

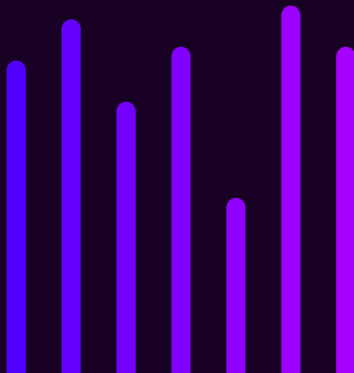


STATE OF ILLINOIS

Model Programs of Study Guide

Health Sciences

PATHWAYS



EdSystems
EDUCATION SYSTEMS CENTER at
NORTHERN ILLINOIS UNIVERSITY

DRAFT FOR PUBLIC COMMENT | MAY 2024

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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 EdSystems

Education Systems Center (EdSystems) is a mission-driven policy development and program implementation center based within Northern Illinois University. We work at the state level to create ecosystem and policy change while simultaneously working at the local level to create organizational change. This bi-directional approach allows us to align local efforts to state policy while elevating local experiences and learnings to state tables. Learn more at edsystemsniu.org.

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I. About the Model Programs of Study Guide

The Illinois Community College Board (ICCB) sponsored the development of the State of Illinois 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 pathway programs to adopt or customize as they develop programs of study for approval as part of Perkins V or Illinois' College and Career Pathway Endorsements.
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 sector's program of study 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 work-based learning 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](#), [Recommended Technical and Essential Employability Competencies](#), [State of Illinois Workforce Development 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 Model Programs of Study Guide in Health Sciences can be used as a reference in local planning processes. The guide presents and describes in detail each component of the sequence, including descriptions of the underlying research, analysis, and Advisory Committee input. In addition to the complete guide, a [pathway map](#) depicting the diagrams of the secondary and postsecondary sequences, as well as a table of the selected occupations, wages, and job growth, is available at the end of this document or at edsystemsniu.org/guides.

II. Development of the 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. The State of Illinois Model Programs of Study Guides are aligned with broader state policy goals to promote college and career readiness, including the state's Perkins V and ESSA plans (in particular, the College and Career Readiness Indicator), the Postsecondary and Workforce Readiness Act, the Dual Credit Quality Act, and the Illinois 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 Illinois.
2. **Identifying promising postsecondary credentials** (degrees or certificates) that are broadly accessible to and 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 broadly among promising credentials, provide a solid 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 is applicable to both Illinois secondary and postsecondary Perkins V requirements.
6. **Defining related technical competencies** for the foundational program of study courses that can be utilized to guide course development and postsecondary articulation.

Using data from the Department of Labor, Illinois Department of Employment Security, and MIT's Living Wage Calculator for the State of Illinois as a reference, the project team identified "high-priority occupations" as jobs with a positive growth outlook over the next 10 years, of high relative volume within that industry sector, and with median salaries that could sustain various family sizes within Illinois.¹ Occupations with median salaries higher than the living wage for 1 adult + 1 child (\$39.63/hour) are considered as having a "high" living wage potential. Occupations with median salaries only higher than the living wage of 1 adult, no children (\$22.86/hour) are considered as having a "medium" living wage

¹ U.S. Department of Labor, Employment and Training Administration (n.d.). "Explore Careers." CareerOneStop. Retrieved December 2023, from careeronestop.org/explorecareers. Illinois Department of Employment Security, "Long-Term Occupational Projections 2020-2030" and "Wage Information: Occupational Employment and Wage Statistics (OEWS) Statewide." Retrieved December 2023, from ides.illinois.gov. Amy K. Glasmeier, "Living Wage Calculator," Massachusetts Institute of Technology, 2024. Retrieved December 2023, from livingwage.mit.edu.



potential, and occupations with median salaries below the living wage of 1 adult, no children (less than \$22.86/hour) are considered as having a “low” living wage potential.

The team identified as a “promising credential” any degree or certification that immediately prepares an individual for entry into or is a stackable for the identified high-priority occupations, then analyzed community college programs leading to these credentials from a sampling of six to ten colleges from across Illinois, representing a mix of urban, suburban, and rural institutions.² EdSystems analyzed and categorized all the career-focused and general education courses across the full sampling of the promising credential programs to determine which of these courses:

- are broadly common across multiple college programs in the sample,
- are likely accessible for dual credit opportunities considering student prerequisites and teacher credentialing requirements, and
- are generally transferable through Illinois Articulation Initiative or various articulation agreements.

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 [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 or IDES 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 including adjusting the course map and promising credential endpoints, selecting strategic early college credit courses, and identifying key competencies for target courses lacking broad statewide articulation. The culmination of EdSystems’ analysis and the input of the Advisory Committee is reflected in this guide.

² For the analysis of this guide, EdSystems surveyed City Colleges of Chicago, Elgin Community College, Harper College, Illinois Central College, Rock Valley College, Sauk Valley Community College, and Shawnee Community College.

III. Priority Occupations and Promising Credentials

Health sciences and technology occupations are a significant focus of Illinois' job growth trajectory. According to Illinois' five-year Economic Development Plan released in 2019, Illinois is experiencing rapid growth in the healthcare sector that could result in a statewide workforce shortage for a range of occupations such as nurses, nurse practitioners, and medical/laboratory technicians.³ Moreover, with an aging population, Illinois is more likely to experience these shortages than the typical state, with the shortage exacerbated by the recent COVID-19 public health crisis.

