

APPROVED BY SENATE
02/10/2020

New Proposal

Date Submitted: 11/26/19 2:34 pm

Viewing: : **Plant Biotechnology, BS**

Last edit: 12/05/19 11:11 am

Changes proposed by: Scott Bartlett

In Workflow

1. **U Program Review**
2. **1802 Committee Chair**
3. **1802 Head**
4. **KL Committee Chair**
5. **KL Dean**
6. **University Librarian**
7. **Provost**
8. **Senate EPC**
9. Senate
10. U Senate Conf
11. Board of Trustees
12. IBHE
13. DMI

Approval Path

1. 12/02/19 10:39 am
Deb Forgacs (dforgacs):
Approved for U Program Review
2. 12/02/19 10:43 am
Lane Rayburn (arrayburn):
Approved for 1802 Committee Chair
3. 12/02/19 10:46 am
Adam Davis (asdavis1):
Approved for 1802 Head
4. 12/05/19 9:12 am
Anthony Yannarell (acyann):

- Approved for KL
Committee Chair
5. 12/05/19 9:27 am
Anna Ball (aball):
Approved for KL
Dean
6. 12/05/19 9:33 am
John Wilkin
(jpwilkin):
Approved for
University
Librarian
7. 12/05/19 10:04
am
Kathy Martensen
(kmartens):
Approved for
Provost

Proposal Type

Proposal Type:

Major (ex. Special Education)

Proposal Title:

if this proposal is one piece of a multi-element change please include the other impacted programs here. *example: A BS revision with multiple concentration revisions*

Proposal to Establish a new Bachelor of Science degree with a major in Plant Biotechnology (B.S. in Plant Biotech) in the Department of Crop Sciences, College of Agricultural, Consumer and Environmental Sciences.

Official Program Name Plant Biotechnology, BS

Banner/Codebook Name

Corresponding Degree BS Bachelor of Science

Program Code:

Major Code	Minor Code	Conc Code	Degree Code
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EP Control Number EP.20.70

Senate Approval Date

Senate Conference Approval Date

BOT Approval Date

IBHE Approval Date

Effective Date:

Effective Catalog Term Fall 2020

Sponsor College Agr, Consumer, & Env Sciences

Sponsor Department Crop Sciences

Sponsor Name A. Lane Rayburn
arayburn@illinois.edu

Sponsor Email

College Contact Brianna Gregg
bjgray2@illinois.edu

College Contact Email

Is this program interdisciplinary?

No

Academic Level Undergraduate

Will you admit to the concentration directly?

Is a concentration required for graduation?

Program Description and Justification

Provide a **brief** description and justification of the program, including highlights of the program objectives, and the careers, occupations, or further educational opportunities for which the program will prepare graduates, when appropriate.

Many students are highly interested in learning about and acquiring employable skillsets in innovative biotechnology-based solutions for addressing urgent global challenges to agriculture and food security. The proposed new Bachelor of Science in Plant Biotechnology degree incorporates courses in crop sciences, molecular biology, genetics and genomics, biochemistry, plant protection, and data analysis to provide a comprehensive education in the field of biotechnology. This interdisciplinary curriculum prepares students for careers in a variety of different fields. This major also allows enough flexibility for students to take courses in various disciplines or obtain a minor all within the 126 total hours.

The proposed new degree has been a successful concentration within the Bachelor of Science in Crop Sciences degree program for more than 20 years, and in recent years, this concentration has had the largest number of students enrolled compare to the other concentrations.

Is This a Teacher Certification Program?

No

Will specialized accreditation be sought for this program?

No

Institutional Context

University of Illinois at Urbana-Champaign

Describe the historical and university context of the program's development. Include a short summary of any existing program(s) upon which this program will be built.

Explain the nature and degree of overlap with existing programs and, if such overlap exists, document consultation with the impacted program's home department(s).

