

State of Illinois Model Programs of Study Guide: **Agriculture, Food, and Natural Resources**

February 2022



Funding for this project was provided through a Grant Agreement from the Illinois Community College Board, utilizing Perkins Leadership funding.



About ICCB

In 1965, the Illinois General Assembly established the Illinois Community College Board to create a system of public community colleges that would be within easy reach of every resident. Today, the Illinois Community College System covers the entire state with 48 colleges and one multi-community college center in 39 community college districts. Community colleges serve nearly one million Illinois residents each year in credit and noncredit courses and many more through their public service programs.

Illinois' community colleges meet both local and statewide needs for education and workforce development through high-quality, affordable, accessible, and cost-effective programs and services. Learn more at iccb.org.



About Education Systems Center

Education Systems Center (EdSystems) is a mission-driven policy development and program implementation center based within Northern Illinois University's Division of Outreach, Engagement, and Regional Development. EdSystems' mission is to shape and strengthen education and workforce systems that prepare more young people for productive careers and lives in a global economy. EdSystems leads and manages the Illinois P-20 Council's College and Career Readiness Committee, which recently drove the development and adoption of the Postsecondary and Workforce Readiness Act (pwract.org). Learn more about EdSystems at edsystemsniu.org.

About the Model Programs of Study Guide

The Illinois Community College Board (ICCB) sponsored the development of Model Programs of Study Guides in crucial industry areas as part of the Illinois State Plan for Strengthening Career and Technical Education for the 21st Century Act (also known as the Perkins V Plan). This Guide was developed in consultation and collaboration with the Illinois State Board of Education (ISBE) through a process led and facilitated by Education Systems Center at NIU (EdSystems). As further detailed in this Guide, the process involved extensive research into labor market information and credential programs, and dialogue across secondary, postsecondary, and employer stakeholders.

The primary purposes and goals for the Model Programs of Study are to:

1. **Provide guidance and exemplars** for local programs to adopt or customize as they develop programs of study for approval as part of the Perkins V Plan.
2. **Establish a framework** for State agencies to develop and implement program supports.
3. **Identify priority dual credit courses** that are foundational to the industry area and well-situated for statewide scaling and articulation.
4. **Define the competencies** that should be sequenced across a program of study course sequence to prepare students for the future of work in that industry area.
5. **Identify entry points** for employers to support coursework and related experiences.

Model Programs of Study supplement and complement other State of Illinois career and technical education and career pathway resources, including the [ISBE Career Guide](#), [State of Illinois Career Pathways Dictionary](#), [Career Development Experience Toolkit](#), [Postsecondary and Workforce Readiness Act Recommended Technical and Essential Employability Competencies](#), [State of Illinois Workforce Development Strategic Plan](#), [Workforce Education Strategic Plan](#), and related state and regional data resources. School districts, community colleges, and their partners are encouraged to use this Guide, state resources, and local program and course information to develop materials for student and family outreach.

The full Model Programs of Study for Agriculture, Food, and Natural Resources, depicted graphically on pp. 4 – 5, can be used as a reference in local planning processes. The Guide then presents and describes in detail each component of the sequence, including descriptions of the underlying research, analysis, and Advisory Committee input leading to each component:

- I. Background and Process for Developing Model Programs of Study ([pp. 6 – 7](#))
- II. Priority Occupations and Promising Credentials in Finance and Business Services ([pp. 8 – 10](#))
 - a. Promising Credential Program Categories ([pp. 8 – 9](#))
 - b. High-Priority Occupations ([pp. 9 – 10](#))
 - c. Levels of Education Needed ([p. 10](#))
- III. Programs of Study Sequence Description ([pp. 11 – 14](#))
 - a. High School Career-Focused Instructional Sequence and Related Work-Based Learning ([pp. 11 – 13](#))
 - b. Recommended High School General Education Courses ([pp. 13 – 14](#))
 - c. Recommended First Year Postsecondary Courses ([p. 14](#))
- IV. Strategic Dual Credit Courses – Competency Descriptions ([p. 15](#))

Appendix A includes the PWR Act Recommended Technical Competencies and the recommended Essential Employability Competencies. Appendix B includes the Advisory Committee membership.

Model Programs of Study Guide: Agriculture, Food, and Natural Resources

ORIENTATION / INTRODUCTION Grades 9-10

SKILL DEVELOPMENT Grades 10-12

CAPSTONE / ADVANCED Grades 12



POSTSECONDARY COURSES +

Recommended 1st Year

**CAREER
FOCUSED
COURSES**

Agribusiness

Horticulture
& Plant Science

<p>Basic Agricultural Science or Introduction to the Agricultural Industry</p>	<p>Agriculture Business Management </p> <p>or Introductory Economics of Food, Fiber, and Natural Resources </p>	<p>Introduction to Animal Science </p> <p>or Introduction to Soil Science </p>	<p>Introduction to Microcomputer Skills in Agriculture</p> <p>Continue AS or AAS Sequence</p>
	<p>Horticulture Production & Management </p> <p>or Introduction to Horticulture </p>	<p>Introduction to Soil Science </p> <p>or Introduction to Crop/Plant Science </p>	<p>Introductory Economics of Food, Fiber, and Natural Resources </p>

Courses and Work-Based Learning Address the PWR Act Recommended Technical and Essential Employability Competencies

**WORK-BASED
LEARNING**

<p>Career Exploration (2)* Team-Based Challenge* or FFA Career Development Event</p>	<p>Team-Based Challenge* or FFA Career Development Event Supervised Agricultural Experience or Youth Apprenticeship</p>	<p>Team-Based Challenge Supervised Agricultural Experience or Apprenticeship</p>
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* May be offered through Career and Technical Student Organizations (CTSOs) including Illinois Association of Agricultural Education (FFA) and Science Olympiad