Promising Credential Program Categories

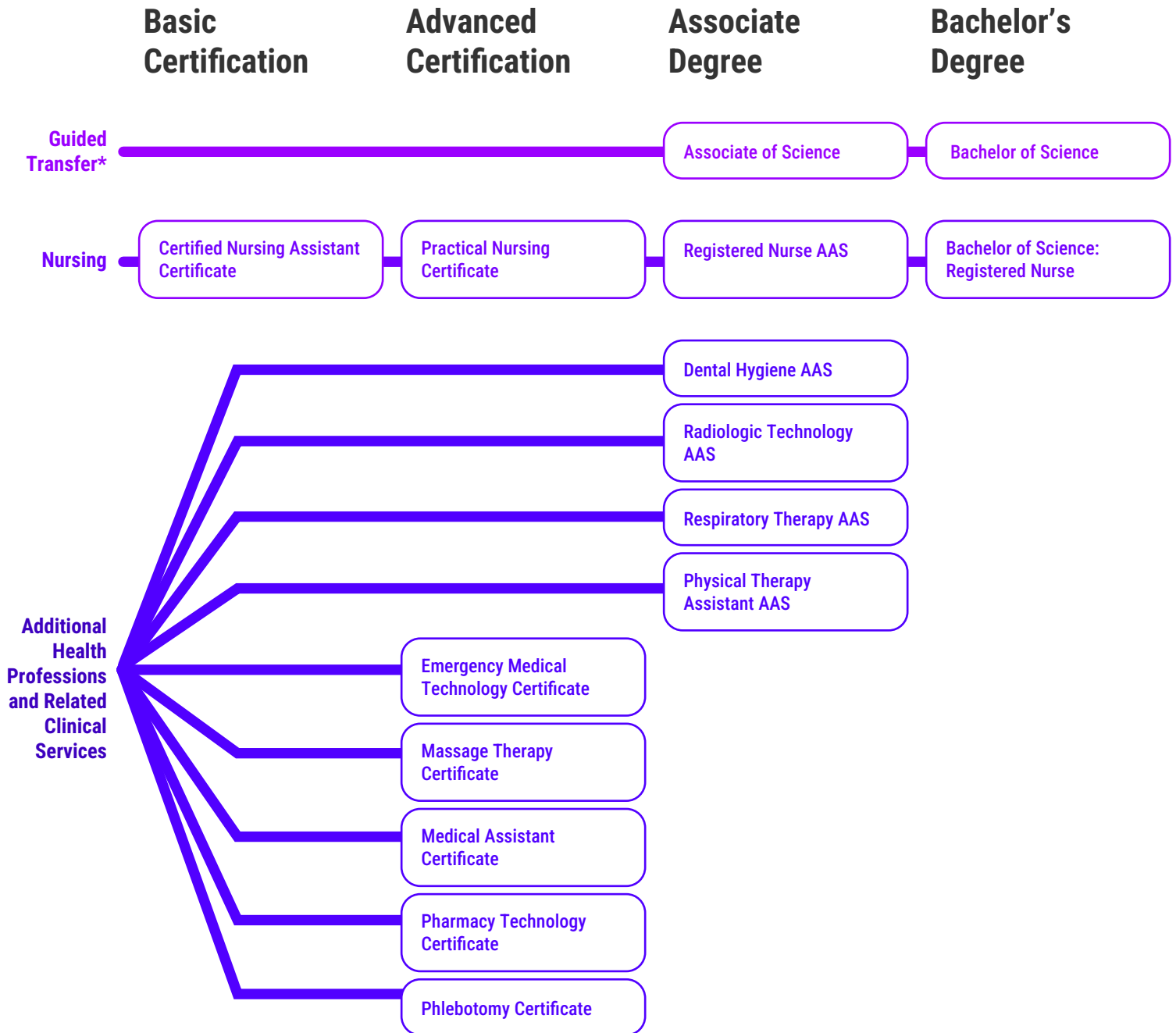
The project team's analysis of promising credentials in the health sciences sector tied to Illinois community colleges led to an identification of three credential program categories or pathways:

1. **Guided transfer** programs are for students seeking university degrees commonly associated with health science occupations requiring professional school upon completion of a bachelor's degree, such as physician, pharmacist, or physical therapist. A guided transfer typically involves a curated Associate of Science degree that transfers to a university bachelor's degree program and then a further professional degree.
2. **Nursing** credentials start by preparing students as a Certified Nursing Assistant (CNA), which can lead into several categories, such as licensed practical nurse, registered nurse, or nurse practitioner. These credentials could culminate at community college or continue a trajectory to a bachelor's program and professional school.
3. **Additional health professions and related clinical services** credentials prepare students to enter a myriad of roles as allied health professionals, clinical and laboratory technicians, and frontline staff such as medical assistants, phlebotomists, therapists, and therapy assistants. These credentials normally involve a short-term postsecondary credential or an Associate of Applied Science, both of which are designed for immediate entry to a career.

The project team notes additional credentials at colleges around the state designed for highly specialized roles critical to the health science industry, such as community health care and health information technology. However, the required coursework and competencies for these degrees and occupations do not generally overlap with those required for the promising credentials mentioned above. For example, careers in health information technology emphasize computer coding or administrative procedures instead of being more focused on human biology and clinical experiences. Although the occupations are promising and high priority, the team excluded these credentials from the Model Programs of Study analysis to simplify the academic recommendations described in the Programs of Study Sequence Description (section III). However, they are in no way discouraged as worthwhile career pathways and programs of study.

³ Illinois Department of Commerce and Economic Opportunity (2019, October 9). "A Plan to Revitalize the Illinois Economy and Build the Workforce of the Future." Retrieved April 2024, from dceo.illinois.gov/econplan2019.html.

Diagram: Postsecondary Opportunities



* Pre-Professional Programs in Pharmacy, Medicine, Physical Therapy, Speech-Language Pathology

