

A young woman with dark hair, wearing blue scrubs and a stethoscope, is smiling as she checks a patient's pulse. She is holding the patient's hand and using a stethoscope to listen to their wrist. The background is a bright, out-of-focus window.

Beginning the Bachelor of Science in Nursing in High School

*How Kentucky Created a
120-Credit Hour Nursing
Career Pathway*

MAY 2017

SREB

Inside

Beginning the Bachelor of Science in Nursing in High School: How Kentucky Created 1 a 120-Credit Hour Nursing Career Pathway	1
Career Pathways – Accelerating Access to the Middle Class	1
Building Career Pathways in Nursing and Health Care	1
Labor Market Demand for Nurses and Other Health-Care Professionals.....	2
The Broken Educational Pipeline to Jobs in Nursing and Health Care	2
Building Kentucky’s 120-Credit Hour Nursing Career Pathway	3
Components of Kentucky’s Nursing Career Pathway Curriculum	4
Nursing Career Pathway Implementation Options	4
Instructional Strategies for Career Pathways in Nursing and Health Care.....	9
Career Academies.....	9
College-Ready Academics and Career Pathway Courses.....	9
Project-Based Assignments	10
Career Guidance and Exploration	10
Readiness Interventions for Struggling Students.....	10
Overcoming Barriers to Career Pathways in Nursing and Health Care.....	10
Supporting Career Pathways in Nursing and Health Care.....	12
Appendix: Kentucky Nursing Pathway College Course Titles and Descriptions.....	13
Endnotes	16

The Southern Regional Education Board works with states to improve education at every level, from early childhood through doctoral education. A nonprofit, nonpartisan organization based in Atlanta, SREB was created in 1948 by Southern governors and legislators to help leaders in education and government advance education to improve the social and economic life of the region. Member states are Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.

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Beginning the Bachelor of Science in Nursing in High School: *How Kentucky Created a 120-Credit Hour Nursing Career Pathway*

Career Pathways — Accelerating Access to the Middle Class

Across the country, many states are using career pathways to meet their skilled workforce needs and bridge the gap between high school, postsecondary education programs and the workplace.

As jointly defined by the U.S. Departments of Education, Health and Human Services, and Labor, *career pathways* are education and training programs and support services that enable youth and adults to secure industry credentials, obtain jobs and advance to higher levels of education and employment.¹ In high school, pathways begin with *programs of study* — sequences of related career and technical education (CTE) courses that include opportunities to earn college credits leading to certificates, credentials and degrees.²

When taught in context with a college-ready academic core, career pathway programs of study have the potential to help millions of young adults earn the postsecondary credentials and degrees they need to secure a middle-class way of life.

The Southern Regional Education Board's (SREB) vision of career pathways — established in the reports of two special commissions on community colleges and CTE³ — encompasses but exceeds these definitions. SREB holds that, when taught in context with a college-ready academic core, career pathway programs of study have the potential to help millions of young adults earn the postsecondary credentials and degrees they need to secure a middle-class way of life.⁴ What's more, schools that adopt SREB's Senior-Year Redesign⁵ can use pathways to give eligible students a head start of up to 30 credits toward a postsecondary credential or degree.

Building Career Pathways in Nursing and Health Care

In October 2015, SREB convened policymakers and leaders from secondary and postsecondary education and business around the shared goal of building strong career pathways leading from high school to rewarding careers in high-growth industries. At this meeting, a team of educators and policymakers from **Kentucky** acknowledged that the state lacked a pathway that embodied the vision expressed in SREB's two special commission reports.

As a result, the Kentucky Department of Education (KDE) committed to developing a truly seamless, secondary-to-postsecondary career pathway in one of the state's high-demand fields. A work group comprised of leaders from KDE, the Kentucky Community and Technical College System, the Kentucky Education and Workforce Development Cabinet, and SREB then set a goal of developing a pathway in nursing and piloting it in high schools in August 2017.

Over the span of one year and with the support of an SREB career pathways consultant, a coalition of partners (see the sidebar) co-designed a **120-credit hour nursing pathway** that will allow Kentucky students to secure well-paying nursing careers by earning a series of stackable credentials and degrees:

- certified nursing assistant (CNA)
- licensed practical nurse (LPN)
- associate degree in nursing (ADN) — registered nurse (RN)
- bachelor of science in nursing (BSN)

Partners agreed that the pathway must be effective, affordable and sustainable and follow best practices for pathway implementation.⁶

Health-care careers are ideally suited for pathway development because employers have clearly established the credentials they need in settings like hospitals, rehabilitation centers and long-term care facilities, for example. State nursing boards review these credentials and the institutions that offer them.

Kentucky's Nursing Pathway Partners

- Kentucky Department of Education
- Kentucky districts and high schools
- Jefferson Community and Technical College
- Kentucky Education and Workforce Development Cabinet
- Kentucky Board of Nursing
- Health Career Collaborative of Greater Louisville
- Spalding University
- Southern Regional Education Board

This report describes a **model pathway** that secondary and postsecondary education agencies and employers in other states can adapt to suit their own health-care workforce needs. It also describes instructional strategies for career pathways; outlines barriers to pathway implementation that Kentucky, and states like it, may face; and offers actions states can take to support pathways in nursing, health care and other high-demand fields.

Labor Market Demand for Nurses and Other Health-Care Professionals

Health care, one of the fastest growing sectors of the economy, will continue to grow as the U.S. population ages. By 2024, health-care jobs will increase by 19 percent, faster than all other occupational groups.⁷

In health care, higher education pays off. Sixty-eight percent of *health professional and technical occupations* — for example, dentists, doctors, lab technicians, nurses, pharmacists and physical therapists — require a bachelor's degree or more.

The 2015 median annual wage for such jobs was \$62,610, higher than the \$36,200 median for all jobs.⁸ By 2020, the economy will gain more than 2 million health professional and technical jobs,⁹ with at least 1.6 million of those jobs going to nurses — 1.2 million RNs and 370,000 LPNs.¹⁰ RNs with a BSN can earn a median salary of \$67,500.¹¹

By contrast, two-thirds of all *health-care support occupations* — like dental assistants, home health aides, nursing aides and occupational therapy aides — require some college or an associate degree and pay a median wage of \$27,040.

