

CUNY Common Core Course Submission Form

Instructions: All courses submitted for the Common Core must be liberal arts courses. Courses may be submitted for only one area of the Common Core. All courses must be 3 credits/3 contact hours unless the college is seeking a waiver for another type of Math or Science course that meets major requirements. Colleges may submit courses to the Course Review Committee at any time. Courses must also receive local campus governance approval for inclusion in the Common Core.

College	Lehman College
Course Prefix and Number (e.g., ANTH 101, if number not assigned, enter XXX)	BIO 174
Course Title	Scientific Problem-Solving
Department(s)	Biological Sciences
Discipline	Biology
Credits	3
Contact Hours	3
Pre-requisites (if none, enter N/A)	n/a
Co-requisites (if none, enter N/A)	n/a
Catalogue Description	Understanding how the human brain works and learning how to train it for solving problems and making decisions.
Special Features (e.g., linked courses)	
Sample Syllabus	Syllabus must be included with submission, 5 pages max recommended
Indicate the status of this course being nominated:	
<input checked="" type="checkbox"/> current course <input type="checkbox"/> revision of current course a new course being proposed	
CUNY COMMON CORE Location	
Please check below the area of the Common Core for which the course is being submitted. (Select only one.)	
Required <input type="checkbox"/> English Composition <input type="checkbox"/> Mathematical and Quantitative Reasoning <input type="checkbox"/> Life and Physical Sciences	Flexible <input type="checkbox"/> World Cultures and Global Issues <input type="checkbox"/> Individual and Society <input type="checkbox"/> US Experience in its Diversity <input checked="" type="checkbox"/> Scientific World <input type="checkbox"/> Creative Expression
Waivers for Math and Science Courses with more than 3 credits and 3 contact hours	
Waivers for courses with more than 3 credits and 3 contact hours will only be accepted in the required areas of "Mathematical and Quantitative Reasoning" and "Life and Physical Sciences." Three credit/3-contact hour courses must also be available in these areas.	
If you would like to request a waiver please check here:	<input type="checkbox"/> Waiver requested
If waiver requested: Please provide a brief explanation for why the course will not be 3 credits and 3 contact hours.	
If waiver requested: Please indicate whether this course will satisfy a major requirement, and if so, which major requirement(s) the course will fulfill.	

Learning Outcomes

In the left column explain the course assignments and activities that will address the learning outcomes in the right column.

I. Required Core (12 credits)

A. English Composition: Six credits

A course in this area must meet all the learning outcomes in the right column. A student will:

	<ul style="list-style-type: none"> • Read and listen critically and analytically, including identifying an argument's major assumptions and assertions and evaluating its supporting evidence.
	<ul style="list-style-type: none"> • Write clearly and coherently in varied, academic formats (such as formal essays, research papers, and reports) using standard English and appropriate technology to critique and improve one's own and others' texts.
	<ul style="list-style-type: none"> • Demonstrate research skills using appropriate technology, including gathering, evaluating, and synthesizing primary and secondary sources.
	<ul style="list-style-type: none"> • Support a thesis with well-reasoned arguments, and communicate persuasively across a variety of contexts, purposes, audiences, and media.
	<ul style="list-style-type: none"> • Formulate original ideas and relate them to the ideas of others by employing the conventions of ethical attribution and citation.

B. Mathematical and Quantitative Reasoning: Three credits

A course in this area must meet all the learning outcomes in the right column. A student will:

	<ul style="list-style-type: none"> • Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
	<ul style="list-style-type: none"> • Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.
	<ul style="list-style-type: none"> • Represent quantitative problems expressed in natural language in a suitable mathematical format.
	<ul style="list-style-type: none"> • Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.
	<ul style="list-style-type: none"> • Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.
	<ul style="list-style-type: none"> • Apply mathematical methods to problems in other fields of study.

C. Life and Physical Sciences: Three credits

A course in this area must meet all the learning outcomes in the right column. A student will:

	<ul style="list-style-type: none">• Identify and apply the fundamental concepts and methods of a life or physical science.
	<ul style="list-style-type: none">• Apply the scientific method to explore natural phenomena, including hypothesis development, observation, experimentation, measurement, data analysis, and data presentation.
	<ul style="list-style-type: none">• Use the tools of a scientific discipline to carry out collaborative laboratory investigations.
	<ul style="list-style-type: none">• Gather, analyze, and interpret data and present it in an effective written laboratory or fieldwork report.
	<ul style="list-style-type: none">• Identify and apply research ethics and unbiased assessment in gathering and reporting scientific data.