In Fall 2018, 51 out of 138 total Crop Sciences students (37%) were enrolled in the Plant Biotech concentration. However, we now seek to expand the visibility and prominence of this program. In a self-evaluation of our curriculum, we determined that a lack of student awareness of the concentration combined with disinterest in the current degree designation of "Crop Sciences" strongly limited student enrollment in the program. There is significant non-departmental student demand for research opportunities with our biotechnology faculty, suggesting strong student interest in this area. Despite this interest, the students do not see Crop Sciences as a potential major indicating that we are failing to attract these students as they are matriculating at the university. Due to the scope of the plant biotechnology concentration growing beyond its original intent, this concentration has become very distinct from our other concentrations. While modifying this concentration it was realized that this is more than a concentration change but warrants designation as a major. Many of the core requirements, CPSC 261, 265, and MCB 450 to name a few, are not part of the other concentrations. Thus, the creation of this new major would enhance student identity, provide greater prominence to this area of diverse expertise in the Crop Sciences, and reflect the distinctness of this plan of study.

University of Illinois

Briefly describe how this program will support the University's mission, focus and/or current priorities. Demonstrate the program's consistency with and centrality to that mission.

The University's "The Next 150: 2018-2023 Strategic Plan" identified four fundamental goals for the future of the university: 1) foster scholarship, discovery, and innovation; 2) provide transformative learning experiences; 3) make a significant and visible societal impact; and 4) steward current resources and generate additional resources for strategic initiatives. Our program in Plant Biotechnology includes facets that cover all of these priority areas. Due to the nature of the subject, the degree emphasizes discovery and innovation by teaching students about historical and current advances in the biotechnology field (e.g. CPSC 261 "Biotechnology in Agriculture") and by providing students with hands-on opportunities to explore cutting-edge technologies (e.g. CPSC 265 "Genetic Engineering Lab"). Each student is required to participate in either an internship or a research experience (CPSC 393 or 395) which fosters integrative learning, and to develop the professional skills needed for future success in their chosen careers (CPSC 498 "Crop Sciences Professional Development"). Finally, we anticipate that increasing our number of B.S. graduates will increase our national and international standing as a leader in the Plant Biotechnology field, and would help us develop new corporate partnerships to support student education and research efforts.

Since we have information regarding student enrollment in the corresponding concentration for the past 20 years, we will be able to assess whether the new degree program results in increased student enrollment. We have also defined specific learning outcomes to evaluate student success in the program.

State of Illinois

Indicate which of the following goals of the Illinois Board of Higher Education's Strategic Initiative are supported by this program: (choose all that apply)

Educational Attainment - increase educational attainment to match the best-performing states.
Integration of Educational, Research and Innovation Assets - Better integrate Illinois' educational, research and innovation assets to meet economic needs of the state and its regions.

Describe how the proposed program supports these goals.

Educational Attainment: By including an internship/research requirement in this curriculum, our students will not only match the best-performing states but will exceed the educational attainment for most states. Illinois is already in leader in the area of plant biotechnology and by requiring our students to take their knowledge beyond the classroom and into the business/laboratory setting will allow them to learn not only the knowledge but also how to apply that knowledge in real world settings.

Integration of Educational, Research and Innovation Assets: The Crop Sciences Department is already a leader in developing superior employees/leaders in the field of plant biotechnology. By more critically focusing the Plant Biotechnology core curriculum, the students graduating from this program will be more prepared and therefore more beneficial to potential employers. Having Plant Biotechnology as a major will also let more students self-identify with the program and therefore increase visibility. It will also potential employers to more successfully identify our students with their true discipline.

Admission Requirements

Desired Admissions Term Fall 2020

Provide a brief narrative description of the admission requirements for this program. Where relevant, include information about licensure requirements, student background checks, GRE and TOEFL scores, and admission requirements for transfer students.

The minimum GPA for admission consideration is 2.50 (A=4.00). Transfer coursework equivalent to the University of Illinois courses listed in bold, red italics must be successfully completed prior to the desired term of entry.

Sophomore-level transfer admission requires completion of transfer coursework equivalent to the following University of Illinois courses:

CHEM 101, Introductory Chemistry or an introductory chemistry course with Lab
MATH 112, Algebra or higher¹

Junior-level transfer admission requires completion of transfer coursework equivalent to the following

University of Illinois courses:

CHEM 102, General Chemistry I and CHEM 103, General Chemistry Lab I

CHEM 104, General Chemistry II and CHEM 105, General Chemistry Lab II

MATH 220, Calculus or MATH 234, Calculus for Business I

Describe how critical academic functions such as admissions and student advising are managed.

Our Undergraduate Recruiter engages with prospective and admitted students via marketing, recruitment events, campus visits, etc. Once students accept their offer of admission, our Academic Program Manager becomes their primary academic advisor and guides them through degree requirements. Additionally, students are assigned to faculty mentors for career, internship, research, and graduate school advising.