Like the nation, **Kentucky** is experiencing strong growth in health-care jobs. The Kentucky Education and Workforce Development Cabinet projects that by 2024, health-care support occupations will grow more than 38 percent, faster than all other occupational groups.¹² RNs and nursing assistants will not only rank among the fastest growing jobs in the state, but also experience the largest number of annual job openings.



Demand for nurses is particularly high in **Louisville**, Kentucky's largest metro area. Labor market analyses consistently rank RNs at or near the top of all high-wage, high-demand jobs in the region.¹³ Representatives of KentuckianaWorks, the Workforce Development Board of Greater Louisville, note that Louisville's acute care hospitals have a hiring preference for nurses with a BSN, while long-term care facilities prefer CNAs and LPNs.¹⁴

Critical nursing shortages exist across Kentucky. Regional workforce development board representatives report that, in response to these shortages, more health-care providers are seeking to partner with education to build capacity for pathways that begin in high school and lead from entry-level credentials like the CNA and the LPN to the BSN.

The Broken Educational Pipeline to Jobs in Nursing and Health Care

At present, Kentucky's secondary and postsecondary institutions are not producing enough individuals with nursing credentials to meet demand. In Louisville, for example, the number of RN candidates who pass the National Council Licensure Examination (NCLEX) has declined from a net perspective by over 100 since 2010.¹⁵

The broken pipeline starts in high school. Stakeholders perceive Kentucky's nursing pipeline as inefficient and unaligned, with few connections between high school, postsecondary programs and employers. National data bear this out. SREB analyzed secondary and postsecondary CTE data and found the largest disconnect in health science, which enrolled under 10 percent of U.S. high school students but about 25 percent of postsecondary students.¹⁶

Readiness is key. SREB's consultants observe that many high school CTE programs, including health science and pre-nursing programs, do not teach an intensive curriculum in the context of college-ready academic courses that help students master the skills needed to earn a credential or degree.

In Kentucky, many students graduate unprepared for further education. Only 20 percent of Kentucky high school graduates who took the ACT in 2016 met ACT's readiness benchmarks in English, reading, math and science.¹⁷ Data also

suggest that health science students may be insufficiently challenged. Analyzing 2014 student surveys from schools in its High Schools That Work network,¹⁸ SREB found that a minority of Kentucky health science students are:

- *Completing a college-ready core.* Only 35 percent of respondents reported completing at least four advanced English courses; 44 percent reported completing at least three advanced science courses.
- *Experiencing challenging academic assignments.* Twenty-seven percent of respondents reported that literacy assignments¹⁹ required them to read and write about varied texts, conduct research or give presentations. The same percentage said their science assignments²⁰ required them to conduct experiments, read scientific articles or use graphs to explain phenomena. Fifty-nine percent said that math assignments required them to use math in other classes, solve real-world problems or develop and analyze graphs.²¹
- *Experiencing rigorous CTE assignments.* Forty-six percent of respondents said that CTE assignments²² required them to use academic skills to solve problems, develop hypotheses or complete long-term projects.

Kentucky’s high school pre-nursing curriculum does not prepare graduates for immediate entry into postsecondary nursing programs. State Registered Nurse Aide (SRNA; Kentucky’s name for the CNA) is the only component of the state’s pre-nursing pathway (see Table 1) that meets pre-application requirements for the LPN or Associate Degree in Nursing (ADN) programs at Jefferson Community and Technical College (JCTC). Further, only some Kentucky Community and Technical College System campuses accept selected pre-nursing courses for dual credit.

Many Kentucky students seeking an ADN or BSN are graduating with excess credit hours — and debt. On average, graduates of JCTC’s 71-credit ADN program earn 116 college credits. Although most BSN programs consist of 120 to 125 credit hours, the average Kentucky BSN graduate accumulates 153 credits and \$26,420 of debt. Over time, following the existing educational pipeline, a high school pre-nursing student who completes JCTC’s LPN and ADN programs and acquires a BSN could earn a total of 168 credits: 48 credits in excess of a 120-credit BSN.

Table 1: Alignment of Kentucky Department of Education Curriculum with JCTC Requirements

KDE Pre-Nursing Pathway Courses	JCTC Pre-Application Requirements for the LPN or ADN
Principles of Health Science	PAX-RN* Minimum Score
Emergency Procedures	Performance in the Verbal category
Medical Terminology	Computer literacy
Medical Nurse Aide	Certification - State Registered Nurse Aide
Medical Math	BIO 137 Anatomy & Physiology
Internship Advanced Allied Health Core Skills	PSY 110 General Psychology
Advanced Pre-Nursing	MAT 150 College Algebra / MAT 110 Applied Math
Body Structures and Functions OR Anatomy	
Co-op (Nursing)	* PAX-RN: National League for Nursing Pre-Admission Examination for Registered Nursing

Building Kentucky’s 120-Credit Hour Nursing Career Pathway

By relocating multiple curricular components to the high school level, Kentucky’s **120-credit hour, structurally guided career pathway in nursing** is intended to eliminate duplicative courses, shorten the time needed to secure stackable credentials and degrees, and lower the overall cost of education for aspiring nurses.

Kentucky’s nursing pathway partners designed the pathway to meet the needs of all students, not just the gifted and talented. To that end, the pathway will be piloted in Fall 2017 in Louisville-area high schools and technology centers offering health science programs or health science career academies. Students served are racially and ethnically diverse and represent a broad range of ability levels.

The partners have also sought to ensure that pathway courses meet existing graduation and postsecondary program entry requirements. Further, following SREB’s best practices for pathway instruction (see page 9), all nursing pathway students will complete a college-ready academic core curriculum.

Components of Kentucky’s Nursing Career Pathway Curriculum

Kentucky’s nursing pathway draws upon the strengths of existing curricula and structures. However, because the current KDE pre-nursing curriculum (see Table 1) does not prepare students for immediate entry into LPN or ADN programs, partners agreed to adopt the four-course **Health Care Foundations — Basic Certificate (HCFBC)** as the pathway’s “front door.” KDE began embedding HCFBC courses in its health science curriculum in Spring 2017. In Jefferson County Public Schools, the state’s largest district, six new health science academies opening in Fall 2017 will debut the HCFBC curriculum, with other JCPS health science programs adopting it thereafter.