SCIENCE

<p>Science Sequence</p>	<p>Science Sequence</p>	<p>Biology </p> <p>or General Biology for Non-Majors </p>	<p>Chemistry or Science Sequence</p>
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**SOCIAL
SCIENCE**

<p>Social Science Sequence</p>	<p>Social Science Sequence</p>	<p>Microeconomics </p>	<p>Microeconomics </p> <p>or Macroeconomics </p> <p>or Social Science Sequence</p>
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MATH

<p>Algebra/Geometry</p>	<p>Geometry/Algebra 2</p>	<p>General Education Math or Transitional Math: Quantitive Literacy Statistics</p>	<p>General Education Math </p> <p>or Statistics </p>
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ENGLISH

<p>English Sequence</p>	<p>English Sequence</p>	<p>English Composition </p> <p>or Transitional English</p>	<p>English Composition </p> <p>or Oral Communication</p>
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AP or
Dual Credit



Dual
Credit
Course



Dual Credit
Course Affiliated
With IAI Code



Course or Program
Prepares for
Industry Credential



Postsecondary
Course Affiliated
with IAI Code



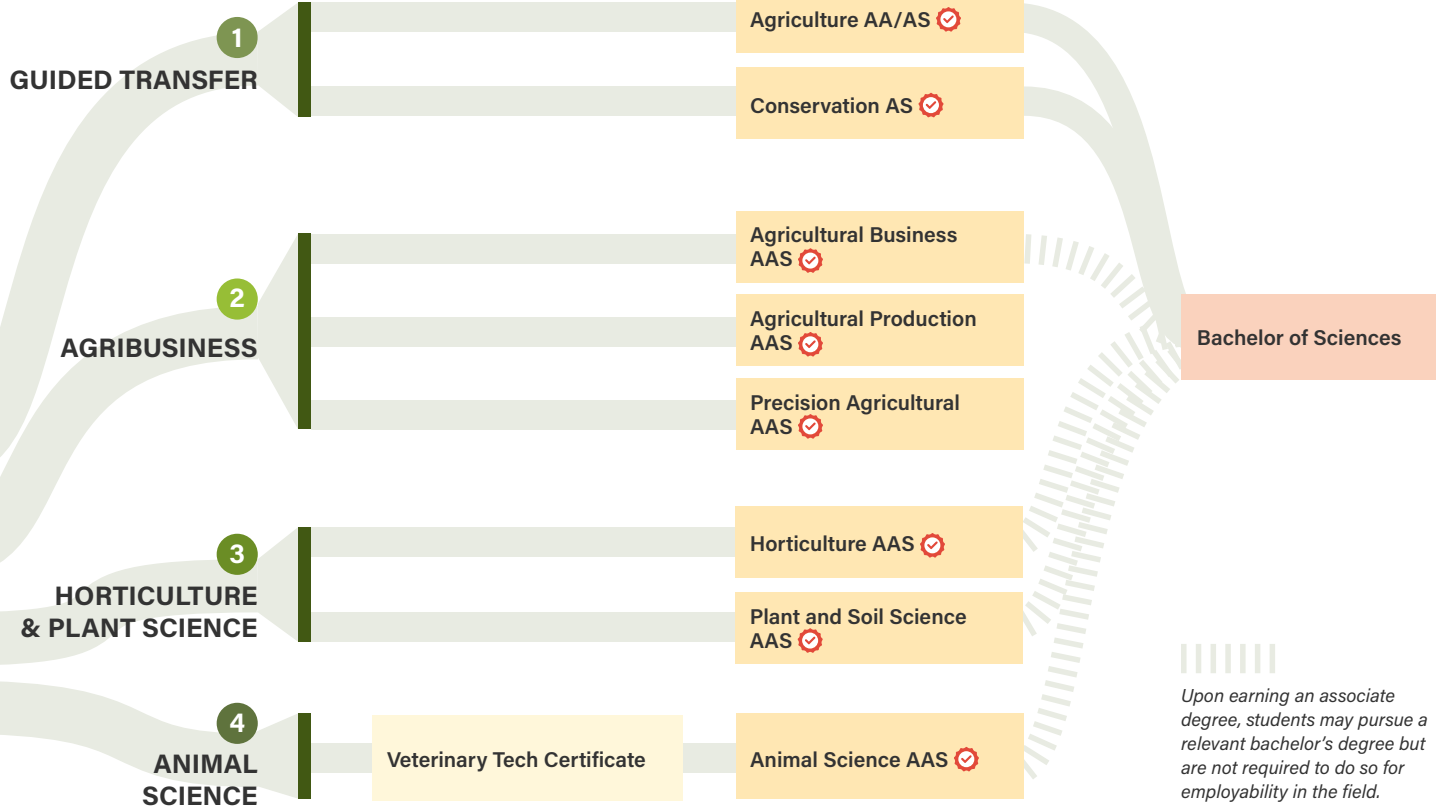
College and Career
Pathway Endorsement
Earned



If courses in this column were accomplished through early college credit, students should take the next required course in the sequence or, if none, additional AAS or Major Courses