II. Flexible Core (18 credits)

Six three-credit liberal arts and sciences courses, with at least one course from each of the following five areas and no more than two courses in any discipline or interdisciplinary field.

A. World Cultures and Global Issues

A Flexible Core course must meet the three learning outcomes in the right column.

	<ul style="list-style-type: none">• Gather, interpret, and assess information from a variety of sources and points of view.
	<ul style="list-style-type: none">• Evaluate evidence and arguments critically or analytically.
	<ul style="list-style-type: none">• Produce well-reasoned written or oral arguments using evidence to support conclusions.

A course in this area (II.A) must meet at least three of the additional learning outcomes in the right column. A student will:

	<ul style="list-style-type: none">• Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring world cultures or global issues, including, but not limited to, anthropology, communications, cultural studies, economics, ethnic studies, foreign languages (building upon previous language acquisition), geography, history, political science, sociology, and world literature.
	<ul style="list-style-type: none">• Analyze culture, globalization, or global cultural diversity, and describe an event or process from more than one point of view.
	<ul style="list-style-type: none">• Analyze the historical development of one or more non-U.S. societies.
	<ul style="list-style-type: none">• Analyze the significance of one or more major movements that have shaped the world's societies.
	<ul style="list-style-type: none">• Analyze and discuss the role that race, ethnicity, class, gender, language, sexual orientation, belief, or other forms of social differentiation play in world cultures or societies.
	<ul style="list-style-type: none">• Speak, read, and write a language other than English, and use that language to respond to cultures other than one's own.

B. U.S. Experience in its Diversity

A Flexible Core course must meet the three learning outcomes in the right column.

	<ul style="list-style-type: none"> • Gather, interpret, and assess information from a variety of sources and points of view.
	<ul style="list-style-type: none"> • Evaluate evidence and arguments critically or analytically.
	<ul style="list-style-type: none"> • Produce well-reasoned written or oral arguments using evidence to support conclusions.

A course in this area (II.B) must meet at least three of the additional learning outcomes in the right column. A student will:

	<ul style="list-style-type: none"> • Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the U.S. experience in its diversity, including, but not limited to, anthropology, communications, cultural studies, economics, history, political science, psychology, public affairs, sociology, and U.S. literature.
	<ul style="list-style-type: none"> • Analyze and explain one or more major themes of U.S. history from more than one informed perspective.
	<ul style="list-style-type: none"> • Evaluate how indigenous populations, slavery, or immigration have shaped the development of the United States.
	<ul style="list-style-type: none"> • Explain and evaluate the role of the United States in international relations.
	<ul style="list-style-type: none"> • Identify and differentiate among the legislative, judicial, and executive branches of government and analyze their influence on the development of U.S. democracy.
	<ul style="list-style-type: none"> • Analyze and discuss common institutions or patterns of life in contemporary U.S. society and how they influence, or are influenced by, race, ethnicity, class, gender, sexual orientation, belief, or other forms of social differentiation.

C. Creative Expression

A Flexible Core course must meet the three learning outcomes in the right column.

	<ul style="list-style-type: none"> • Gather, interpret, and assess information from a variety of sources and points of view.
	<ul style="list-style-type: none"> • Evaluate evidence and arguments critically or analytically.
	<ul style="list-style-type: none"> • Produce well-reasoned written or oral arguments using evidence to support conclusions.

A course in this area (II.C) must meet at least three of the additional learning outcomes in the right column. A student will:

	<ul style="list-style-type: none"> • Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring creative expression, including, but not limited to, arts, communications, creative writing, media arts, music, and theater.
	<ul style="list-style-type: none"> • Analyze how arts from diverse cultures of the past serve as a foundation for those of the present, and describe the significance of works of art in the societies that created them.
	<ul style="list-style-type: none"> • Articulate how meaning is created in the arts or communications and how experience is interpreted and conveyed.
	<ul style="list-style-type: none"> • Demonstrate knowledge of the skills involved in the creative process.
	<ul style="list-style-type: none"> • Use appropriate technologies to conduct research and to communicate.