The HCFBC was developed by JCTC. In 2011, a higher education consortium that included JCTC received a \$19 million U.S. Department of Labor grant to expand health pathways. JCTC convened Louisville health-care employers and education providers around the goal of developing a foundational curriculum to prepare individuals for entry-level jobs in hospitals, long-term care facilities, physicians’ offices and home health-care agencies.

Intended for adult learners or high school students, the 13-hour HCFBC exposes students to health careers, acclimates them to the health-care environment and prepares them for entry-level positions in diverse health fields. HCFBC emphasizes knowledge and skill attainment in basic skills, health care delivery and management, communications and medical terminology. Students can also earn certifications in digital literacy, career readiness, cardiopulmonary resuscitation (CPR) and nursing aide (SRNA). When integrated with a college-ready academic core, these courses provide the basis for ongoing student success in credential and degree programs and the workplace.

Kentucky’s partners identified a total of **six pathway curricular components**, as shown in Table 2, starting with the HCFBC curriculum and leading to and through the LPN, RN and BSN (see the Appendix for course descriptions).

The conditions under which Kentucky high school students may take and earn credits for college-level courses in the pathway vary by curricular component. For the four-course HCFBC curriculum, student eligibility is determined by KDE and individual high schools in consultation with JCTC. High school students wishing to complete the academic prerequisites for the LPN (see Section B, Table 2) must meet postsecondary eligibility requirements for placement into college credit-bearing courses. Kentucky postsecondary institutions use a range of benchmarks for college readiness, including ACT scores of 18 in English, 19 in math and 20 in reading.²³

LPN and ADN courses will be offered by JCTC. An existing articulation agreement provided the basis for granting JCTC pathway students admission into the BSN program at **Spalding University**, which agreed to be the pathway’s first RN-to-BSN partner.

Spalding’s online **30-credit hour BSN** is offered in six-week sessions that cover the content taught in a standard semester. Given this condensed time frame, students are advised to take no more than one or two courses per session. Spalding reports that shorter sessions allow working adults with families to attend full or part time and temporarily “stop out” when life intervenes. The BSN can be completed in as little as one year.

Nursing Career Pathway Implementation Options

Table 3 on pages 6 and 7 illustrates how high school students in Kentucky’s nursing pathway might graduate with 26 to 51 college credits, depending on their preparation and their school setting.

- **Under Option One**, students could graduate with *up to 26 college credits*, including several LPN and ADN prerequisites. Students go on to the LPN program at JCTC. Table 4, a sample counseling sheet, shows how pathway courses substitute for graduation requirements. Students could earn a BSN three years after graduating.



“Kentucky’s nursing pathway is a strong example of how community and technical colleges and high schools can come together to prepare students with the knowledge, skills and credentials industry values. All of the pathway’s necessary components already existed: The challenge lay in finding the time, resources and commitment to bring partners together.”

Tim Shaughnessy,
Career Pathways Consultant, SREB

- **Under Option Two**, students could graduate with *up to 35 college credits* by completing the HCFBC, the LPN and ADN prerequisites, and the first course of the LPN. Students earn the LPN that summer and begin the RN in the fall. Option 2 students could complete a BSN two years after graduating.
- **Under Option Three**, students attending the iLEAD Academy, a regional career academy high school located in Carrollton, Kentucky,²⁴ could graduate with *up to 51 college credits* by completing multiple components of the curriculum in high school. JCTC is in ongoing discussions with iLEAD regarding the three LPN courses listed under Section C. These courses will most likely be taught on a JCTC campus by JCTC faculty. Under this model, iLEAD students could potentially earn a BSN within two years after graduating.

Table 2: Curricular Components of Kentucky’s 120-Credit Hour Nursing Pathway

Curricular Component	College Credit Hours
Section A. Health Care Foundations - Basic Certificate	13
AHS 115 – Medical Terminology	3
HST 102 – Health Care Delivery & Management	3
HST 103 – Health Care Communication	3
HST 104 – Health Care Basic Skills with Clinical	4
<i>Certifications/Degrees: Digital Literacy, National Career Readiness Certificate (NCRC), Cardiopulmonary Resuscitation (CPR), State Registered Nurse Aide (SRNA)</i>	
Section B. Prerequisites and English	13
BIO 137 – Human Anatomy & Physiology I	4
PSY 110 – General Psychology	3
MAT 110 – Applied Mathematics	3
ENG 101 – Writing I	3
Section C. Licensed Practical Nurse (LPN)	23
NRS 101 – Nursing I	9
NRS 102 – Nursing II	10
BIO 139 – Human Anatomy & Physiology II	4
<i>Certifications/Degrees: Medication Technician Certification, LPN-Diploma</i>	
Section D. LPN to Registered Nurse (RN)	33
NSG 196 – Nursing LPN Bridge	5
NSG 236 – Nursing III	9
NSG 246 – Nursing IV	9
HST 121 – Pharmacology	2
HST 122 – Clinical Pathophysiology	3
PHI 110 – Medical Ethics	3
<i>Certifications/Degrees: Associate Degree Nursing (ADN) – Associate in Applied Science (AAS) in preparation for the National Council Licensure Examination (NCLEX) – RN</i>	
Section E. Additional Courses	10
PSY 223 – Developmental Psychology	3
REL 130 – Introduction to Comparative Religion	3
PSY 212 – Applications of Statistics in Psychology	4
Section F. RN to Bachelor of Science in Nursing (BSN)	30
NURS 486 – Dimensions of Professional Practice	3
NURS 414 – Health Assessment Across the Lifespan	4
NURS 420 – Health Promotion and Disease Prevention Across the Lifespan	4
NURS 526 – Informatics and the Principles of Evidence-Based Practice	3
NURS 406 – Evidence-Based Practice in Health Care	4
NURS 411 – Professional Role Development and Leadership in Nursing	4
NURS 488 – Community Health Nursing	4
NURS 475 – Advanced Concepts in Professional Nursing: Capstone Experience	4
<i>Certifications/Degrees: Bachelor of Science in Nursing (BSN)</i>	
Pathway Total	120