POSTSECONDARY OPTIONS



SELECTED OCCUPATIONS, WAGES, & JOB GROWTH

Program	Typical Job	Near or Above Living Wage Threshold for 1 Adult + 1 Child ¹	Median Hourly Wage ²	Growth in IL: Annual Job Openings ²	Growth in IL: % Change Over 10 years ²	Stackable?
1 Guided Transfer	Soil and Water Conservationist/ Conservation Scientists	Y	\$ 29.43	70	5%	Typically Stacks to Required Bachelor's Degree
	Agricultural Inspectors	Y	\$25.52	50	8%	
	First-Line Supervisors of Animal Husbandry & Animal Care Workers	Y	\$23.43	70	3%	
2 Agribusiness	Precision Agriculture Technicians	Y	\$24.07	440	8%	Not Typically Stackable
	Farm and Ranch Managers	Y	\$29.61	4,390	1%	
	First-Line Supervisors of Farming, Fishing, & Forestry Workers	Y	\$23.43	70	3%	
	Farm Equipment Mechanics and Service Technicians	Y	\$22.31	170	9%	
	Agricultural Sales	Y	\$28.19	7,990	8%	
	First-Line Supervisor of Agricultural Crop Workers	Y	\$23.43	70	30%	
3 Horticulture & Plant Science	First-Line Supervisor of Horticultural Workers	Y	\$23.43	70	30%	Typically Stacks to Related Bachelor's Program at Select IL Universities or with Additional Coursework
	Nursery and Greenhouse Managers	Y	\$29.61	4,390	1%	
	Soil and Plant Scientist	Y	\$26.57	60	11%	

1. Living wage calculations are based on: Glasmeier, Amy K. Living Wage Calculator. 2020. Massachusetts Institute of Technology. livingwage.mit.edu. As of January 2021 for the state of Illinois, the "Living Wage" for 1 Adult + 1 Child equaled \$26.27/hour and "near," defined as 85% of that statewide living wage, was \$22.33/hour. In March of 2021, the Living Wage calculator updated its calculations for Illinois, but information presented in this guide reflects the wage levels as of January 2021, when the project team conducted its analysis.

2. U.S. Department of Labor, CareerOnestop (careeronestop.org/explore Careers), Illinois Department of Employment Security Virtual Labor Market Information (www2.illinois.gov/ides)



Background and Process for Developing Model Programs of Study

Programs of study are a coordinated, non-duplicative sequence of academic and technical content at the secondary and postsecondary levels that culminate in a recognized postsecondary credential. In Illinois, Perkins V programs of study are aligned with broader State policy goals to promote college and career readiness, including the State of Illinois' ESSA plan (in particular, the College and Career Readiness Indicator), the College and Career Pathway Endorsement framework and other elements of the Postsecondary and Workforce Readiness Act, the Dual Credit Quality Act, the Illinois WIOA Unified State Plan, and the State's Career Pathways Dictionary.

Process for Development

Each Model Programs of Study was developed using a data-driven, backward-mapping approach that extended from the areas of job growth down through to the high school course sequence. The specific steps in this analysis included:

1. **Identifying high-priority occupations** in the industry sector that are high-skill, high-wage, and in-demand based on federal Department of Labor data for the State of Illinois.
2. **Identifying promising postsecondary credentials** (degrees or certificates) that are broadly accessible through the Illinois community college system and lead to high-priority occupations.
3. **Mapping the stackable degrees and certificates** that progress to promising credentials.
4. **Identifying strategic community college courses** that appear across the maximum number of promising credentials, provide a broad foundation of knowledge essential to that industry sector, and are feasible for dual credit delivery.
5. **Mapping a course sequence from secondary through the first year of postsecondary** that incorporates strategic early college credit (including at least six early college credits in the career-focused course sequence) and considers industry trends and innovations in career and technical education.
6. **Defining related technical competencies** for the foundational program of study courses that can be utilized to guide course development and postsecondary articulation.



Using Department of Labor¹ data and the MIT Living Wage Calculator² for the State of Illinois as a reference, the project team identified “high-priority occupations” as jobs with a positive growth outlook and median salaries near or greater than the living wage for one adult and one child.³ Thus, a “promising credential” is a degree or college certification that immediately prepares an individual for entry into a high-priority occupation or is a stackable credential for a high-priority occupation.

After identifying the promising credentials in each industry area, the project team analyzed community college programs leading to these credentials from a sampling of colleges from across Illinois, representing a mix of urban, suburban, and rural institutions.⁴ EdSystems analyzed and categorized all of the career-focused and general education courses across the full sampling of the promising credential programs to determine which of these courses:

- Are most common across all programs in the sample,
- Are broadly accessible for dual credit opportunities considering prerequisites and teacher credentialing requirements, and
- Are included within the Illinois Articulation Initiative.

This analysis and categorization process led to a recommended set of “strategic” career-focused and general education courses that provide a critical foundation for the program of study sequence.

Following this internal analysis, EdSystems and ICCB convened a stakeholder Advisory Committee of secondary, postsecondary, and private sector representatives to vet the recommendations and provide expertise and guidance on the development of the Model Programs of Study (see Advisory Committee listing in Appendix B). Over multiple webinars and feedback sessions across four months, the Advisory Committee and smaller working groups provided information about industry trends that may not be reflected in the Department of Labor data, credentials and degrees that are emerging as most promising in the field, on-the-ground implementation considerations for secondary and postsecondary programs, and future of work implications for the sector. The Advisory Committee further informed important decision-points in the Model Programs of Study process, including adjusting the Model of Programs of Study course map and promising credential endpoints, selecting strategic early college credit courses, and identifying key competencies for target courses in the Model Programs of Study currently lacking current statewide articulation. The culmination of EdSystems’ analysis and the input of the Advisory Committee is reflected in the draft Model Programs of Study and course competencies included within this Guide.

¹ U.S. Department of Labor, Career Onestop: careeronestop.org/ExploreCareers/explore-careers.aspx, Illinois Department of Employment Security Virtual Labor Market Information, www2.illinois.gov/ides

² Glasmeier, Amy K. Living Wage Calculator. 2020. Massachusetts Institute of Technology. livingwage.mit.edu

³ The “Living Wage” as of January 2021 for 1 Adult + 1 Child, which equaled \$26.27/hour for the state of Illinois. “Near” is defined as 85% of that statewide living wage, which is \$22.33/hour. In March of 2021, the Living Wage calculator updated its calculations for Illinois, but information presented in this guide reflects the wage levels as of January 2021, when the project team conducted its analysis.