D. Individual and Society	
A Flexible Core course <u>must meet the three learning outcomes</u> in the right column.	
	<ul style="list-style-type: none"> • Gather, interpret, and assess information from a variety of sources and points of view.
	<ul style="list-style-type: none"> • Evaluate evidence and arguments critically or analytically.
	<ul style="list-style-type: none"> • Produce well-reasoned written or oral arguments using evidence to support conclusions.
A course in this area (II.D) <u>must meet at least three of the additional learning outcomes</u> in the right column. A student will:	
	<ul style="list-style-type: none"> • Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the relationship between the individual and society, including, but not limited to, anthropology, communications, cultural studies, history, journalism, philosophy, political science, psychology, public affairs, religion, and sociology.
	<ul style="list-style-type: none"> • Examine how an individual's place in society affects experiences, values, or choices.
	<ul style="list-style-type: none"> • Articulate and assess ethical views and their underlying premises.
	<ul style="list-style-type: none"> • Articulate ethical uses of data and other information resources to respond to problems and questions.
	<ul style="list-style-type: none"> • Identify and engage with local, national, or global trends or ideologies, and analyze their impact on individual or collective decision-making.
E. Scientific World	
A Flexible Core course <u>must meet the three learning outcomes</u> in the right column.	
Using case studies of personal and biological problems, students will learn how to create decision trees for solving any type of problem. Decision trees are tools for visualizing various factors that may underlie a problem and methodically verifying the pros and cons of various options to make sound decisions. Once the factors are identified, students will be guided to gather relevant information from a variety of sources to assign probabilities for each option.	<ul style="list-style-type: none"> • Gather, interpret, and assess information from a variety of sources and points of view.
Working in small groups, students will be guided to understand probabilities based on collected information and to use them in arguing critically for choosing the best option and deciding under uncertain conditions.	<ul style="list-style-type: none"> • Evaluate evidence and arguments critically or analytically.
Each student will learn how to create, maintain, and present an e-portfolio to show the process of learning how to create decision trees and how to use them for solving either personal or scientific problems. Students will also work in small groups to solve a scientific problem and present their decision trees to the class at the end of the semester.	<ul style="list-style-type: none"> • Produce well-reasoned written or oral arguments using evidence to support conclusions.
A course in this area (II.E) <u>must meet at least three of the additional learning outcomes</u> in the right column. A student will:	
By making clay models of the brain and spinal nerves, students will learn the anatomy of the nervous system in the realm of life and physical sciences.	<ul style="list-style-type: none"> • Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.
Students will use GSR biometric sensors to become familiar with tools that are used to measure physiological reactions to uncertainty associated with problem solving and decision making.	<ul style="list-style-type: none"> • Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.
	<ul style="list-style-type: none"> • Articulate and evaluate the empirical evidence supporting a scientific or formal theory.

	<ul style="list-style-type: none"> • Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.
<p>Making informed decisions about policy or public concern under uncertain conditions requires scientific thinking, some understanding of probabilities, and a basic ability to read graphs. Using case studies of personal and biological problems, students will practice creating decision trees to help them think methodically through any type of simple or complex problem, assign probabilities to outcomes of various factors that may underlie each problem, and understand data presented in tabular or graphic forms.</p>	<ul style="list-style-type: none"> • Understand the scientific principles underlying matters of policy or public concern in which science plays a role.

Scientific Problem-Solving – Fall 2023

Instructor: Maryam Bamshad. I am a Professor in the [Department of Biological Sciences at Lehman College](#). I teach courses such as endocrinology and the human body and brain. My research is focused on cognition and emotions. You can talk to me on Zoom either after class or by scheduling an appointment.

Course Description: BIO 174, a pathways general education course in the Scientific World category that fulfills the Flexible Core requirement.

Recommended Books

- Recommended: Problem Solving 101: A Simple Book for Smart People by Ken Watanabe, 2009 ISBN 978-1-59184-242-2
- Recommended: Bulletproof Problem Solving: The One Skill that Changes Everything, by Robert McLean and Charles Conn, 2019

Technology: We will be using Blackboard as course management system and the [National Science Teaching Association \(NSTA\)](#) as a resource for biological case studies. All your course materials including reading resources, syllabus, assignments, and grades are on Blackboard. Participation in a research project is a requirement for the course. For technology help and issues regarding your CUNY email or password, please contact the IT help desk 718-960-1111.

Learning Goals: My goal is to train your brain in using the scientific principles for solving personal as well as biological problems. You will learn the process by which consultants and scientists use to ask questions, visualize problems, acquire relevant information, analyze data, and make evidence-based decisions.

Learning Objectives

- Learn how to solve problems based on probabilities.
- Learn how to make decisions based on probabilities.