Table 3: Three High School Nursing Pathway Implementation Options*

Option One — 26 College Credits: Students Complete Health Care Foundations — Basic Certificate and Prerequisites .		Option Two — 35 College Credits: Students Complete Health Care Foundations — Basic Certificate and Prerequisites and Begin the LPN.		Option Three — 51 College Credits: iLEAD Students Complete Health Care Foundations — Basic Certificate, Prerequisites and the LPN, Then Begin the ADN-AAS .	
Gr.	College-Ready Core	Nursing Pathway	Gr.	College-Ready Core	Nursing Pathway
9	English I Algebra I Biology I World Civilizations	AHS 115 – Medical Terminology	9	English I Algebra I Biology I World Civilizations	AHS 115 – Medical Terminology
10	English II Geometry Chemistry I Exploring Civics	HST 102 – Health Care Delivery & Management HST 103 – Health Care Communication	10	English II Algebra II BIO 137 – Human Anatomy & Physio. I Exploring Civics	HST 102 – Health Care Delivery & Management HST 103 – Health Care Communication HST 104 – Health Care Basic Skills With Clinical
11	English III Algebra II Physics I U.S. History	HST 104 – Health Care Basic Skills With Clinical	11	English III Geometry BIO 139 – Human Anatomy & Physiology I PSY 110 – General Psychology	HST 104 – Health Care Basic Skills With Clinical JCTC – Licensed Practical Nurse (LPN) – Diploma NRS 101 – Nursing I
12	ENG 101 – Writing I MAT 110 – Applied Math BIO 137 – Human Anatomy & Physiology I PSY 110 – General Psychology		12	ENG 101 – Writing I MAT 110 – Applied Math	JCTC – Licensed Practical Nurse (LPN) – Diploma NRS 101 – Nursing I NRS 102 – Nursing II JCTC – ADN/AAS HST 121 – Pharmacology
13	JCTC – Licensed Practical Nurse (LPN) – Diploma Fall: NRS 101 – Nursing I BIO 139 – Human Anatomy & Physiology II HST 121 – Pharmacology Spring: NRS 102 – Nursing II HST 122 – Clinical Pathophysiology PHI 110 – Medical Ethics		13	Summer: NRS 102 – Nursing II BIO 139 – Human Anatomy & Physiology II HST 121 – Pharmacology Fall: HST 122 – Clinical Pathophysiology PHI 110 – Medical Ethics NSG 196 – Nursing LPN Bridge PSY 223 – Developmental Psychology Spring: NRS 236 – Nursing III PSY 212 – Applications of Statistics in Psychology REL 130 – Intro to Comparative Religions	Summer: NSG 196 – Nursing LPN Bridge HST 122 – Clinical Pathophysiology Fall: NSG 236 – Nursing III PHI 110 – Medical Ethics PSY 223 – Developmental Psychology Spring: NSG 246 – Nursing IV PSY 212 – Applications of Statistics in Psychology REL 130 – Intro to Comparative Religions

Gr.	College-Ready Core	Nursing Pathway	Gr.	College-Ready Core	Nursing Pathway	Gr.	College-Ready Core	Nursing Pathway
14	JCTC – Associate Degree Nursing – Associate in Applied Science Summer: NSG 196 – Nursing LPN Bridge Fall: NSG 236 – Nursing III PSY 223 – Developmental Psychology Spring: NSG 246 – Nursing IV PSY 212 – Applications of Statistics in Psychology REL 130 – Intro to Comparative Religions		14	Summer: NSG 246 – Nursing IV Spalding University – BSN in Nursing Fall, Session 1: NURS 486 – Dimensions of Professional Practice NURS 414 – Health Assessment Across the Lifespan Fall, Session 2: NURS 420 – Health Promotion and Disease Prevention Across the Lifespan NURS 526 – Informatics and the Principles of Evidence-Based Practice Fall, Session 3: NURS 406 – Evidence-Based Practice in Health Care Spring, Session 4: NURS 411 – Professional Role Development and Leadership in Nursing Spring, Session 5: NURS 488 – Community Health Nursing Spring, Session 6: NURS 475 – Advanced Concepts in Professional Nursing: Capstone Experience		14	Spalding University – BSN in Nursing Fall, Session 1: NURS 486 – Dimensions of Professional Practice NURS 414 – Health Assessment Across the Lifespan Fall, Session 2: NURS 420 – Health Promotion and Disease Prevention Across the Lifespan NURS 526 – Informatics and the Principles of Evidence-Based Practice Fall, Session 3: NURS 406 – Evidence-Based Practice in Health Care Spring, Session 4: NURS 411 – Professional Role Development and Leadership in Nursing Spring, Session 5: NURS 488 – Community Health Nursing Spring, Session 6: NURS 475 – Advanced Concepts in Professional Nursing: Capstone Experience	
15		Spalding University – BSN in Nursing Fall, Session 1: NURS 486 – Dimensions of Professional Practice NURS 414 – Health Assessment Across the Lifespan Fall, Session 2: NURS 420 – Health Promotion and Disease Prevention Across the Lifespan NURS 526 – Informatics and the Principles of Evidence-Based Practice Fall, Session 3: NURS 406 – Evidence-Based Practice in Health Care Spring, Session 4: NURS 411 – Professional Role Development and Leadership in Nursing Spring, Session 5: NURS 488 – Community Health Nursing Spring, Session 6: NURS 475 – Advanced Concepts in Professional Nursing: Capstone Experience						

* Indicated in boldface and **red**, **blue**, **green**, **orange** or **black** type, all Kentucky nursing pathway courses – both “general education” (e.g., ENG 101, MAT 110), and nursing-related – are college-level courses taught using college syllabi, assignments and mid-term and final exams. High school students take these courses as dual credit. Courses can be taught by JCTC faculty at a JCTC campus or at the high school by teachers recognized as JCTC adjuncts under JCTC faculty supervision. At present, schools and districts may determine whether to offer these courses on a yearlong or a semester-long basis. However, semester-long courses (e.g., offered on a block schedule) may allow students to accelerate their completion of the pathway. Student eligibility for the **four HCFBC courses** is determined by KDE and individual high schools in consultation with JCTC. High school students wishing to complete the **four academic prerequisites for the LPN** must meet postsecondary eligibility requirements for placement into college credit-bearing courses. Kentucky postsecondary institutions use a range of benchmarks for college readiness, including ACT scores of 18 in English, 19 in math and 20 in reading. Dual credit eligibility requirements vary from campus to campus within the Kentucky Community and Technical College System. SREB recommends that colleges and schools use assessments like the Accuplacer, ACT or ACT Aspire to determine students’ ability to meet mutually agreed-upon literacy and math readiness benchmarks for college studies. Students who need help meeting these benchmarks should co-enroll in specialized readiness courses or just-in-time readiness modules (see page 10). Additionally, career pathway teachers should receive special preparation on how to integrate literacy strategies in their instruction. Eligibility requirements for high school students wishing to complete the **three LPN courses** are currently being negotiated by JCTC and the iLEAD academy. However, these courses will most likely be taught on a JCTC campus by JCTC faculty.