Enrollment

Number of Students in Program (estimate)

Year One Estimate	20	5th Year Estimate (or when fully implemented)
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75-100 (50 continuing from old concentration and 25 to 50 new students)

Estimated Annual Number of Degrees Awarded

Year One Estimate	0	5th Year Estimate (or when fully implemented)
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What is the matriculation

term for this
program?

Fall

Delivery Method

This program is
available:

Face-to-Face

Budget

Will the program or revision require staffing (faculty, advisors, etc.)
beyond what is currently available?

No

Additional Budget
Information

Attach File(s)

Resource Implications

Facilities

Will the program require new or additional facilities or significant
improvements to already existing facilities?

No

Technology

Will the program need additional technology beyond what is currently
available for the unit?

No

Non-Technical Resources

Will the program require additional supplies, services or equipment (non-technical)?

No

Resources

Faculty Resources

Please address the impact on faculty resources including any changes in numbers of faculty, class size, teaching loads, student-faculty ratios, etc. Describe how the unit will support student advising, including job placement and/or admission to advanced studies.

Current departmental teaching loads and class sizes are generally low, and the undergraduate-to-faculty FTE rate is less than 5, so we have the capacity to increase student enrollment without significant impacts on faculty resources.

Library Resources

Describe your proposal's impact on the University Library's resources, collections, and services. If necessary please consult with the appropriate disciplinary specialist within the University Library.

The library currently has a strong collection in the area of Plant Biotechnology which is currently used by our concentration students. We do not anticipate a large impact.

Instructional Resources

Will there be any reduction in other course offerings, programs or concentrations by your department as a result of this new program/proposed change?

Yes

Please describe

Additional capacity currently exists within the departmental courses that will serve as core courses for the major, such that we anticipate a doubling of current enrollment (from 10-15 to 20-30 students per cohort) would not significantly affect existing courses. Additional sections and/or offerings of certain core courses can be added as necessary.

The existing "Plant Biotechnology and Molecular Biology" concentration under the BS in Crop Sciences major will be gradually phased out as students currently enrolled in the program graduate or transfer to the new degree program, and would be eliminated once there are no longer any students enrolled in the concentration (by approximately 2024).

Does this new program/proposed change result in the replacement of another program?

Yes

Choose program being replaced Crop Sciences: Plant Biotechnology and Molecular Biology, BS

Does the program include other courses/subjects impacted by the creation/revision of this program?

Yes

Required courses

IB 103 - Introduction to Plant Biology
IB 150 - Organismal & Evolutionary Biol
MCB 450 - Introductory Biochemistry

ACES 101 - Contemporary Issues in ACES
ACES 200 - ACES Transfer Orientation

Explain how the inclusion or removal of the courses/subjects listed above impacts the offering departments.

This major will be supported by course offerings in the School of Integrative Biology (IB) and the School of Molecular and Cellular Biology (MCB). All of these courses are at the introductory level or serve as required courses for these programs, therefore they are offered regularly and have large capacities. Our concentration students currently take these courses, and thus we do not anticipate that the new degree program would have any significant impact on these courses.

Attach letters of support from other departments. [IB Letter of Support.pdf](#)
[MCB Letter of Support.pdf](#)

Financial Resources

How does the unit intend to financially support this proposal?

As this program is currently offered as a concentration under an existing major, the existing infrastructure exists with the Department of Crop Sciences to support the program. Additionally, the department is currently hiring several new faculty members who may teach new courses that could fit within the scope of the new major curriculum.

Will the unit need to seek campus or other external resources?

No

Attach letters of support

Will an existing tuition rate be used or continue to be used for this program?

Yes

Market Demand

What market indicators are driving this proposal? If similar programs exist in the state, describe how this program offers a unique opportunity for students:

In the consensus study report "Science Breakthroughs to Advance Food and Agricultural Research by 2030" from the National Academies of Sciences, Engineering, and Medicine, the authors identified five interdisciplinary areas with critical breakthrough opportunities: 1) transdisciplinary research and systems approach; 2) sensing technologies; 3) data science and agri-food informatics; 4) genomics and precision breeding; and 5) microbiome. The subject content and learning experiences in the Plant Biotechnology program will prepare our students for careers in these critical areas.