Table: Selected Occupations, Wages, and Job Growth

Program	Typical Job(s)	Living Wage Potential*	Median Hourly Wage**	IL Growth: Change over 10 years ***	IL Annual Job Openings***	Typical Educational Requirements
Guided Transfer	Pharmacist	High	\$65.78	1.0%	438	Doctoral or Professional Degree
	Speech-Language Pathologists	High	\$39.76	19.7%	639	
	Physical Therapist	High	\$50.08	10.0%	496	
Nursing	Nursing Assistants	Low	\$18.41	2.0%	7,040	Postsecondary Certificate
	Licensed Practical and Licensed Vocational Nurses	Medium	\$29.62	3.0%	1,552	
	Registered Nurses	High	\$39.43	5.0%	7,870	Bachelor's Degree
	Nurse Practitioners	High	\$62.33	44.0%	902	Doctoral or Professional Degree
Other Health Professions and Related Clinical Services	Dental Hygienists	High	\$39.72	12.3%	585	Associate Degree
	Radiologic Technologists	Medium	\$32.42	5.0%	668	
	Respiratory Therapists	Medium	\$33.12	18.7%	314	
	Physical Therapist Assistant	Medium	\$32.76	21.3%	586	
	Paramedic	Medium	\$23.45	12.7%	1,050	Postsecondary Certificate
	Emergency Medical Technicians	Low	\$18.69	12.7%	1,050	
	Massage Therapist	Medium	\$30.59	23.4%	868	
	Pharmacy Tech	Low	\$19.16	11.3%	1,750	
	Medical Assistant	Low	\$19.61	11.5%	2,955	
	Phlebotomists	Low	\$20.36	16.6%	744	

* Living wage potential is based on MIT's Living Calculator (livingwage.mit.edu) for Illinois in 2024. Occupations with median salaries higher than the living wage for 1 adult + 1 child (\$39.63/hour) are considered as having a "high" living wage potential. Occupations with median salaries only higher than the living wage of 1 adult, no children (\$22.86/hour) are considered as having a "medium" living wage potential, and occupations with median salaries below the living wage of 1 adult, no children (less than \$22.86/hour) are considered as having a "low" living wage potential.

** Illinois Department of Employment Security (2022). Wage Information: Occupational Employment and Wage Statistics (Statewide). Retrieved April 2, 2024, from ides.illinois.gov/resources/labor-market-information/oews.html

*** Illinois Department of Employment Security. Employment Projections (Long-Term Occupational Projections 2020-2030). Retrieved April 2, 2024, from ides.illinois.gov/resources/labor-market-information/employment-projections.html

High-Priority Occupations

The high-priority occupations associated with each of the promising credential program areas are identified in the table entitled Select Occupations, Wages, and Job Growth. The occupations affiliated with guided transfer and nursing pathways typically meet the job growth and living wage threshold of this guide. Although below the living wage threshold, the Certified Nursing Assistant credential can stack and build towards the higher-earning occupations of licensed practical nurses and registered nurses and is thus included as a promising credential in this analysis. With practical nurses, individual communities should verify local demand as that job growth may be specific to certain parts of the state.

With respect to additional health professions and related clinical services, only the following programs are included in this guide's promising credentials analysis: dental hygiene, radiologic technology, respiratory therapy, physical therapy assisting, emergency medical technicians, massage therapy, pharmacy technology, medical assisting, and phlebotomy. There is a myriad of programs in health science that could have been included but were ultimately omitted under the acceptance of the Advisory Committee for two main reasons: First, the Model Programs of Study analysis tried to emphasize those programs that are more common or accessible in Illinois community colleges, thus deemphasizing more niche programs and occupations (e.g., mortuary science, diagnostic medical sonography). Secondly, and more importantly, programs and occupations were not included if they did not meet the promising credential criterion described in the Background and Development of the Model Programs of Study (section II). This includes programs that lead to occupations such as dental assistants and home health and personal care aides. Although these roles have annual openings and potential job growth in Illinois, these roles typically do not meet the living wage criterion or are not easily stackable to a degree or credential that does and were thus not promising enough for inclusion.

Levels of Education Needed

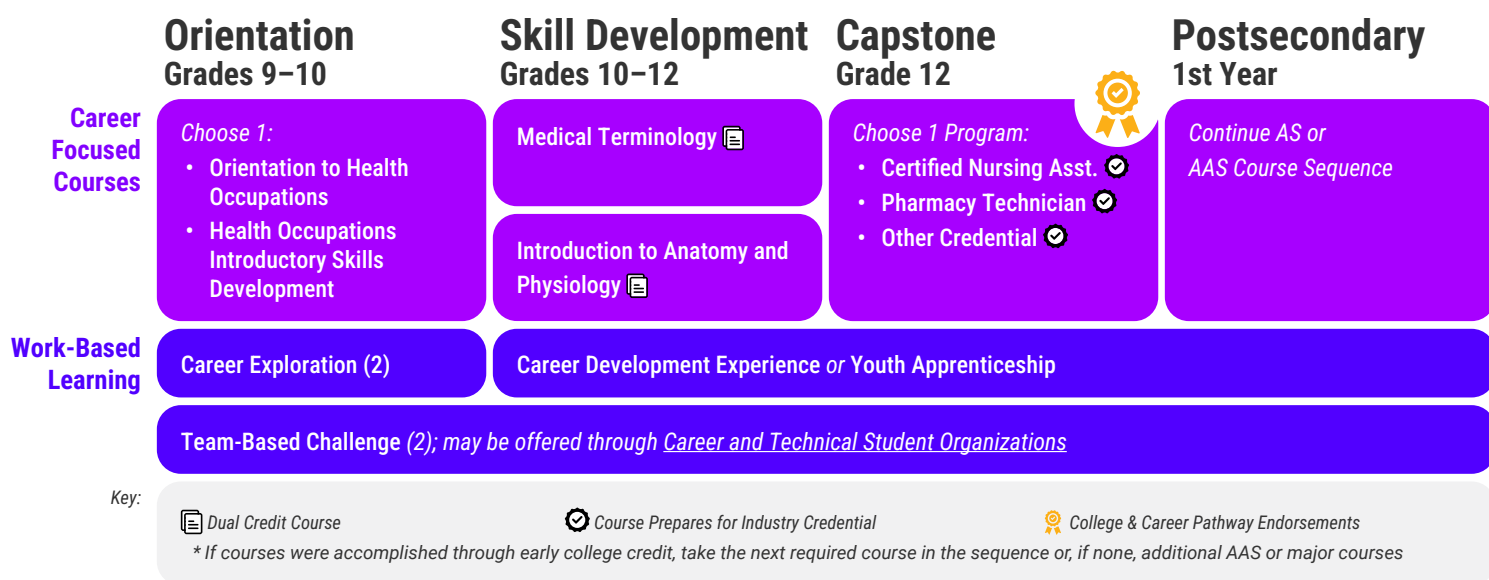
The levels of education needed for the various health sciences careers are somewhat varied, but all the high-priority occupations identified have a labor supply that overwhelmingly has some college education or higher. Any individuals working in high-priority occupations in health science without an associate degree were likely already existing in their role before the labor demand shifted its requirements. As a result, the Model Programs of Study recommends an Associate of Science (AS), Associate of Applied Science (AAS), or higher degree for as many of the promising credentials pathways as possible. Entry-level positions in high-earning occupations such as pediatrician or dentist will typically require a Bachelor of Science degree plus professional school. Those credentials are therefore depicted as a guided transfer pathway from an Associate of Science to a Bachelor of Science, but the exact bachelor's degree is not specified.