Table 4: Sample Nursing Career Pathway Counseling Sheet – Pathway Option One

Option One: Health Care Foundations – Basic Certificate Plus Prerequisites (26 college credits earned in high school)				KCTCS Partner: Jefferson Community and Technical College University Partner: Spalding University		Sample Jobs and 2015 Median Pay by Education Level**
Grade	English (4 credits)	Math (3 credits)	Science (3 credits)	Social Studies (3 credits)	Recommended Career Pathway Courses (7 credits*)	High School / Certification: Home Health Aides (\$21,920) Nursing Assistants & Orderlies \$25,710
	Meets Kentucky Minimum Graduation Requirements* (All academic options can include AP)					
9	English I	Algebra I	Biology I	World Civilizations	AHS 115 – Medical Terminology	Some Postsecondary / Certification: Medical Assistants (\$30,590) Phlebotomists (\$31,630)
10	English II	Geometry	Chemistry I	Exploring Civics	HST 102 – Health Care Delivery & Management HST 103 – Health Care Communication	Associate: LPN & Vocational Nurses (\$43,170)
11	English III	Algebra II	Physics I	U.S. History	HST 104 – Health Care Basic Skills With Clinical	Baccalaureate: Registered Nurses (\$67,490)
12	ENG 101 – Writing I (Substitutes for English IV)	MAT 110 – Applied Math (Optional 4th math)	BIO 137 – Human Anatomy & Physiology I (Optional 4th science)	PSY 110 – General Psychology (Optional 4th social studies)	Total High School Graduation Credits: 22.5 Total Transferrable College Credits: 26	Master's: Physician Assistants (\$98,180) Nurse Anesthetists, Midwives, Practitioners (\$104,740)
* Additional Graduation Requirements: Physical Education (.5 credit); Health (.5 credit), Digital Literacy (.5 credit), History & Appreciation of Arts (1 credit)						
LPN-Diploma – Jefferson Community and Technical College						
13	Fall: NRS 101 – Nursing I, BIO 139 – Human Anatomy & Physiology II, HST 121 – Pharmacology Spring: NRS 102 – Nursing II, HST 122 – Clinical Pathophysiology, PHI 122 – Medical Ethics	LPN-Diploma Credits: 31				
ADN-AAS – RN to BSN Bridge - Jefferson Community and Technical College						
14	Summer: NSG 196 – Nursing LPN Bridge Fall: NSG 236 – Nursing III, PSY 223 – Developmental Psychology Spring: NSG 246 – Nursing IV, PSY 212 – Applications of Statistics in Psychology, REL 130 – Intro to Comparative Religions	ADN-AAS Credits: 33				
Online RN to BSN – Spalding University						
15	Fall Semester, Session 1: NURS 486 – Dimensions of Professional Practice; NURS 414 – Health Assessment Across the Lifespan Fall Semester, Session 2: NURS 420 – Health Promotion and Disease Prevention Across the Lifespan; NURS 526 – Informatics and the Principles of Evidence-Based Practice Fall Semester, Session 3: NURS 406 – Evidence-Based Practice in Health Care Spring Semester, Session 4: NURS 411 – Professional Role Development and Leadership in Nursing Spring Semester, Session 5: NURS 488 – Community Health Nursing Spring Semester, Session 6: NURS 475 – Advanced Concepts in Professional Nursing: Capstone Experience	RN to BSN Credits: 30 Total Pathway Credits: 120				

* <http://education.ky.gov/curriculum/hsgradreq/Pages/default.aspx> Kentucky requires students to complete seven credits of academic and career interest standards-based learning experiences. These should include four standards-based learning experiences in an academic or career interest based on the student's individual learning plan.

** See the Bureau of Labor Statistics' Occupational Outlook Handbook <http://www.bls.gov/oooh/> or O*Net Online <http://www.onetonline.org/> for job descriptions, requirements and salaries.

Instructional Strategies for Career Pathways in Nursing and Health Care

SREB encourages states to adopt these key instructional practices to support student learning in career pathways:

- **Career academies** facilitate integrated curriculum and instruction and student achievement.
- **College-ready academics** and **career pathway courses** prepare students for further education and work.
- **Project-based assignments** challenge students to use academic and technical know-how to solve problems.
- **Career guidance and exploration** help students discover their interests, try on jobs and plan their futures.
- **Readiness interventions** give struggling students the support they need to master foundational skills.

Career Academies

Career academies are small learning communities located within a larger school. Career academy students take their classes as a cohort under the guidance of pathway teachers, counselors, literacy specialists, and science, technology, engineering and mathematics (STEM) specialists who co-design and co-teach assignments that promote career exploration. Cohorting creates a familial learning environment and allows students to maintain a consistent teacher-adviser during high school. Research shows that career academies improve students' labor market outcomes, help them transition to college and careers, and can be offered without detracting from a college-prep focus.²⁵

SREB's Advanced Career STEM Pathway Academy Network brings interdisciplinary teacher teams together to co-plan and co-teach cohorts of students pursuing one of nine Advanced Career Pathways.²⁶ Following this model, Table 5 illustrates how biology and nursing teachers in a health science academy might co-plan lessons and activities.