What type of employment outlook should these graduates expect? Explain how the program will meet the needs of regional and state employers, including any state agencies, industries, research centers, or other educational institutions that expressly encourage the program's development.

We anticipate that, similar to past graduates, our future graduates will readily find job opportunities in the Plant Biotechnology sector. According to the TEconomy/BIO report "Investment, Innovation and Job Creation in a Growing U.S. Bioscience Industry 2018", there are more than 1.74 million bioscience-related jobs in the U.S., representing an increase of almost 19% since 2001, and more than 85,000 of these jobs are located here in Illinois. In particular, Illinois leads the U.S. in the number of people employed in Agricultural Feedstock and Industrial Biosciences, accounting for 12.5% of the total U.S. employment in this field. Also, "The Employment Opportunities for College Graduates in Food, Agriculture, Renewable Natural Resources, and the Environment" forecast for 2015-2020 predicts that "plant science graduates at all degree levels will find excellent career opportunities." Finally, graduates of our Plant Biotechnology program will join a growing field of plant and agricultural scientists who are working to feed the ever-increasing world population using biotechnology. According to PG Economics, from 1996-2016 biotech crops provided 17 million farmers with more than \$186 billion in economic gains ("GM crops: global socio-economic and environmental impacts 1996-2016" by Graham Brookes and Peter Barfoot). As the quantity and diversity of biotech crops grown worldwide continues to increase, we anticipate that our graduates will meet the growing demand for students trained in Plant Biotechnology.

What resources will be provided to assist students with job placement?

The departmental academic advising office offers general assistance to students regarding their university career, while ACES Career Services provides career-related assistance. Additionally, each student is assigned a Faculty Mentor in their first year to help prepare them for their future careers. Not only do Faculty Mentors provide specific career-related advice, they also assist students throughout their four years by guiding them to the most appropriate courses, helping them find and apply to internships or research programs, and serving as recommendation letter writers for post-graduation opportunities. We anticipate that our departmental post-graduation placement rate of >80% (including graduates either employed or pursuing advanced degrees) will remain high in the future.

If letters of support are available attach them here:

Program Regulation

Describe how the program is aligned with or meets licensure, certification, and/or entitlement requirements, if applicable.

Briefly describe the plan to assess and improve student learning, including the program's learning objectives; when, how, and where these learning objectives will be assessed; what metrics will be used to signify student's achievement of the stated learning objectives; and the process to ensure assessment results are used to improve student learning.

Not applicable.

Is the career/profession for graduates of this program regulated by the State of Illinois?

No

Program of Study

"Baccalaureate degree requires at least 120 semester credit hours or 180 quarter credit hours and at least 40 semester credit hours (60 quarter credit hours) in upper division courses" (source: <https://www.ibhe.org/assets/files/PrivateAdminRules2017.pdf>). For proposals for new bachelor's degrees, if this minimum is not explicitly met by specifically-required 300- and/or 400-level courses, please provide information on how the upper-division hours requirement will be satisfied.

All proposals must attach the new or revised version of the Academic Catalog program of study entry. Contact your college office if you have questions.

For new programs, attach Program of Study [Plant Biotechnology-Learning Outcomes.pdf](#)

Catalog Page Text

Catalog Page Text: Description of program for the catalog page. This is not official content, it is used to help build the catalog pages for the program. Can be edited in the catalog by the college or department.

Bachelor of Science in Plant Biotechnology

Biotechnology is now a part of our daily lives in applications such as developing nutritionally enhanced foods, enabling sustainable agricultural production, and engineering plants for industrial and medical purposes. The plant biotechnology major provides an interdisciplinary curriculum integrating the science and practice of crop production through courses in molecular biology, genetics and genomics, biochemistry, plant protection, and data analysis. The program also offers many opportunities to participate in research and internships. This curriculum prepares students for careers in biotechnology or for entrance into graduate and professional schools. Our students pursue employment in scientific research or fields related to the biotechnology enterprise including science policy, patent law, and business development.