Learning Outcomes

1. Be able to articulate and reframe questions.
2. Use visualization tools (decision trees) to identify multiple factors involved in any type of problem.
3. Identify missing information.
4. Acquire relevant data using a variety of resources.
5. Understand probabilistic events expressed verbally, numerically, and graphically.
6. Know how to decide based on probabilities.

Assessment

- Scores for a midterm exam to test knowledge.
- Scores for creating a decision tree to solve a personal problem.

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- Scores for creating a decision tree to solve a biological problem.
- Quality of individual e-portfolios on the process of decision making.
- Quality of group project to present a biological problem and provide a decision for solving the problem.

Classroom Policies

- Attend class regularly and on time.
- Remain present and attentive during class.
- Participate in class discussions and in group work.
- Complete all assignments by the due date.
- Avoid talking, texting, and internet browsing during class unless the activity is regarding the lecture.
- Be respectful when communicating online with your classmates.
- Post online only materials that are relevant to and appropriate for learning the course material.
- Avoid plagiarizing information you post online or cheating during tests (see the Lehman College academic policy shown below)

When to Learn	What to Learn	How to Learn
1. Thursday, August 25	Introduction to the course	Review the syllabus, course objectives, and class policies, Form groups and learn how to work productively in a team.
2. Tuesday, August 30	How does the human brain develop?	Examine a human brain model to learn its major parts.
3. Thursday, September 01	How does the human brain learn?	Build a clay model of a human brain.
4. Tuesday, September 06	How does the human brain process information to make decisions?	Build a clay model of a neuron.
5. Thursday, September 08	How does the human brain process emotions?	Build a clay model of a spinal vertebrae and its somatic and autonomic nerves.
6. Tuesday, September 13	What is uncertainty and how does the body react to uncertainty?	Measure galvanic skin response with sensors to detect arousal in response to uncertainty.
7. Thursday, September 15	How do we express uncertainty in words and numbers? Part 1	Practice understanding probabilities.
8. Tuesday, September 20	How do we express uncertainty in words and numbers? Part 2	Practice understanding probabilities
9. Thursday, September 22	How do we graphically represent uncertainty? Part 1	Practice learning to read graphs
10. Thursday, October 06	How do we graphically represent uncertainty? Part 2	Practice learning to read graphs
11. Tuesday, October 11	Testing your knowledge	Midterm exam on brain and uncertainty expressions

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12. Thursday, October 13	Learn how to create a decision tree for solving problems and making the best possible decision.	Practice drawing decision trees to visualize problems.
13. Tuesday, October 18	Create a decision tree to solve personal problem 1	Search for relevant resources to complete a decision tree.
14. Thursday, October 20	Create a decision tree to solve personal problem 2	Search for relevant resources to complete a decision tree.
15. Tuesday, October 25	Create a decision tree to solve personal problem 3	Search for relevant resources to complete a decision tree.
16. Thursday, October 27	Create a decision tree to solve personal problem 4	Search for relevant resources to complete a decision tree.
17. Tuesday, November 01	Create a decision tree to solve biological problem 1	Search for relevant resources to complete a decision tree.
18. Thursday, November 03	Create a decision tree to solve biological problem 2	Search for relevant resources to complete a decision tree.
19. Tuesday, November 08	Create a decision tree to solve biological problem 3	Search for relevant resources to complete a decision tree.
20. Thursday, November 10	Create a decision tree to solve biological problem 4	Search for relevant resources to complete a decision tree.
21. Tuesday, November 15	Individual e-portfolio presentation Part 1	Demonstrate your learning process and receive feedback.
22. Thursday, November 17	Individual e-portfolio presentation Part 2	Demonstrate your learning process and receive feedback.
23. Tuesday, November 22	Individual e-portfolio presentation Part 3	Demonstrate your learning process and receive feedback.
24. Tuesday, November 29	Group project presentation Part 1	Demonstrate ability for teamwork and receive feedback.
25. Thursday, December 01	Group project presentation Part 2	Demonstrate ability for teamwork and receive feedback.
26. Tuesday, December 06	Participate in research	Become familiar with biometric research and tools
27. Thursday, December 08	Participate in research	Become familiar with biometric research and tools
28. Tuesday, December 13	Participate in research	Become familiar with biometric research and tools
29. Thursday, December 15	Participate in research	Become familiar with biometric research and tools

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Grading is based on the activities completed for the lecture and the laboratory components of the course. The details are specified in the following table.