Table 5: An Example of Integrated Instruction in Biology and Nursing in a Health Science Academy

Dates	Nursing Course	Biology Course	Field Trips	Guests
Sept. 27 – Oct. 1	Integumentary System <ul style="list-style-type: none"> • Anatomy & Physiology • Disease Process • Terminology • Related health careers 	Integumentary System <ul style="list-style-type: none"> • Functions • Evaporation cooling • Density of receptors (lab) • Analysis of human hair 		Dermatologist Cosmetologist
Oct. 4 – Oct. 8	Skeletal System: <ul style="list-style-type: none"> • Anatomy • Chemical composition of bones • Pathology • Terminology • Related health careers 	Skeletal System: <ul style="list-style-type: none"> • Anatomy of a long bone • Histology • Compact bone • Spongy bone 	Meatpacking plant	Orthopedist

Source: Modified from Bottoms, G., & Sharpe, D. (1996). *Teaching for understanding through integration of academic and technical education*. Atlanta, GA: SREB.

College-Ready Academics and Career Pathway Courses

SREB holds that all students should complete a college-ready core and a concentration of four or more career pathway or academic courses.²⁷ Under Kentucky graduation requirements, students must complete four credits of English, three credits each of math, science and social studies, and seven credits of academic or career electives.²⁸

Kentucky's nursing pathway exceeds these requirements by including four years of college-ready English, math, science and social studies. Four LPN and ADN prerequisites — *ENG 101 – Writing I*, *MAT 110 – Applied Math*, *BIO 137 – Human Anatomy & Physiology I*, and *PSY 110 – General Psychology* — also carry both high school and college credit.

All Kentucky nursing pathway courses are college-level courses taught using college syllabi, assignments and mid-term and final exams. Courses can be taught at the high school by teachers recognized as JCTC adjuncts under JCTC faculty supervision if transportation issues prevent students from traveling to a JCTC campus. Whenever possible, such courses should be taught on the college's schedule.

Project-Based Assignments

SREB recommends that schools offering STEM-intensive pathways in fields like nursing use project-based instruction to incorporate essential literacy, math and problem-solving skills in all subject areas. In a project-based approach, teachers support students in taking ownership of their work.²⁹ Project-based assignments spark student interest because they connect the classroom to the real world. They also promote deeper learning, teamwork and leadership skills. Project-based learning works well in academy settings in which cohorts of students are taught by interdisciplinary teacher teams.³⁰

Career Guidance and Exploration

SREB has found that students and parents get excited about the future when schools adopt a **curriculum-based system of career guidance**³¹ in which pathway teachers and counselors work together to help students explore jobs, understand their aptitudes and interests, and identify a purpose for their postsecondary studies using tools like:

- individual graduation plans (IGPs)
- interest inventories like Career Cruising or YouScience
- career and college planning websites like knowhow2goky.org
- participation in career-technical student organizations like Health Occupations Students of America or SkillsUSA³²

SREB advises schools to adopt master schedules in which one half-day every other week gives students time to engage in **experiential learning** — for example, at local health-care facilities — and gives academic and career pathway teachers and counselors time to co-plan instruction and assignments.

Schools can encourage current or aspiring health pathway students to participate in **summer bridge experiences** (see the sidebar) that include projects, career fairs, clinical observations and interviews with health professionals.

Readiness Interventions for Struggling Students

Many students attracted to pathways in nursing and health science may need to bolster weak literacy and math skills in order to pass college-level pathway courses. SREB encourages states to establish literacy and math readiness benchmarks for college-level studies and assess all students for grade-level readiness in the eighth and 11th grades using exams like the Accuplacer, ACT or ACT Aspire.

Schools can use exam results to offer students **ninth- and 12th-grade readiness courses**³³ or **just-in-time readiness modules** that help them meet literacy and math benchmarks. Table 6 shows how students could co-enroll in double blocks of readiness courses and pathway courses or receive just-in-time readiness modules in specific areas of weakness.

Summer Learning for Kentucky Middle and High School Students

The **University of Kentucky's Area Health Education Center** offers two residential camps for high school students: The Summer Enrichment Program Camp for rising high school juniors and the Health Researchers Youth Academy Camp for rising seniors. Campers reside at UK and engage in hands-on learning with health professionals, medical college deans and UK students.

The **Bluegrass Healthcare Consortium** hosts a one-week non-residential Medical Career and Science Institute for middle grades students. Students perform clinical observations with college faculty and medical professionals and visit sites like Spencerian College's Lexington campus, Southside Technical Center, the Sullivan University School of Pharmacy, and the University of Kentucky's Outreach Center for Science and Health Opportunities and Center for Advanced Training & Simulation.

Overcoming Barriers to Career Pathways in Nursing and Health Care

Kentucky's nursing pathway partners have worked hard to eliminate barriers to the pathway's success, but some remain. Many are not unique to Kentucky or pathways in nursing or health care. Some involve regulatory or funding issues that may require policy changes or legislative action. Others include daily classroom challenges, scheduling constraints, and accreditation, licensure and graduation requirements.

Addressing these and other barriers will require not just the political will to change the status quo, but also *significant investments in the personnel and resources needed to build and implement effective career pathway systems.*

Table 6: Readiness Interventions for Struggling Students in Kentucky’s Nursing Pathway

Grade	Readiness Courses	College-Ready Academic Courses	Nursing Pathway Courses
8	First Summer Bridge Experience		
9	Ready for High School Literacy + Ready for High School Math	English I Algebra I Biology I World Civilizations	AHS 115 – Medical Terminology
	Optional Summer Bridge Experience		
10	Just-in-time readiness modules	English II Geometry Chemistry I Exploring Civics	HST 102 – Health Care Delivery & Management HST 103 – Health Care Communication
	Optional Summer Bridge Experience		
11	Just-in-time readiness modules	English III Algebra II Physics I U.S. History	HST 104 – Health Care Basic Skills with Clinical
	Optional Summer Bridge Experience		
12	Literacy Ready + Math Ready	ENG 101 – Writing I MAT 110 – Applied Math	BIO 137 – Human Anatomy & Physiology I PSY 110 – General Psychology

Performance-based funding measures being considered by Kentucky legislators may affect the new nursing pathway, which includes 90 credit hours at the community and technical college level and 30 at the university level. By contrast, most Kentucky community and technical college programs consist of 60 credit hours or less. New funding measures must be flexible, and partnering institutions must accept greater responsibility for program completion.