Statement for Programs of Study Catalog

General Education Requirements

Code	Title	Hours
Requirement		Hours
Composition I and Speech		6 to 7
RHET 105 & CMN 101	Writing and Research and Public Speaking	
OR		
CMN 111 & CMN 112	Oral & Written Comm I and Oral & Written Comm II	
Advanced Composition		3 to 4
Cultural Studies		9
Western/Comparative Cultures		
Non-Western Cultures		
US Minority Cultures		
Foreign Language	Third Level or Above	
Quantitative Reasoning I		4 to 5
MATH 220 or MATH 221 or MATH 234	Calculus Calculus I Calculus for Business I	
Quantitative Reasoning II		3
CPSC 241	Intro to Applied Statistics	
Natural Sciences and Technology		8
CHEM 102 & CHEM 103 CHEM 104 & CHEM 105	General Chemistry I and General Chemistry Lab I General Chemistry II and General Chemistry Lab II	
Humanities and the Arts		6

Code	Title	Hours
	Social and Behavioral Sciences	7 to 8
ACE 100	Introduction to Applied Microeconomics 1	
	Total Hours for Gen Ed Requirements	46-50

Course List

Code	Title	Hours
	ACES Requirements	0-2
ACES 101	Contemporary Issues in ACES	
or ACES 200	ACES Transfer Orientation	

Major Requirements

Course List

Code	Title	Hours
	Non-Departmental Core Requirements	11
IB 103	Introduction to Plant Biology	4
IB 150	Organismal & Evolutionary Biol	4
MCB 450	Introductory Biochemistry	3
	Crop Sciences Core Requirements	12-13
CPSC 102	Research in Crop Sciences	1
CPSC 112	Introduction to Crop Sciences	4
CPSC 382	Organic Chem of Biol Processes	4
	Internship or Research/Thesis (choose one):	2-3
CPSC 393	Crop Sciences Internship	
or HORT 393	Horticulture Internship	
CPSC 395	Undergrad Research or Thesis	
or HORT 395	Undergrad Research or Thesis	
or PLPA 395	Undergrad Research or Thesis	
CPSC 498	Crop Sci Professional Developmt	1
	Biotechnology Requirements	13-14
CPSC 261	Biotechnology in Agriculture	3
CPSC 265	Genetic Engineering Lab	3
CPSC 352	Plant Genetics	4
CPSC 452	Advanced Plant Genetics	3-4
or CPSC 453	Principles of Plant Breeding	
	Plant Protection and Data Analysis Requirements	6-7
	Select two of the following:	6
CPSC 226	Introduction to Weed Science	3
CPSC 266	Data in Biology and Agriculture	4
CPSC 270	Applied Entomology	3
PLPA 204	Introductory Plant Pathology	3
	Major Electives	8
	Choose from any 300- or 400- level CPSC, HORT, or PLPA courses, excluding: CPSC 393 , HORT 393 , CPSC 395 , HORT 395 & PLPA 395 .	

EP Documentation

Attach
Rollback/Approval
Notices

DMI Documentation

Attach Final
Approval Notices

Attached
Document

Justification for
this request

Program Reviewer
Comments

Kelly Ritter (ritterk) (10/30/19 11:26 am): Rollback: Rollback per email exchange with Anna Ball 10/29/19. KR 10/30/19

Adam Davis (asdavis1) (10/30/19 11:44 am): Rollback: Please share with Lane to revise the course tables with respect to the organic chemistry requirements for the program.

Deb Forgacs (dforgacs) (11/01/19 10:54 am): Rollback: letters of approval.

Lane Rayburn (arayburn) (12/02/19 10:42 am): The Plant Biotechnology major proposal has been revised. CHEM 232/233 (Organic Chemistry Lecture/Lab) has been removed from the Non-Departmental Core requirements and CPSC 382 (Organic Chemistry of Biological Processes) added to the Crop Science Core requirements. During the development of this major it was discussed which of these should be in the major. It was decided that since the CHEM classes were in the original Crop Sciences : Plant Biotechnology concentration that it may be simpler to keep it as is in the new major. However, upon review by CHEM and LAS, the only courses that seemed to cause an issue was CHEM 232/233. There was concern by chemistry that the addition of students in this major would overwhelm the CHEM classes. Given the department had already discussed using CPSC 382 as the organic chemistry course and there is room for the additional students in CPSC 382. We are proposing to replace CHEM 232/233 with CPSC 382 to alleviate the concerns of chemistry and LAS.

