite: BIO 166 and BIO 167 and one BIO course at 200 level or above. ~~Corequisite: BIO 312~~
Credits	3
Hours	3
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable _____ Require _____ English Composition _____ Mathematics _____ Science _____ Flexible _____ World Cultures _____ US Experience in its Diversity _____ Creative Expression _____ Individual and Society _____ Scientific World

3. **To:**

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 311
Course Title	Parasitology
Description	The study of parasitic organisms, their life cycles, the diseases they cause, and the treatments of these diseases in humans.
Pre/ Co Requisites	Prerequisite: BIO 166 and BIO 167 and one BIO course at 200 level or above.
Credits	3
Hours	3
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable _____ Required _____ English Composition _____ Mathematics _____ Science _____ Flexible _____ World Cultures _____ US Experience in its Diversity _____ Creative Expression _____ Individual and Society _____ Scientific World

4. **Rationale (Explain how this change will impact the learning outcomes of the department and Major/Program):**
1) Removal of BIO 312 lab as a corequisite will allow students the flexibility to take the lecture and lab courses in different semesters. The change will make it easier for students to schedule their courses.

5. **Date of departmental approval:** 09/28/2022

LEHMAN COLLEGE
OF THE
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DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of Change:** *Pre/Co Requisites*

2. **From:**

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 312
Course Title	Parasitology Laboratory
Description	Microscopic identification of life cycle stages of parasites. Diagnostic testing of animal parasites covered in BIO 311
Pre/ Co Requisites	Prerequisite: BIO 166 and BIO 167, and one BIO course at the 200 level or above. Corequisite: BIO 311
Credits	2
Hours	4 (lab)
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society ____ Scientific World

3. **To:**

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 312
Course Title	Parasitology Laboratory
Description	Microscopic identification of life cycle stages of parasites. Diagnostic testing of animal parasites covered in BIO 311
Pre/ Co Requisites	Prerequisite: BIO 166 and BIO 167 and one BIO course at 200 level or above Pre OR Corequisite: BIO 311
Credits	2
Hours	4 (lab)
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society ____ Scientific World

4. **Rationale (Explain how this change will impact the learning outcomes of the department and Major/Program):**
The addition of BIO 311 as Pre or Corequisite will allow students the flexibility to take the lecture course either within the same semester as the lab or a semester before taking the lab. The change will make it easier for students to schedule their courses.

5. **Date of departmental approval:** 09/28/22

LEHMAN COLLEGE
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DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of change:** *New Course*

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 229
Course Title	Astrobiology
Description	Introduction to the emerging field of Astrobiology which is concerned with the origin, evolution, and distribution of life in the Universe. Topics include the molecular and cellular structures of life, the co-evolution of life and a planet, the habitability of planetary bodies, the search for extraterrestrial life, the impact of spaceflight on human health and physiology, and the role of space exploration research and technologies in advancing our understanding of plant science and agriculture, the environment, and climate change. Laboratory exercises complement lecture topics and teach basic laboratory skills and techniques.
Pre/Co Requisites	BIO 166 and BIO 167
Credits	4
Hours	6 (2, lecture; 4, lab)
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society

	____ Scientific World

2. **Rationale:**
This proposed course for biology majors will expand and reinvigorate the Bioenvironmental track and provide an exciting new elective course option for other tracks within the major. The course is topical as there is a growing interest among the scientific community and public at large in space exploration and the possibility of extraterrestrial life, as well as the future viability of humans living on a planet that is undergoing climate change and subject to other environmental threats. An understanding of how life may co-evolve on other planets may provide insights into the evolution of life on our home planet, earth.

3. **Learning Outcomes (By the end of the course students will be expected to):**
- Describe how the emerging field of astrobiology may address fundamental questions related to the phenomenon of life in its cosmic context.
- Describe the molecular and cellular basis of life, energy requirements for life, the origins of life on earth, the co-evolution of life and a planet, and the habitability of planetary systems
- Identify the impact of spaceflight on human health and physiology.
- Identify the role and importance of space exploration in generating spin-off technologies that have led to notable advancements in the fields of energy and environment, climate science, crop science, and health and medicine.
- Demonstrate competency in interpreting and assessing quantitative data in various formats (i.e., graphs and tables).

4. **Date of Departmental Approval:** 12/07/22

LEHMAN COLLEGE
OF THE
CITY UNIVERSITY OF NEW YORK

DEPARTMENT OF BIOLOGICAL SCIENCES

CURRICULUM CHANGE

1. **Type of change:** New Course

2.

Department(s)	Biological Sciences
Career	[X] Undergraduate [ ] Graduate
Academic Level	[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial
Subject Area	Biology
Course Prefix & Number	BIO 317
Course Title	Drugs, Brain and Behavior
Description	Introduction to neuropharmacology, including therapeutic drugs such as anti-anxiety, antidepressant, and antipsychotic drugs, as well as psychoactive drugs of abuse. Biological basis of drug addiction, animal research, and emerging treatments for mental illness and neurodegenerative disease.
Pre/ Co Requisites	Prerequisites: BIO 166 and BIO 167 and BIO 238, and BIO 228, and CHE 232-233
Credits	3
Hours	3
Liberal Arts	[X] Yes [ ] No
Course Attribute (e.g. Writing Intensive, WAC, etc)	
General Education Component	__X_ Not Applicable ____ Required ____ English Composition ____ Mathematics ____ Science ____ Flexible ____ World Cultures ____ US Experience in its Diversity ____ Creative Expression ____ Individual and Society ____ Scientific World

3. **Rationale:**
BIO 317 has been running successfully as an experimental course.
Knowledge of neuroscience, neurochemistry and pharmacology is relevant for students interested in the pharmaceutical industry, research, and the medical field. This course will provide a foundation in neuroscience for more advanced courses in the department. The course will introduce students to classical and current research and literature in neuropharmacology.

4. **Learning Outcomes (By the end of the course students will be expected to):**
- Explain the neurochemical and molecular biology underlying neuronal communication (basic neuropharmacology, neurotransmitter systems, pharmacodynamics, route of drug administration, dose response and drug metabolism and elimination).
- Explain how drugs alter various aspects of behavior, including cognition and mood.
- Distinguish between drug use/abuse/ and physical and psychological drug dependence.
- Explain the development of the nervous system and its relevance to psychiatric and neurodegenerative disease, and the effectiveness of drug therapies in treating psychiatric/neurodegenerative disorders.
- Describe the neurobiological and neurochemical explanations proposed for psychiatric/neurodegenerative disorders.
- Describe the importance of behavioral neuroscience research in humans and laboratory animals to development of drug treatment, understanding neurological disorders and behavior.
- Demonstrate quantitative literacy skills through the articulation of dose-response curves, drug metabolism, and elimination.
- Demonstrate critical thinking skills by reading and assessing scientific literature.
- Demonstrate written and oral communication skills through individual and group presentations.

5. **Date of Departmental Approval:** March 29, 2023