Kentucky’s strong **dual credit**³⁴ and **credit transfer policies**³⁵ are designed to increase the number of students who enroll and persist in postsecondary education and obtain credentials and degrees. However, changes may be needed to ensure that all students, especially low-income students, can afford to complete the nursing pathway.

- **Dual credit scholarships** are limited to a maximum of two courses per academic year or a total of nine college credits during high school.³⁶ Per a recent executive order, in 2017-18, eligible students may include juniors if funding remains after serving seniors.³⁷ Changes are needed to support nursing pathway students, who begin taking dual credit in the ninth grade and can potentially earn more than 12 credits each year.
- Kentucky has established but not fully defined a **new community and technical college scholarship** for 2017-18. High school nursing pathway students may or may not be eligible for these scholarships.

Learning through work. At present, students participating in clinical and nursing aide rotations at acute care hospitals must be 18 or older. Some students in Kentucky’s nursing pathway may not meet this requirement. Flexible work-study age requirement policies are needed to protect underage students and health-care employers.

Preparing students for success. As noted, less than a quarter of Kentucky’s ACT-tested high school graduates meet benchmarks in English, reading, math and science. Significant efforts must be made to ensure that all students receive rigorous instruction and assignments and individualized learning supports that help them master foundational skills.

Addressing scheduling and course-taking constraints. Several Kentucky health science teachers expressed concerns regarding students’ ability to handle multiple college-level courses and clinical experiences during junior and senior years that are already packed with end-of-course exams and graduation requirements. Readiness courses or modules and extended school days or years may help nursing pathway students excel during these challenging years.

Pathway students must also be able to complete college-level courses on the same schedule and at the same level of rigor as their adult counterparts at community and technical colleges. Creative funding and scheduling strategies are needed to help students travel to and from their schools, community and technical colleges, and clinical sites.

Credentialing teachers. Only a small number of Kentucky’s health science teachers have the credentials needed to teach college-level courses. The state could seek to credential more teachers, bring KCTCS faculty into the classroom, or pursue a hybrid approach in which high school teachers and KCTCS faculty co-teach in an online setting.

Engaging employer partners. Most health-care employers are not in the business of educating nurses and other health professionals. As such, career pathway initiatives need to adopt employer engagement strategies that specify what employer partners will be asked to contribute and do and facilitate ongoing communication with employers.

Strategies should be flexible and tailored to address the needs of small, medium and large businesses serving different sectors. Employer interviews revealed that whereas nursing homes expressed a need for LPNs, acute care hospitals preferred RNs and BSNs. All employers sought nursing assistants, but hospitals preferred for CNAs to hold acute care certifications. Some nursing homes saw acute care certifications as a threat to their supply of nursing assistants.



Balancing competing priorities in fiscally challenged times. “Student success with less” is the new normal in Kentucky as funding for secondary and postsecondary education continues to decline but expectations for achievement continue to rise. High school and college faculty and administrators should be recognized and rewarded for taking on the challenge of implementing the new nursing pathway.

Promoting communication and a culture of change. Little systematic communication currently exists among high school health science teachers, community and technical college faculty, or four-year university faculty. Joint professional development could promote dialogue among secondary and postsecondary nursing pathway leaders and faculty and foster a shared sense of urgency regarding the pathway’s success.

Kentucky could also use its accountability and funding systems to reward high schools, community and technical colleges, and universities that adopt the pathway and achieve success in meeting college- and career-readiness benchmarks, promoting on-time completion, and increasing credential and degree attainment and job placements.

Supporting Career Pathways in Nursing and Health Care

Kentucky’s nursing shortage is a pressing concern for health-care employers. Yet when presented with a three- to five-year phase-in of the 120-credit hour nursing pathway, some employers said, “We can’t wait. We need nurses now.”

Only full implementation of the pathway, beginning with Fall 2017 pilot tests, will ultimately determine whether this pathway offers an effective, affordable and sustainable way to increase the supply of nurses *and* help more high school students transition to higher education and fulfilling careers. In the meantime, Kentucky’s nursing pathway partners encourage other states to freely adapt Kentucky’s model as they develop their own pathways.

SREB urges states to adopt policies and practices that support health pathways. As a first step, states should consider convening a **health-care pathway advisory council** comprised of secondary and postsecondary health-care education leaders, CTE directors, labor department and economic and workforce development agency officials, health-care employers, parents and community members. These partners can:

- Create a **state pathway strategic plan** for nursing and health-care careers.
- **Develop, adopt or redesign pathways** leading to high-demand jobs and **create websites and pathway road maps** that show students and parents the educational on- and off-ramps leading to those jobs.
- Set **performance metrics** and create a process for **auditing nursing and health-care pathways** for rigor, quality and student outcomes like pathway completion, credential and degree attainment, and employment.
- Use **state longitudinal data systems** to assess the return on investment of pathways.
- Work with the state nursing board and education providers to approve **assessments of health-care skills**.
- Prioritize the investment of **federal, state and private-sector funds** in nursing and health-care pathways.

Appendix: Kentucky Nursing Pathway College Course Titles and Descriptions

Health Care Foundations — Basic Certificate (HCFBC)

AHS 115 – Medical Terminology (3 credits) — A study of the anatomical, physiological and pathological terminology with emphasis on work structures and definition of root words, suffixes and prefixes from Greek and Latin. Additional emphasis is placed on spelling and pronunciation. Primarily designed for individuals preparing for a career in health care. No previous knowledge of Greek or Latin is required.

HST 102 – Health Care Delivery & Management (3 credits) — Introduces delivery and management of health care including professionalism, health care roles, health care delivery models and types of health care coverage. Explores legal/ethical issues including HIPAA and confidentiality, electronic medical records and patients' rights as well as analysis of current trends in health care today.

HST 103 – Health Care Communication (3 credits) — Introduces communication and its various forms as it exists in the health care field. Focuses on verbal, nonverbal, written and oral communication between members of the health team, patient and care givers through an interdisciplinary approach. Examines each role with discussion from the perspective of the involved parties. Emphasis on diversity, sociocultural influences and teamwork. Includes discussion of the media's role in health care, as well as how health promotion campaigns may be implemented and managed. Appropriate for students interested in a career in allied health or nursing.