⁴ For the analysis of Agriculture, Food, and Natural Resources, the community colleges surveyed were Blackhawk, Joliet Junior College, Parkland, Kaskaskia, Lake Land, Lincoln Land, John Wood, and Rend Lake.



Priority Occupations and Promising Credentials in Agriculture, Food, and Natural Resources

Agriculture, food, and natural resource (AFNR) occupations represent a broad range of occupations that are growing across Illinois, in a diverse range of urban, suburban, and rural contexts. As noted in the State's Economic Development plan, the concentration of Agribusiness and Ag Tech occupations is above average in 7 of our 10 Economic Development Regions (EDRs) in comparison to the nation.⁵ This means that AFNR occupations are prevalent and growing statewide. Available occupations are highly regionalized, dependent on local context and natural/agricultural resources. Further, the State hopes to build from these abundant natural resources, noting that they "contribute to the state's economy by facilitating trade, attracting tourists, enhancing the quality of life for residents, and supporting a diverse agricultural industry."⁶

The Advisory Committee frequently emphasized that current postsecondary programs reflect the state of AFNR as it is currently, but that the sector is evolving technologically and philosophically in ways that will ultimately require new approaches for preparing students for the AFNR jobs of tomorrow. As such, it is increasingly important to cultivate a breadth of technical and essential employability competencies that emphasize adaptability and innovation for long-term success for students completing these pathways.

The deep connections that AFNR fields and occupations have both across AFNR and with other sectors both provides an opportunity to consider how to attract students who may have an interest in other subjects such as geography or education, as well as a challenge for identifying the most appropriate Labor Market Information

(LMI) for certain roles. For example, operational and sales roles in agribusiness do not have their own code in the US Department of Labor (USDOL) data, so the "Agricultural Sales" role is tied to more general sales data.⁷ The Advisory Council did note that for these roles, an individual needs both sales-related skills as well as specialized expertise in relevant AFNR fields.

Promising Credential Program Categories

The project team's analysis of promising credentials in the AFNR sector tied to Illinois community colleges led to an identification of four overarching categories:

1. **Guided transfer programs** are for students seeking university degrees commonly associated with AFNR occupations requiring advanced scientific knowledge, such as Agricultural Inspectors, Soil and Plant Scientists, or Conservation Scientists. A guided transfer typically involves an Associate of Science degree that transfers to a university bachelor's program or further professional degree.
2. **Agribusiness** credentials prepare students for a myriad of roles in agricultural businesses, including direct technical roles and applications as well as agricultural business management roles. While these credentials often culminate at the community college level, in some cases students could continue a trajectory to a bachelor's program at certain Illinois universities.
3. **Horticulture and Plant Science** credentials prepare students to enter various roles pertaining to plant, soil, and crop management, including landscaping-related

occupations. While these credentials often culminate at the community college level, in some cases students could continue a trajectory to a bachelor's program at certain Illinois universities, particularly in pursuit of more scientific roles.

- Animal Science** credentials prepare students for Veterinary Technician roles and then can build towards agricultural business applications of those skills, including animal husbandry.

The Advisory Committee emphasized that while shorter-term technical credentials exist within AFNR fields and occupations, the vast majority would not lead to entry-level employment in jobs without an associate degree as well. In many cases, employers will support their employees and new hires to obtain the most current technical credentialing in their ever-evolving context.

High-Priority Occupations

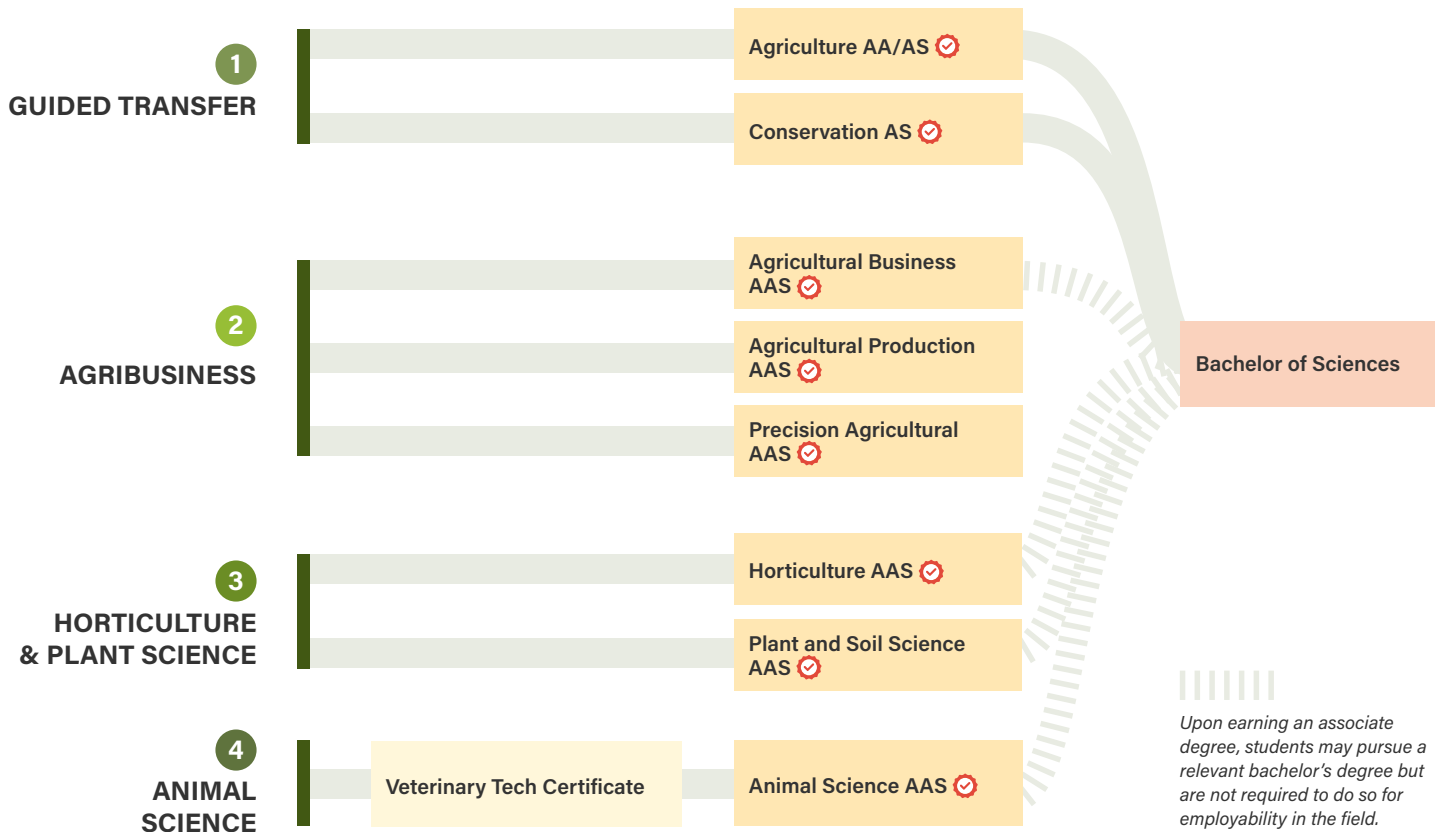
The high-priority occupations associated with each of these areas are identified in the table entitled Select Occupations,