IV. Programs of Study Sequence Description

Students should 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 have more openings in their schedule to complete skill development and capstone options, obtain significant early college credits, earn valuable industry credentials, and potentially acquire a [College and Career Pathway Endorsement](#) before high school graduation.

As school districts and their community college partners develop a program of study sequence, they should ensure that the high school coursework enables all students in the pathways to attain Illinois' [Recommended Essential Employability and Technical Competencies](#) and the top relevant technical competencies (see [Appendix A](#)).

Diagram: **Career-Focused Instructional Sequence**



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

The Model Programs of Study in Health Sciences and Technology begins by introducing students to the broad range of careers in the field and highlighting a set of community college courses that are applicable to all [ISBE CIP Codes](#) for health sciences (51.0000 to 51.3902) while still being highly strategic for the field of health sciences at the postsecondary level. Upon completion of the initial courses, students can pursue an industry credential in health science, earn early college credit, and further deepen their understanding of the profession through work-based learning. This triad of experiences is designed to help students prepare for life after high school: The credential opens the possibility of employment in the field, early college credit supports their transition into postsecondary programs, and work-based learning experiences help solidify students interests in the field and help them build social capital with industry professionals. Within postsecondary programs, students should become fully prepared for careers in health science by seeking promising credentials in nursing or additional health professions and related

clinical services, including guided transfer programs to professional school occupations.

Orientation Coursework

At the secondary level, ISBE has two proposed Career and Technical Education (CTE) courses that introduce students to the health science career broadly: Orientation to Health Occupations and Health Occupations Introductory Skill Development. Both courses apply to all facets of the Model Programs of Study and should be chosen based on local capabilities and access. Some community colleges offer a similar introductory course to the health science profession at the postsecondary level but, because student access and availability to that varies greatly across colleges, it is not included in this guide. If local communities have a robust partnership with their local community college, they should explore a postsecondary orientation or introductory course that could be offered to students as dual credit as early as 9th or 10th grade. At the secondary level, these courses would likely fulfill the [ISBE CTE program matrix](#) for health sciences and technology program in Group 1 or 2.

To begin preparing for the College and Career Pathway Endorsements, students should also participate in multiple virtual and in-person visits to employer sites to better understand authentic industry environments and engage with professionals in the field. Students should hear from a variety of guest speakers in an array of health sciences careers to better understand opportunities in the field. Through the orientation course, students should be prepared to document their own personalized career pathway that leads to a promising credential.

Skill Development Coursework

The skill development course recommendations are primarily Medical Terminology and Introduction to Anatomy and Physiology, offered as early college classes. Medical Terminology is offered as an ISBE Group 2 CTE course, but districts should primarily pursue it as a dual credit offering. The reason for this is that Medical Terminology is offered broadly at all Illinois community colleges, applies to many health science postsecondary pathways, and is one of the most accessible courses in terms of dual credit. Generally speaking, Medical Terminology in Illinois colleges does not have any additional courses as prerequisites, meaning students can begin their familiarity with high-level health science competencies with this course.⁴ Typically, Medical Terminology can be taught for dual credit by anyone with a bachelor's degree in nursing, allied health, or a related field combined with some years of clinical experience and/or a current license to practice, making it more likely for high schools to staff this course for dual credit certification.

Aside from introductory biology courses, Anatomy and Physiology is the most frequent postsecondary course required for a promising credential in health science. Offering the course, however, requires teacher credentials with a master's degree and/or a school with significant laboratory infrastructure. Thus, Anatomy and Physiology might be more accessible to students if offered as a dual enrollment course (with a college professor as the teacher of record at a local college campus) instead of a dual credit course (typically taught as a part of a high school curriculum with a credentialed high school teacher). Like Medical Terminology, Anatomy and Physiology is offered as an ISBE CTE course but should be pursued as early college credit if possible, as it greatly prepares a student for successful and varied career options in health science.

Most community colleges offer Anatomy and Physiology as a one- or two-semester option; the two-semester sequence is more frequently required in promising credentials. The Advisory Committee considered both recommendations for this guide and weighed several pros and cons with each option. The single semester course may more easily fit into a student's high school schedule, but the content may be difficult to properly digest for a high school student. The two-semester course may be difficult

⁴ However, many colleges place restrictions on enrollment in Medical Terminology that are in line with other dual credit courses, such as minimum student GPA, or college-level English placement.

to fit into a student schedule in addition to what is already required for a College and Career Pathway Endorsements and may still be overwhelming. Ultimately, the committee recommends that high schools teach Anatomy and Physiology either as a year-long or single-semester course and, in either case, articulate it to a one-semester college course. As a best practice, the single-semester version of the course can serve as solid preparation for the more robust two-semester sequence that students may likely be required to take at the postsecondary level. We call this course Introduction to Anatomy and Physiology and it would also fulfill the ISBE CTE program matrix requirement for Group 2.