Lecture Activities	Other Activities
Midterm Exam: 15%	Quality of personal decision trees: 20%
Quality of built models: 10%	Quality of biological decision trees: 20%
Class participation: 5%	Quality of individual e-portfolios: 15%
	Quality of group project presentation: 15%

Percent	Grade
93%	A
90%	A-
87%	B+
83%	B
80%	B-
77%	C+
73%	C
70%	C-
67%	D+
63%	D
60%	F

Grading Policy

- Grades will not be changed under any circumstances unless I have made an error in calculating your grade.
- Make-up exams are only given prior to the exam date with proof of legitimate excuse.
- An INC grade is given only if the student has missed one exam and has a passing grade in the course.
- Instructors are not allowed to give any projects for extra credits to change a grade.
- You will lose 100 points if you miss an exam without proof of a legitimate excuse.
- The final exam and a make-up final exam will be given in accordance with the timetable provided by the Office of the Registrar.

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Student Disability: Lehman College is committed to providing access to all programs and curricula to all students. Students with disabilities who may need classroom accommodations are encouraged to register with the Office of Student Disability Services. For more information, please contact the [Office of Student Disability Services](#), Shuster Hall, Room 238, phone number, 718-960-8441, [Email](#). **Public Safety:** 109 APEX (718-960-8593) **Emergency:** (718-960-7777).

Recording of Remote Classes: Students who participate in this class with their camera on or use a profile image are agreeing to have their video or image recorded solely for the purpose of creating a record for students enrolled in the class to refer to, including those enrolled students who are unable to attend live. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live.

Exam Proctoring: All exams in this course will be proctored online by TopHat/CUNY-sponsored program.

Internet Access and Connectivity: Lehman College has arranged for all its students to have access to computers and high-speed internet connection. Therefore, we expect that students in this class will be present and attentive for the duration of each class and each exam without disruption. If you have any problems with computer technology or internet access, it is your responsibility to contact the [Lehman College Office of Information Technology](#) to resolve the issue ahead of the scheduled class time or exam. Please note that the instructor may not be able to disrupt the class or the exam in order to solve problems related to student internet connectivity or other technological issues.

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Academic integrity is acting with honesty, respect, and responsibility in learning and in research. It is a moral code that binds us to do the right thing even when no one is looking.

Academic integrity is essential to any course, including this one _____. Students may fail to exhibit integrity by cheating, plagiarizing, obtaining unfair advantage, or falsifying records. In so doing, they hurt themselves, because they do not learn the material sufficiently and move on to later courses and careers as impostors, assumed to have skills they do not yet possess. They hurt their classmates, because they cheapen their hard-won accomplishments and disrupt the class. And they hurt future students, because the reaction to cheating will be to create ever stricter testing conditions.

Examples of academic dishonesty include but are not limited to those shown at <http://lehman.smartcatalogiq.com/2019-2021/Undergraduate-Bulletin/Academic-Services-and-Policies/Academic-Integrity>. For example, cheating on an exam includes, but is not limited to: Consulting with others regarding the exam while it is ongoing (this includes tutors, classmates, people who took the class before and family members etc.) and posting exam questions online for others to answer while the exam is ongoing, and including posting exam questions to online tutoring services such as Chegg. For online or hybrid courses, academic dishonesty also includes communicating in any form electronically or otherwise during an exam, sharing answers with peers electronically, or sharing screenshots of exam questions. Copying and pasting answers from the internet and not writing in own words or paraphrasing another's written statements. Additional rules may apply to specific exams. If so, they will be listed in the instructions for the exam.

Academic dishonesty is a very serious issue and will not be tolerated for any lecture, lab, or research activity.

Cheating on an exam in this course: Should a student exhibit academic dishonesty, the instructor will inform the student of the suspicion, charges, and sanctions in writing. Any form of academic dishonesty will result in an F for the course, and a report to the College's Academic Integrity Officer, regardless of whether the cheating materially affected the score of the student in question.

Your pledge: To indicate that you understand academic integrity is central to the success of this course and your future success, you will be asked either to write out an honor statement during each exam or to confirm the receipt of this statement that has been approved and sponsored by the School of Natural and Social Sciences of Lehman College.

"I, _____ have read the syllabus and the statement of academic integrity. I understand that academic integrity is central to the success of myself and others during this and future courses. The work I present here in this exam/lab/homework is my own and is in my own words. I declare that I have fulfilled my responsibility as an honest student, and the work presented here is true representation of my ability in this course."