Wages, and Job Growth. The Advisory Committee emphasized that there are diverse AFNR occupations across sectors that might not be considered a traditional AFNR role. For example, many agribusinesses in Illinois require sales teams who both understand the science behind and can promote their products to customers in a local, regional, and even international context. In identifying the high-priority occupations to highlight in the Model Program of Study, the group sought to refine a manageable list that covers a breadth of occupations that both meet the desired criteria and are accessible through programs commonly found at Illinois Community Colleges.

Generally, across AFNR pathways, there are many occupations meeting living wage and job growth criteria that do not require advanced education beyond an associate-level degree, with some exceptions. While select roles can be reached with a high school diploma, an associate-level degree leads to stronger entry wages and a path to higher-earning managerial roles with experience. The occupations affiliated with guided transfer pathways



POSTSECONDARY OPTIONS



in Conservation and Agriculture meet the living wage and job growth criteria, and prepare students to transfer into programs that can lead to entry-level roles that stack to Scientist or Inspector roles.

While not depicted in the diagram, the Advisory Committee emphasized the importance of secondary programs in AFNR to connect to broader efforts to cultivate the teacher pipeline in Illinois, particularly Agriculture Educators. To that end, secondary districts and community colleges can consider how to combine experiences outlined in the AFNR Model Programs of Study and the [Education Model Programs of Study](#) in secondary and postsecondary to support that pipeline.

Levels of Credentials Needed

The levels of education needed for the various pathways in the Model Programs of Study are somewhat varied, but most high-priority occupations identified have a labor supply that overwhelmingly has “some college

education” or higher. While individuals can enter into AFNR occupations with a high school diploma, roles with growth and strong wage potential require the specialized expertise gained through the associate degree programs described above. Further, individuals can pursue a bachelor’s degree, but such degrees are not necessary for the majority of high-priority occupations as outlined above. As a result, the Model Programs of Study recommends at least an Associate of Science (AS) or Associate of Applied Science (AAS).

⁵ p. 9 www2.illinois.gov/dceo/Documents/IllinoisEconomicPlan2019.10.9.2019.pdf

⁶ IBID p. 21

⁷ careeronestop.org/Toolkit/Careers/Occupations/Occupation-profile.aspx?keyword=Sales%20Representatives.%20Wholesale%20and%20Manufacturing.%20Except%20Technical%20and%20Scientific%20Products&onetcode=41401200&location=Illinois

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2. U.S. Department of Labor, CareerOnestop (careeronestop.org/explorecareers), Illinois Department of Employment Security Virtual Labor Market Information (www2.illinois.gov/ides)

Programs of Study Sequence Description

Students in a Program of Study should generally start a career-focused instructional sequence with an orientation course in 9th or 10th grade, with students engaging in career awareness and exploration in the middle school grades if possible. With this early start, students will have more openings in their schedule to complete Skill Development and Capstone options across AFNR, obtain significant early college credits, earn valuable industry credentials, and potentially acquire the College and Career Pathway Endorsement before high school graduation.

As school districts and their community college partners develop the sequence, they should ensure that the high school coursework enables all students in the AFNR Program of Study to attain both the State's recommended Essential Employability and Entrepreneurship Competencies and the newly-developed Top Technical Competencies for AFNR. These Top Technical Competencies were developed alongside and in alignment with this Model Programs of Study, and can be found in Appendix A.2.

High School Career-Focused Instructional Sequence and Related Work-Based Learning Overview

The Model Programs of Study for AFNR prepares students for a variety of postsecondary options in AFNR by introducing students to a broad range of careers in the field and highlighting a set of early college credit courses that support meeting the CTE Course Matrix while strategically positioning students for success in a breadth of community college programs.