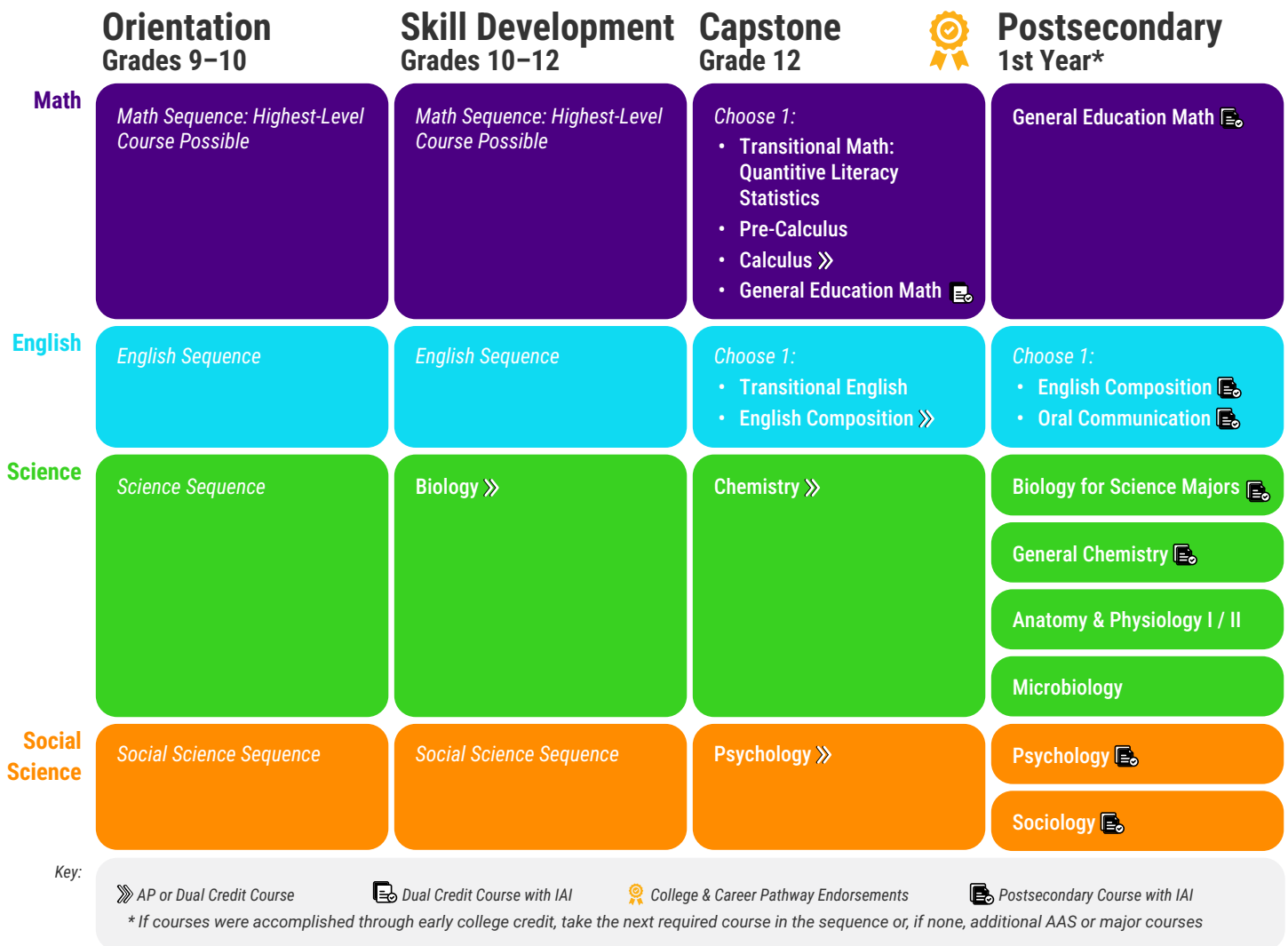
To be on track to earn the College and Career Pathway Endorsements, regional high school and community college partners should ensure students have earned three to six early college credit hours through the skill development courses. Additionally, students should continue progressing through the [work-based learning continuum](#). Classroom instruction should be coupled with continued employer site visits, an opportunity for students to participate in a job shadow experience at an employer site, and clubs or challenges related to their program area. Team-based challenges should be completed either as activities embedded within course curriculum or through a student/extracurricular organization. Students should be encouraged to engage in student or professional [SECTOR] organizations, including Career and Technical Student Organizations, to continue to build familiarity with the profession and pathways towards various career options.

Capstone Coursework

At the capstone level, a work-based learning experience could take the place of a course entirely, depending on student schedule and completion of graduation requirements. Either way, students should attempt to acquire an industry credential before graduating high school. Certified Nursing Assistant is specifically listed as an option as it stacks to the promising credentials already mentioned in nursing. Local partnerships between secondary districts and community colleges should also pursue any alternative industry credentials or certifications available, such as pharmacy technician, emergency medical technician, first aid, or cardiopulmonary resuscitation (CPR). However, those opportunities should be driven by the local partnerships and with an eye to high-priority occupations.

To be eligible for the College and Career Pathway Endorsements, all students should complete a career development experience of at least 60 hours in length and earn at least six or more early college credit hours, through a mix of both career-focused and general education coursework. Additionally, students should continue participation in clubs, professional organizations, or challenges related to their pathway.

Diagram: General Education Instructional Sequence



High School General Education Courses

There are several critical considerations for general education coursework before graduating high school. The courses mentioned here are frequent requirements for many postsecondary promising credentials in health science and enhance students' opportunities for postsecondary success in addition to the career-focused courses already delineated.

- In **science**, students should complete biology and chemistry as either an Advanced Placement or dual credit course if possible.
- In **social science**, students prepared for college-level coursework in their senior year should enroll in a dual credit or Advanced Placement Psychology course if available.
- In **math**, students should complete the highest-level course possible while in high school in preparation for a general education math course sequence 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 Quantitative Literacy and Statistics, a 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 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.

First-Year Postsecondary Courses

The recommended first-year postsecondary courses build upon the knowledge and skills recommended at the capstone level. As with other high school programs, community colleges should pursue opportunities to integrate and align health science 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 general education course areas, students will take the required 100-level courses. In science, selected courses should be strategic for many promising credentials and also transferable through the Illinois Articulation Initiative (IAI). The recommendations, due to their frequency in promising credentials, are:

- In **science**: Introductory Biology, Anatomy and Physiology I and II, Chemistry, and Microbiology
- In **social science**: Psychology and Sociology
- In **English/communications**: Oral Communication and English Composition

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 in their major.