Key: 896

UNIVERSITY OF ILLINOIS
AT URBANA - CHAMPAIGN

School of Molecular and Cellular Biology

393 Morrill Hall
505 South Goodwin Avenue
Urbana, IL 61801



26 November 2019

Dear Professor Rayburn,

I am writing in on behalf of the School of Molecular & Cellular Biology regarding your new degree program (BS) in Plant Biotechnology. After reviewing the proposal, I see that there is a possibility of approximately 25 more students per academic year taking MCB 450 from this major. At this time, we have capacity in MCB 450, offered Fall, Spring and Summer terms, and should be able to manage this small increase. Best of luck with your new degree program.

Sincerely,

A handwritten signature in black ink, appearing to read 'Melissa Michael', written in a cursive style.

Melissa Michael
Director for Core Curriculum
Asst. Director for Undergraduate Instruction
School of Molecular & Cellular Biology
217.244.6238
mmichae@illinois.edu

From: [Downie, Stephen R](#)
To: [Rayburn, A Lane](#)
Cc: [Bartlett, Scott E](#)
Subject: Re: PLANT BIOTECHNOLOGY, BS proposed by Crop Sciences
Date: Friday, November 8, 2019 6:20:51 PM

Dear Dr. Rayburn,

I'm glad to see Crop Sciences is proposing a major in Plant Biotechnology. The School of Integrative Biology (IB) has reviewed your latest proposal and as before, we see no issues with including courses IB 103 (Introduction to Plant Biology) and IB 150 (Organismal and Evolutionary Biology) is your list of required courses for the proposed major.

As you have indicated in your proposal, these courses are offered regularly and have large enrollments. Any increased enrollment through your major should not have any significant impact on these courses.

If you or any one else wishes any additional information, please do not hesitate to contact me. I hope this email will serve your purpose in lieu of a formal letter.

Sincerely,
Stephen Downie
Associate Director of Academic Affairs, School of Integrative Biology

On 11/6/19 3:44 PM, Rayburn, A Lane wrote:

Dear Dr. Downie,

Crop Sciences is proposing a Plant Biotechnology Major. Your department had already approved it in the CIM; however, we now need a letter from your department. There has been a revision. After the departments approved the major, LAS indicated that the only issue concerning them was room in CHEM 232/233. CHEM 232/233 (Organic Chemistry Lecture/Lab) has been removed from the Non-Departmental Core requirements and CPSC 382 (Organic Chemistry of Biological Processes) added to the Crop Science Core requirements.

No changes have been made in your courses. It should be noted that the Plant Biotechnology major is not really new. It is a transition from a concentration to a major. As a concentration it has averaged 50 students total in the last 3 years. We expect to increase our enrollment in this major to 75 - 100 (an increase of 50% - 100%). Thus this is not an influx of 75 (or 100 new students) but a potential increase of 25 (max 50) students total over the next 4 years.

We would appreciate a letter as soon as possible with regard to the impact on

your department.

I am attaching the revised draft proposal of the Plant Biotechnology major.

Thank you for your time and consideration in this matter.

Sincerely

Dr. A. Lane Rayburn
Professor of Cytogenetics
Director of Undergraduate and Online Certificate Programs
Department of Crop Sciences
University of Illinois
AE-120 Turner Hall, 1102 S. Goodwin Ave
Urbana, IL 61801
Telephone - 217 333-4374.
[http:// https://cropsciences.illinois.edu/people/profile/arayburn](https://cropsciences.illinois.edu/people/profile/arayburn)

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Stephen R. Downie, Professor
Associate Director of Academic Affairs | School of Integrative Biology
Director | GAANN Fellowships
Curator | University of Illinois Vascular Plant Herbarium (ILL)
Department of Plant Biology | 239 Morrill Hall | 505 S Goodwin Ave
University of Illinois at Urbana-Champaign | Urbana | IL 61801-3707
Telephone: (217) 333-1275
Email: sdownie@illinois.edu
www.life.illinois.edu/downie/
www.life.illinois.edu/plantbio/

**Plant Biotechnology
Learning Outcomes**

1. Students will demonstrate proficiency in the areas of crop sciences, molecular biology, genetics and genomics, biochemistry, plant protection, and data analysis.
2. Students will gain leadership skills through team-based science in an experiential learning context to become leaders in scientific fields.
3. Students will communicate biotechnology-related content to the public using traditional and 21st century media platforms.
4. Students will discover how to apply biotechnologies to solve global problems and how these technologies can serve as class equalizers between developed and developing countries.
5. Students will develop professional networks that will enhance future career choices.