Through the introductory and strategic early college credit courses, students will develop critical skills for application across AFNR pathways. It must be noted that more than any other career focused programs, the Illinois ecosystem for AFNR postsecondary courses has an extensive offering of Illinois Articulation (IAI) courses. These dozen or so AFNR courses with an IAI code are generally transferable between community college AFNR programs and many Illinois university programs as well.

While the Model Programs of Study progression in AFNR highlights two primary pathways (Agriculture, Horticulture and Plant Science), the reality of AFNR pathways is at once broader and more complex than what can be reflected in any one Model Program of Study. The Agriculture pathway both prepares students for postsecondary programs in Agriculture (Agriculture, Agribusiness, etc.), while also strategically opening the door to related pathways such

as Animal Science. Across many AFNR postsecondary programs, introductory courses are common all or most pathways, providing students with a broad range of content knowledge and skills, from which point students can specialize in areas such as Agribusiness, Animal Science, or Horticulture. Thus, while the two secondary pathways highlighted here cannot fully encompass the full breadth of the eight AFNR pathways outlined in the ISBE CTE Matrix, they are strategically aligned with early postsecondary work that can position students to specialize in those pathways down the line based on their interest. Through their postsecondary experience, students will become fully prepared to enter into the occupations described by earning promising credentials, including Guided Transfers.

Orientation

At the secondary level, the ISBE AFNR matrix includes two courses that cut across all pathways: Basic Agricultural Science and Introduction to the Agriculture Industry. Secondary districts should offer both of these courses, as they may attract different students to AFNR pathways. The Introduction to the Agriculture Industry provides students with the opportunity to learn about the breadth of AFNR pathways in what serves as a survey course at the Group 2 level. Also a Group 2 course, the Basic Agricultural Science course can be used to deepen a student's knowledge of the research and scientific principles underlying many AFNR fields of study, and can attract students who are interested in science and research into AFNR more broadly. Advisory Committee members emphasized the importance of schools being able to demonstrate early on to students the breadth of pathways in AFNR, drawing in students who might be interested in science, business, and more.

Skill Development

The Skill Development course recommendations in the Model Programs of Study diverge for the general Agribusiness pathway and the Horticulture and Plant Science pathway.

In the Agribusiness pathway, the recommended course is either Agriculture Business Management (as a dual credit course addressing the competencies outlined on p. 15) or the similar IAI course Introductory Economics of Food, Fiber, and Natural Resources. The latter course is common across a broad range of AFNR pathways at the postsecondary level, from Agriculture to Animal Science to Plant Science. If at all possible, the Model Programs of Study encourages secondary districts to offer this course in collaboration with their local community college.

However, the project team acknowledges that this IAI course may be difficult to implement as dual credit because it commonly requires a teacher to have a Master's in Agricultural Education, Agribusiness, Agricultural Economics, or other related fields of study in order to be credentialed by the college partner. As a result, the Model Programs of Study recommends offering Agriculture Business Management as an alternative strategic dual credit course, which can cover many of the same topics such as policy and regulation, economic principles, and financial management. Agriculture Business Management is commonly offered at many community colleges with an AFNR program and is likely to be easier to implement both in terms of teacher credentialing. These courses would fulfill the skills course requirements for the Agribusiness Systems pathway within the ISBE CTE Matrix for AFNR and overlap with the course Introduction to the Agricultural Industry.

In the Horticulture and Plant Science pathway, the Model Programs of Study recommends either Horticulture

Production and Management or Introduction to Horticulture (the latter ideally as an IAI dual credit course). As with the Agribusiness pathway, there is overlap in content for these courses with the Plant Systems pathway of ISBE's AFNR CTE matrix and the course Basic Horticultural Science. If at all possible, secondary districts should work closely with their community college partners to offer Introduction to Horticulture as IAI dual credit, and there are examples of districts who have done so across Illinois. As an alternative, the dual credit course Horticulture Production and Management, widely available at most community colleges, could be offered as well and likelier easier to implement in terms of teacher credentialing.

In either of the pathways tracts, districts should seek to integrate the required Supervised Agricultural Experience (SAE) for students to gain valuable work-based learning experience common in AFNR programs of study. The benefit of this approach is that, upon completion of the courses outlined in this Skill Development section, as well










ORIENTATION / INTRODUCTION Grades 9-10

SKILL DEVELOPMENT Grades 10-12

CAPSTONE / ADVANCED Grades 12

POSTSECONDARY COURSES Recommended 1st Year


CAREER FOCUSED COURSES
Agribusiness
Horticulture & Plant Science


<p>Basic Agricultural Science <i>or</i> Introduction to the Agricultural Industry</p>	<p>Agriculture Business Management  <i>or</i> Introductory Economics of Food, Fiber, and Natural Resources </p> <p>Horticulture Production & Management  <i>or</i> Introduction to Horticulture </p>	<p>Introduction to Animal Science  <i>or</i> Introduction to Soil Science </p> <p>Introduction to Soil Science  <i>or</i> Introduction to Crop/Plant Science </p>	<p>Introduction to Microcomputer Skills in Agriculture Continue AS or AAS Sequence</p> <p>Introductory Economics of Food, Fiber, and Natural Resources </p>
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Courses and Work-Based Learning Address the PWR Act Recommended Technical and Essential Employability Competencies


WORK-BASED LEARNING


<p>Career Exploration (2)* Team-Based Challenge* <i>or</i> FFA Career Development Event</p>	<p>Team-Based Challenge* <i>or</i> FFA Career Development Event Supervised Agricultural Experience <i>or</i> Youth Apprenticeship</p>	<p>Team-Based Challenge Supervised Agricultural Experience <i>or</i> Apprenticeship</p>
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* May be offered through Career and Technical Student Organizations (CTSOs) including Illinois Association of Agricultural Education (FFA) and Science Olympiad



AP or Dual Credit



Dual Credit Course


Dual Credit Course Affiliated With IAI Code


Course or Program Prepares for Industry Credential


Postsecondary Course Affiliated with IAI Code


College and Career Pathway Endorsement Earned


If courses in this column were accomplished through early college credit, students should take the next required course in the sequence or, if none, additional AAS or Major Courses



as the SAE, students will have completed both the course requirements and professional learning goals under ISBE's AFNR CTE Matrix and be aligned to College and Career Pathway endorsement in AFNR, allowing them to further deepen or specialize their knowledge at the Capstone level.