V. Strategic Dual Credit Courses: Competency Descriptions

EdSystems and ICCB convened a stakeholder Advisory Committee of secondary, postsecondary, and private sector representatives to vet the recommendations in this guide. A smaller working group further convened to identify key competencies for the targeted early college courses currently lacking statewide articulation. In health sciences, those courses are Medical Terminology and Anatomy and Physiology.

MEDICAL TERMINOLOGY Key Competencies	
Building and Defining Words	<ul style="list-style-type: none"> • Students can correctly spell and pronounce medical language relating to anatomical, diagnostic, and symptomatic medical terms. • Students can correctly construct, identify, define, and analyze medical terms and language, using word roots, prefixes, suffixes, and combining forms. • Students can recognize and translate medical abbreviations.
Anatomy and Body Structure	<ul style="list-style-type: none"> • Students will identify and describe components of the human body in relation to other structures or locations in the body, incorporating anatomical planes, directional terms, quadrants, and regions. • Students can identify major human body structures and organs, their function, and their related medical terms.
Communicate Medical Terms	<ul style="list-style-type: none"> • Students will use their understanding of basic medical terminology, including abbreviations, acronyms, and diagnostic terms, to communicate effectively with healthcare personnel and patients.
Diagnostic Terminology	<ul style="list-style-type: none"> • Students will define and describe medical terminology relating to common health conditions and diagnostic practices including tests, procedures, symptoms, and diagnoses.
Understanding Medical Records and Case Studies	<ul style="list-style-type: none"> • Students will use electronic resources and research methods to read medical writings and understand the medical information contained in them. • Students will analyze and interpret patient records, lab reports, diagnostic summaries, etc., and the information contained in them.
Topics	<p>At minimum, courses should cover the following topics:</p> <ul style="list-style-type: none"> • Reproductive Systems: Male and Female • Senses: Eye and Ear • Musculoskeletal System • Urinary System • Respiratory System • Nervous System • Integumentary System • Digestive System • Cardiovascular System • Lymphatic and Immune System • Endocrine System

INTRODUCTION TO ANATOMY AND PHYSIOLOGY

Key Competencies

Biological Systems, Molecular Interactions, and Cellular Physiology	<ul style="list-style-type: none"> • Students will have a working understanding of basic chemistry as it relates to cellular interactions. • Students can differentiate the various parts, structures, and molecules of various human cells and describe their functions.
Anatomical Systems and Organs	<ul style="list-style-type: none"> • Students can identify and describe key organ systems using 2- and 3-dimensional models and diagrams as well as through dissections of cadavers. • Students will be able to define and describe homeostasis and its applicability to various bodily and cellular systems. • Students can demonstrate a working knowledge of the anatomical features of key human organ systems, including their related cells and tissues, and describe those systems in a state of physiological homeostasis.
Laboratory Skills and Techniques	<ul style="list-style-type: none"> • Students can display a working knowledge of basic laboratory techniques and procedures including the use of microscopes, dissection, safety, and clean up. • Students can conduct various laboratory activities on anatomical models and cadavers and interpret recorded data.
Scientific Inquiry and Communication	<ul style="list-style-type: none"> • Students can demonstrate the ability to acquire information from scientific descriptions, medical records, and research documents and use that information to make conclusions regarding anatomical structures and physiological processes. • Students can use their understanding of basic biological, anatomical, and physiological terminology, including abbreviations, acronyms, and diagnostic terms, to communicate effectively with healthcare and scientific personnel.
Physiological Processes	<p>Through lectures and laboratories, students demonstrate a familiarity with:</p> <ul style="list-style-type: none"> • Homeostasis • Blood Pressure Regulation • Membrane Transport • Blood Cell Formation • Bone Formation • Gas Exchange • Muscle Contraction • Nutrient Absorption • Nerve Impulse Conduction • Urine Formation • Hormone Regulation • Reproductive Cycles • Cardiac Physiology • Gamete Production • Capillary Exchange • Pregnancy & Development
Topics	<p>At minimum, courses should cover the following topics:</p> <ul style="list-style-type: none"> • Introductory Chemistry for A&P • Cell Structure and Function • Nervous System and Special Senses • Digestive System and Metabolism • Cardiovascular System • Respiratory System • Reproductive System • Muscular System • Endocrine System • Urinary System • Tissues • Skin and the Integumentary System • Skeletal System

Appendices

A.1: Technical and Essential Employability Competencies for Health Sciences

The following technical and employability competencies for health sciences are from “[Recommended Technical and Essential Employability Competencies for College and Career Pathway Endorsements](#),” a document developed through an iterative process involving public-private steering committees established pursuant to the Postsecondary and Workforce Readiness Act in order to implement College and Career Pathway Endorsements.

Technical and Essential Employability Competencies for HEALTH SCIENCES & TECHNOLOGY	
Medical Terminology	Students can use their understanding of basic medical terminology, including abbreviations, acronyms, and diagnostic terms, to communicate effectively with healthcare personnel and patients.
Healthcare Industry & Culture	Students can use their understanding of the basic components and culture of the health industry to understand the purpose and function of key stakeholders, practices, practitioners, and regulations.
Healthcare Delivery Practices	Students can use their understanding of the practices, procedures, and personnel involved in delivering quality patient care to evaluate the appropriateness of a plan, instructions, or assigned task.
Healthcare Industry Ethics	Students can use their understanding of confidentiality, morality, and legal concepts to evaluate and apply the merits, risks, and social concerns to workplace decisions.
Health Professions Licensure	Students can use their understanding of education requirements, licensure, and certification to ensure proper adherence to regulations that guide service delivery.
Emergency Response	Students can use their understanding of emergency procedures and protocols to respond to and expedite safety in an emergency situation.
Healthcare Confidentiality	Students can use their understanding of HIPPA to adhere to legal requirements and maintain confidentiality.
Healthcare Personnel & Roles	Students can use their understanding of the practices, procedures, and personnel used to deliver quality patient care to identify one’s role on a team and within the overall health environment.
Healthcare Sanitation	Students can use their understanding of sanitation and health regulations to ensure that healthcare facilities and tools meet standards for cleanliness.
Healthcare Rules & Regulation	Students can use their understanding of basic laws and regulations (Patient Bill of Rights, CLIA, EMTALA, OSHA, etc.) to meet accreditation standards and to obey the law.

A.2: Cross-Sector Essential Employability and Entrepreneurial Competencies

The following cross-sector competencies are from “[Recommended Technical and Essential Employability Competencies for College and Career Pathway Endorsements](#),” a document developed through an iterative process involving public-private steering committees established pursuant to the Postsecondary and Workforce Readiness Act in order to implement College and Career Pathway Endorsements.

ESSENTIAL EMPLOYABILITY COMPETENCIES	
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.

Source: "State of Illinois [Recommended Technical and Essential Employability Competencies for College and Career Pathway Endorsements](#)"

B: 2020 Advisory Committee Membership

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Illinois Community College Board*

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*Principal, Health Sciences Career Academy
Instituto Del Progreso Latino*

Rhonda Bell

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*Associate Director for Integrated Career Programs
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Jeffrey Gregor

*Dean for Health Professions & Public Service
Waubensee Community College*

Wendee Guth

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Jon Furr

Executive Director

Juan Jose Gonzalez

Pathways Director

Sarah Clark

Development and Communications Director

C: College and Career Pathway Endorsements Framework

The College and Career Pathway Endorsements system is a voluntary system for school districts to award endorsements on high school diplomas to graduates who have demonstrated readiness for college and careers. The following framework for the endorsement system is available as a [PDF download](#).



College and Career Pathway Endorsements Framework



INDIVIDUAL PLAN

Each student completing an endorsement must have an individualized plan, which includes college planning linked to early understanding of career goals, financial aid, resume, and personal statement.

PROFESSIONAL LEARNING

Awareness, exploration, and preparation activities that provide opportunities for students to interact with adults in their workplace and gain essential employability and technical competencies.

9th	10th	11th	12th
At least 2 career exploration activities or 1 intensive experience		60 cumulative hours of paid or for credit, supervised career development experience(s) with a professional skills assessment r	
At least 2 team-based challenges with adult mentoring			

CAREER-FOCUSED INSTRUCTIONAL SEQUENCE

2 years of secondary coursework or equivalent that include essential employability and technical competencies, at least 6 hours of early college credit, and articulation to a postsecondary credential with labor market value.

9th	10th	11th	12th
Orientation / Introduction Courses			
	Skill Development Courses		
			Capstone / Advanced Courses

ACADEMIC READINESS

Ready for non-remedial coursework in reading and math by high school graduation through criteria defined by the school district and local community college.

D: Illinois' Work-Based Learning Continuum

Illinois has a defined continuum of work-based learning opportunities, which spans from secondary to postsecondary. Components, defined in statute and the [Illinois Career Pathways Dictionary](#), include career awareness, career exploration, team-based challenges, career development experiences, youth or pre-apprenticeships, and apprenticeships.

Work-Based Learning & Host Engagement Continuums



Illinois' continuum represents the many forms of work-based learning that grow in intensity depending on the model. However, this continuum is not intended to convey a fixed or ideal progression. As individuals learn through their work-based learning experiences, they may return to less intensive models to develop different skills or explore additional interests. Individuals should be supported to engage in these activities iteratively as they explore the multiple entry and exit points of career pathways.

Providing high-quality work-based learning requires strong partnerships between educators and regional employers. As the intensity of students' experiences progress, so too does the role of employer partners serving as host sites.



Model Programs of Study in Health Sciences

Recommended Courses

	Orientation Grades 9–10	Skill Development Grades 10–12	Capstone Grade 12	Postsecondary 1st Year*
Career Focused Courses	<p>Choose 1:</p> <ul style="list-style-type: none"> Orientation to Health Occupations Health Occupations Introductory Skills Development 	<p>Medical Terminology </p> <p>Introduction to Anatomy and Physiology </p>	<p>Choose 1 Program:</p> <ul style="list-style-type: none"> Certified Nursing Asst. Pharmacy Technician Other Credential 	<p>Continue AS or AAS Course Sequence</p>
Work-Based Learning	Career Exploration (2)	Career Development Experience or Youth Apprenticeship		
	Team-Based Challenge (2); may be offered through <i>Career and Technical Student Organizations</i>			
Math	Math Sequence: Highest-Level Course Possible	Math Sequence: Highest-Level Course Possible	<p>Choose 1:</p> <ul style="list-style-type: none"> Transitional Math: Quantitative Literacy Statistics Pre-Calculus Calculus General Education Math 	General Education Math
English	English Sequence	English Sequence	<p>Choose 1:</p> <ul style="list-style-type: none"> Transitional English English Composition 	<p>Choose 1:</p> <ul style="list-style-type: none"> English Composition Oral Communication
Science	Science Sequence	Biology	Chemistry	<p>Biology for Science Majors </p> <p>General Chemistry </p> <p>Anatomy & Physiology I / II</p> <p>Microbiology</p>
Social Science	Social Science Sequence	Social Science Sequence	Psychology	<p>Psychology </p> <p>Sociology </p>

Key:

AP or Dual Credit Course

Dual Credit Course

Dual Credit Course with IAI

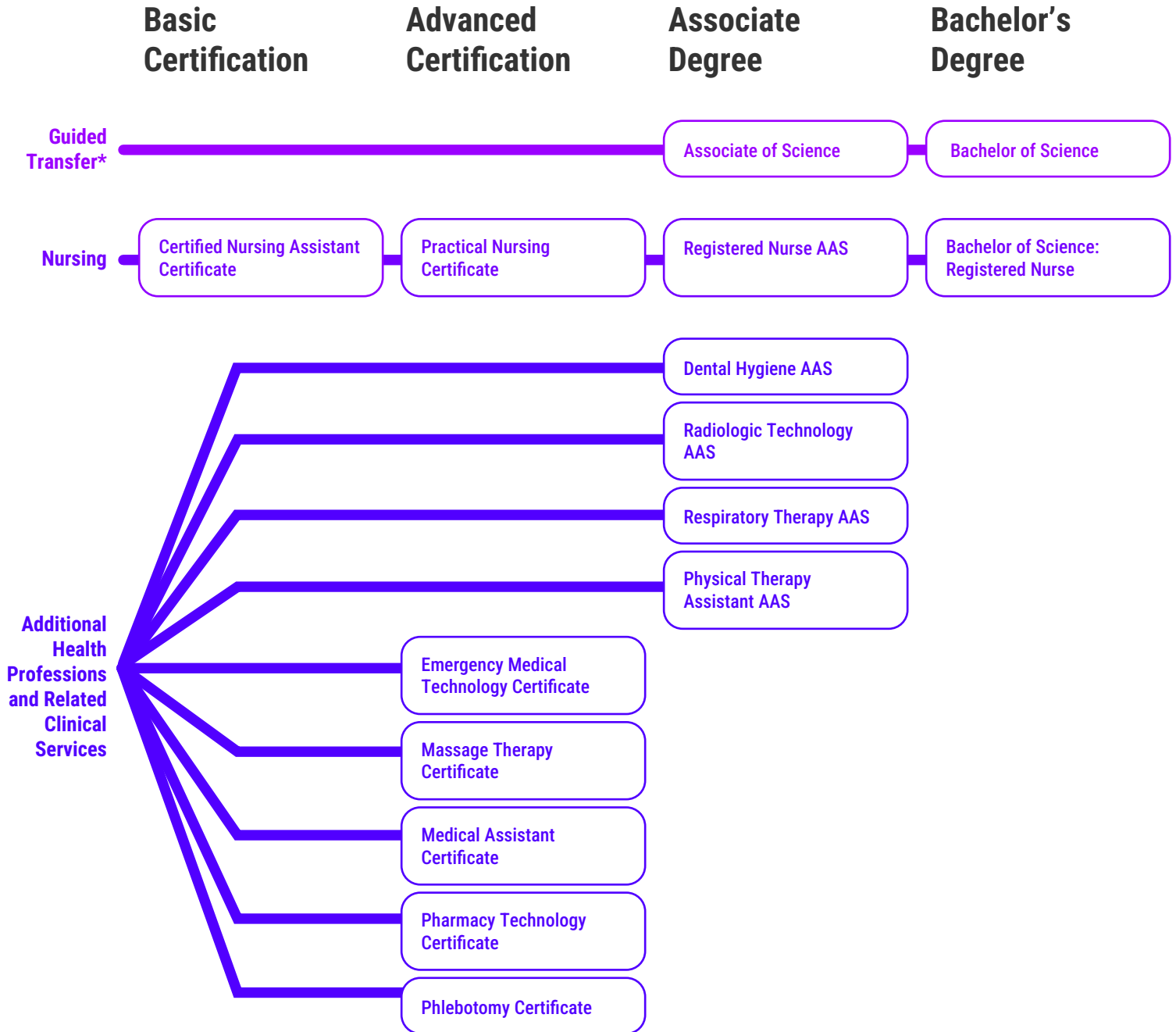
Course Prepares for Industry Credential

College & Career Pathway Endorsements

Postsecondary Course with IAI

* If courses were accomplished through early college credit, take the next required course in the sequence or, if none, additional AAS or major courses

Postsecondary Opportunities



* Pre-Professional Programs in Pharmacy, Medicine, Physical Therapy, Speech-Language Pathology

Selected Occupations, Wages, and Job Growth

Program	Typical Job(s)	Living Wage Potential*	Median Hourly Wage**	IL Growth: Change over 10 years ***	IL Annual Job Openings***	Typical Educational Requirements
Guided Transfer	Pharmacist	High	\$65.78	1.0%	438	Doctoral or Professional Degree
	Speech-Language Pathologists	High	\$39.76	19.7%	639	
	Physical Therapist	High	\$50.08	10.0%	496	
Nursing	Nursing Assistants	Low	\$18.41	2.0%	7,040	Postsecondary Certificate
	Licensed Practical and Licensed Vocational Nurses	Medium	\$29.62	3.0%	1,552	
	Registered Nurses	High	\$39.43	5.0%	7,870	Bachelor's Degree
	Nurse Practitioners	High	\$62.33	44.0%	902	Doctoral or Professional Degree
Other Health Professions and Related Clinical Services	Dental Hygienists	High	\$39.72	12.3%	585	Associate Degree
	Radiologic Technologists	Medium	\$32.42	5.0%	668	
	Respiratory Therapists	Medium	\$33.12	18.7%	314	
	Physical Therapist Assistant	Medium	\$32.76	21.3%	586	Postsecondary Certificate
	Paramedic	Medium	\$23.45	12.7%	1,050	
	Emergency Medical Technicians	Low	\$18.69	12.7%	1,050	
	Massage Therapist	Medium	\$30.59	23.4%	868	
	Pharmacy Tech	Low	\$19.16	11.3%	1,750	
	Medical Assistant	Low	\$19.61	11.5%	2,955	
Phlebotomists	Low	\$20.36	16.6%	744		

* Living wage potential is based on MIT's Living Calculator (livingwage.mit.edu) for Illinois in 2024. Occupations with median salaries higher than the living wage for 1 adult + 1 child (\$39.63/hour) are considered as having a "high" living wage potential. Occupations with median salaries only higher than the living wage of 1 adult, no children (\$22.86/hour) are considered as having a "medium" living wage potential, and occupations with median salaries below the living wage of 1 adult, no children (less than \$22.86/hour) are considered as having a "low" living wage potential.

** Illinois Department of Employment Security (2022). Wage Information: Occupational Employment and Wage Statistics (Statewide). Retrieved April 2, 2024, from ides.illinois.gov/resources/labor-market-information/oews.html

*** Illinois Department of Employment Security. Employment Projections (Long-Term Occupational Projections 2020-2030). Retrieved April 2, 2024, from ides.illinois.gov/resources/labor-market-information/employment-projections.html