Capstone/Advanced

At the Capstone level, the Model Programs of Study recommends that students take the opportunity to further specialize by enrolling in courses either offered as IAI dual credit, or as dual enrollment courses where the student takes the course at the local community college. The Model Programs of Study emphasizes the value of striving to offer these courses as early college credit opportunities given that they are required across a breadth of postsecondary AFNR programs and will set students up to accelerate into their AFNR pathway of choice.

In the Agribusiness pathway, two potential options for Capstone courses include introductory courses in Animal Science or Soil Science. In the Horticulture and Plant Science pathway, districts should consider introductory courses in either Soil Science or Crop and Plant Science, both of which are required across various plant systems postsecondary programs. The Advisory Committee noted that a common barrier to offering these science courses as dual credit are required lab components, particularly at the IAI level. As such, the Model Programs of Study encourages districts to consider pursuing offering these as dual enrollment or hybrid/virtual models that enable students to gain the skills they need and accelerate their ultimate postsecondary success.

Recommended High School General Education Courses

The Model Programs of Study for AFNR identifies several critical considerations for general education coursework

before graduating high school. The courses mentioned here position students for many postsecondary promising credentials in AFNR and enhances students'

opportunities for postsecondary success in addition to the career-focused courses already delineated. The general education recommended courses are the following:

- In **science**, students should complete the science sequence culminating in Biology as either an Advanced Placement or IAI dual credit course where possible.
- In **social science**, students prepared for college-level coursework in their senior year should enroll in a dual credit or AP course in Microeconomics, further deepening their foundation in business concepts and consumer behavior widely applicable to AFNR.
- In **math**, students should complete the highest math course possible while in high school and be preparing for General Education Math or Statistics at the postsecondary level. Students that do not demonstrate readiness for an early college math course during their senior year of high school should enroll in a Transition to Quantitative Literacy/Statistics Transitional Math Course that will guarantee placement into postsecondary math courses.
- In **English**, students prepared for college-level coursework in their senior year should enroll in a dual credit English Composition or Advanced Placement English Language and Composition course if available. Students who are not prepared for college-level coursework should enroll in a Transitional English course that guarantees placement into the partner community college's English Composition course.

While not reflected in the diagram, the Advisory Committee discussed the opportunity to incorporate an integrated curriculum into core academic coursework, particularly in science. For example, the Agriculture Biology course offered at [Rolling Meadows High School](#) applies an agriculture lens to the course that also fulfills the life sciences graduation requirement. Due to the emergent nature of these approaches, the Advisory Committee determined such models should be highlighted for consideration but not yet wholesale endorsed.

Recommended First Year Postsecondary Courses

The recommended first-year postsecondary courses in the Model build upon the knowledge and skills recommended at the Capstone level. The courses highlighted (Intro to Microcomputer Skills in Agriculture; Introductory Economics of Food, Fiber, and Natural Resources) are common across a range of AFNR programs and develop valuable content knowledge and skills for applying in the field. As with high school programs, community colleges should pursue opportunities to integrate and align AFNR coursework and work-based learning opportunities.

Students pursuing a Guided Transfer or any other Associate of Applied Science (AAS) should initiate or continue to take career-focused courses in the associate degree or certificate sequence.

In the general education course areas, students will start with the required 100-level courses. Across disciplines, that means courses that are strategic for as many promising credentials and also transferable through the Illinois Articulation Initiative. In science, the Model Programs of Study recommends Chemistry. In English/communications, both Oral Communication and English Composition are recommended because of their frequency in promising credentials. In social science, the Model Programs of Study recommends Microeconomics and Macroeconomics, particularly for students continuing on in Agribusiness. In math, this will mean either General Education Math or Statistics. If the 100-level courses have been accomplished through early college credit, students will take the next required course in the subject, or, if none, additional courses aligned to their program of choice.

	ORIENTATION / INTRODUCTION Grades 9-10	SKILL DEVELOPMENT Grades 10-12	CAPSTONE / ADVANCED Grades 12	POSTSECONDARY COURSES + Recommended 1st Year
SCIENCE	Science Sequence	Science Sequence	Biology >> or General Biology for Non-Majors	Chemistry or Science Sequence
SOCIAL SCIENCE	Social Science Sequence	Social Science Sequence	Microeconomics >>	Microeconomics or Macroeconomics or Social Science Sequence
MATH	Algebra/Geometry	Geometry/Algebra 2	General Education Math or Transitional Math: Quantitive Literacy Statistics	General Education Math or Statistics
ENGLISH	English Sequence	English Sequence	English Composition >> or Transitional English	English Composition or Oral Communication

>>	📖	📖	🏆	📖	🏆	+
AP or Dual Credit	Dual Credit Course	Dual Credit Course Affiliated With IAI Code	Course or Program Prepares for Industry Credential	Postsecondary Course Affiliated with IAI Code	College and Career Pathway Endorsement Earned	If courses in this column were accomplished through early college credit, students should take the next required course in the sequence or, if none, additional AAS or Major Courses

Strategic Dual Credit Courses: Competency Descriptions

EdSystems and ICCB convened a stakeholder Advisory Committee of secondary, postsecondary, and private sector representatives to vet the Model Program of Study recommendations. A smaller working group further convened to identify key competencies for the targeted early college course in the Model Program of Study currently lacking current statewide articulation. In AFNR, that was Agriculture Business Management (1 Semester). The same smaller working group identified and developed the proposed Technical Employability Competencies outlined in Appendix I in accordance with the Postsecondary and Workforce Readiness Act.

AGRICULTURE BUSINESS MANAGEMENT COURSE <i>Key Competencies</i>	
Business Design	<ul style="list-style-type: none"> Students can create comprehensive plans for different models of AFNR operations in order to guide business goals, objectives, and resource allocations.
Principles of Agricultural Economics	<ul style="list-style-type: none"> Students can identify and analyze the basic principles of economics and trade in order to manage inputs and outputs of AFNR businesses.
Business Operations & Personnel Management	<ul style="list-style-type: none"> Students can assess and implement procedures used to recruit, train, and retain employees in order to create a sustainable pipeline of human resources for AFNR operations. Students can identify and apply business management skills in order to conduct AFNR business operations in an efficient, legal, and ethical manner. Students can use their understanding of verbal and written communication to effectively maintain relationships with employers, employees, and customers.
Policy & Regulatory Context	<ul style="list-style-type: none"> Students can identify sources and seek out relevant and reliable information on current AFNR policies and regulations at different levels of jurisdiction (local, state and federal) in order to understand the impact of those policies on business operations. Students can describe basic principles of agricultural law and taxes in order to examine the implications for AFNR operations.
Financial Management & Reporting	<ul style="list-style-type: none"> Students can develop and utilize financial and credit management tools in order to achieve AFNR business goals.
Sales & Marketing	<ul style="list-style-type: none"> Students can perform tasks and responsibilities related directly or indirectly to sales and marketing in order to develop marketing plans and accomplish goals of sale of AFNR products.

APPENDIX A.1: PWR Act Recommended Technical and Essential Employability Competencies for Agriculture, Food, and Natural Resources

The recommended technical competencies for AFNR were developed by the working group convened in the Model Program of Study process, which included members from secondary and postsecondary education as well as employers. These will ultimately be embedded in the broader Postsecondary and Workforce Readiness Act Technical and Essential Employability Competencies document in addition to this Program of Study.

AGRICULTURE, FOOD, AND NATURAL RESOURCES <i>Technical and Essential Employability Competencies</i>	
AFNR Systems & Integration	Students can identify and analyze the breadth, depth, and interconnectivity of AFNR systems in order to make sustainable and innovative management decisions.
Technology	Students can apply their understanding of relevant technology and tools to collect information and execute effective practices across AFNR systems.
Policy & Regulations	Students can seek out, analyze, and apply information about relevant public policy and regulations to manage their impact on AFNR production, processing, distribution, and management practices.
Society & Culture	Students can use their understanding of the local natural and cultural resources, food, and economic context to steward consumer education and connections to AFNR stakeholders.
Resource Stewardship	Students can identify and analyze essential resources in order to steward them and implement sustainable management practices.
Ethical Production	Students can apply their understanding of ethical standards and practices in order to produce, process, and distribute AFNR goods and services with integrity.
Research & Innovation	Students can apply research and critical thinking skills to design innovative practices that address complex challenges in AFNR operations and industries.
Health, Safety, & Compliance	Students can use their understanding of personal safety and environmental regulations to comply with health and safety requirements as well as maintain safe and proper use of AFNR tools and equipment.

APPENDIX A.2: Statewide Essential Employability and Entrepreneurial Competencies

TOP 10 CROSS-SECTOR ESSENTIAL EMPLOYABILITY COMPETENCY STATEMENTS	
Teamwork & Conflict Resolution	Students can use their understanding of working cooperatively with others to complete work assignments and achieve mutual goals.
Communication	<p>Verbal: Students can use their understanding of English grammar and public speaking, listening, and responding, convey an idea, express information, and be understood by others.</p> <p>Written: Students can use their understanding of standard business English to ensure that written work is clear, direct, courteous, and grammatically correct.</p> <p>Digital: Students can use their understanding of email, keyboarding, word processing, and digital media to convey work that is clear, direct, courteous, and grammatically correct.</p>
Problem Solving	Students can use their critical thinking skills to generate and evaluate solutions as they relate to the needs of the team, customer, and company.
Decision Making	Students can use their understanding of problem solving to implement and communicate solutions.
Critical Thinking	Students can use their understanding of logic and reasoning to analyze and address problems.
Adaptability & Flexibility	Students can use their understanding of workplace change and variety to be open to new ideas and handle ambiguity.
Initiative & Self-Drive	Students can use their understanding of goal setting and personal impact to achieve professional goals and understand personal impact.
Reliability & Accountability	Students can use their understanding of commitment, time management, and follow through to ensure that a professional team functions properly and meets collective goals.
Cultural Competence	Students can use their understanding of diversity and inclusion to communicate and work effectively across a multitude of abilities, cultures, and backgrounds.
Planning & Organizing	Students can use their understanding of time management to plan effectively and accomplish assigned tasks.

ENTREPRENEURIAL COMPETENCIES

Principles of Entrepreneurship

Students can apply their understanding of the process and characteristics of business development and promotion in order to apply strategies of innovation to personal and professional business pursuits.

Innovation & Invention

Students can use their understanding of idea generation, design thinking, product and business development in order to introduce and process new and effective ideas.

Growth Mindset

Students can use their understanding of learning from challenges, set-backs, and failure in order to adapt strategies and continue efforts to achieve personal goals.



APPENDIX B: Advisory Committee Membership

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