HST 104 – Health Care Basic Skills I with Clinical (3 credits) — Introduces students to basic health care skill such as: measuring and recording vital signs, assisting licensed personnel, observing and reporting patient conditions, collecting specimens and caring for the hygiene, comfort and safety of patients in various settings. Prepares the student for entry-level health care positions by incorporating certification for American Heart Association Cardiopulmonary Resuscitation (CPR). Prepares student for the State Registered Nurse Aide examination.

LPN Prerequisites and Other Courses

BIO 137 – Human Anatomy & Physiology I (4 credits) — The relationship of structure and function will be presented in two semesters. The first semester will include basic chemistry, cell structure, cell physiology, metabolism, tissues, and integumentary, skeletal, muscular, and nervous systems.

PSY 110 – General Psychology (3 credits) — Introduces the history, methods and content of modern psychology. Covers the history and systems of psychology, psychological research, physiological psychology, psychological processes, developmental psychology, personality, abnormal behavior and social psychology.

MAT 110 – Applied Mathematics (3 credits) — Includes the concept of ratios and proportions, units and conversions, linear equations in two variables, inequalities, graphing and writing equations of a line, percentages, interest, descriptive statistics and logical symbolism. Emphasizes applications in the various technologies.

ENG 101 – Writing I (3 credits) — Focuses on academic writing. Provides instruction in drafting and revising essays that express ideas in standard English, including reading critically, thinking logically, responding to text, addressing specific audiences, researching and documenting sources. Includes review of grammar, mechanics and usage.

LPN — Diploma

NRS 101 – Nursing I (9 credits) — Establishes the foundations for competency-based nursing practice by introducing beginning concepts and skills that are built upon the nursing curriculum. Introduces the four roles of nursing practice including human flourishing, human judgment, professional identity and spirit of inquiry. Applies problem solving and critical thinking skills in the care of clients across the life span and of diverse cultures with actual or the potential for health alterations due to common acute and chronic health problems. Includes the application of the nursing process to meet the needs of patients at the practical nursing level.

NRS 102 – Nursing II (10 credits) — Includes the application of problem solving and critical thinking skills in the care of clients across the lifespan and of diverse cultures with actual or the potential for alterations in health due to common acute and chronic health problems. Provides care of clients during the childbearing cycle focusing on common health alterations in the reproductive process. Strengthens the four roles of nursing practice including human flourishing, human judgment, professional identity and spirit of inquiry while higher level skills are introduced. Includes an integrated clinical practicum of direct patient care in a health care facility or organization to facilitate the transition from the student role to LPN practice.

BIO 139 – Human Anatomy & Physiology II (4 credits) — The second semester continues the study of the interrelationships of organ systems, including the endocrine, reproductive, cardiovascular, lymphatic, digestive, respiratory and urinary systems.

ADN-AAS — RN to BSN Bridge

NSG 196 – Nursing LPN Bridge (5 credits) — Builds upon the LVN/LPN experience in application of core components of nursing. Focuses on the nursing care for the patient with mental health dysfunctions and the patient experiencing acute and/or chronic health pattern dysfunctions. Covers selected content and skills from Nursing I and Nursing II. Includes the role of the Associate Degree Nurse and the application of the core components of nursing practice to patient's experience.

NSG 236 – Nursing III (9 credits) — Includes application of core components of nursing to the care of child-bearing and child-rearing families experiencing functional and dysfunctional health patterns.

NSG 246 – Nursing IV (9 credits) — Emphasizes the development of the nurse as a provider of care, manager of care and member of the nursing profession. Provides for the application of critical thinking skills in the care of diverse patients/families across the lifespan with actual or potential alteration in health due to complex acute and chronic health problems. Includes an integrated practicum with an emphasis on leadership management, clinical judgment, collaboration, knowledge, skills and professional values within the legal/ethical framework to facilitate the transition of the student to Registered Nurse practice.

HST 121 – Pharmacology (2 credits) — Introduces students to the basics of pharmacology/pharmacokinetics; includes terms used to describe various effects and reactions from drug usage. Will also introduce metric system and basic dosage calculations common to most fields of study within allied health and nursing.

HST 122 – Clinical Pathophysiology (3 credits) — Explores an introduction to the nature of disease and its effect(s) on body systems. Provides a study of pathology and general health management of disease and injuries across the lifespan. Includes topics of etiology, symptoms, physical and psychological reactions to disease and injuries.

PSY 223 – Developmental Psychology (3 credits) — Introduces the principles of developmental psychology as seen in human growth over the entire lifespan, focusing primarily through adolescence. Emphasizes theory and data relating to developmental aspects of cognition, language, and personality.

REL 130 – Comparative Religion (3 credits) — Introduces students to a comparative analysis of world religions, emphasizing beliefs, rituals, artistic expressions and cultural and social organizations. Includes both Eastern and Western Religions

PSY 212 – Applications of Statistics in Psychology (4 credits) — Introduces students to descriptive and inferential statistics in design, analysis and interpretation of psychological research.

PHI 110 – Medical Ethics (3 credits) — Introduces examination and application of major ethical theories to specific moral questions related to health care.

RN to BSN

NURS 406 – Evidence-Based Practice in Health Care (4 credits) — This course prepares the professional nurse to translate clinical research and to critically appraise literature and other evidence related to health care practices. During this course, the student will become familiar with the research process, statistical analysis and interpretation of data. The student will apply this knowledge by identifying evidence-based practice recommendations and mechanisms for incorporation into health care.

NURS 411 – Professional Role Development and Leadership in Nursing (4 credits) — This course focuses on theories and principles related to leadership and management in health care systems. During the course, students will examine the changing health care environment including the ways in which legal, economic, political and sociocultural issues impact the delivery of patient-centered care. Differences in health care policies and health care systems and methods for ensuring quality in health care outcomes will be studied. Communication concepts including collaboration, negotiation, conflict management, delegation and cooperation will be discussed and practiced.

NURS 414 – Health Assessment Across the Lifespan (4 credits) — This course focuses on assessment of clients throughout their lives. The student will utilize effective communication skills to obtain a complete health history of clients. The student will employ physical assessment techniques to identify normal and common variation in physical findings of clients. Students will demonstrate competence in history-taking and assessment skills in the clinical laboratory.

NURS 420 – Health Promotion and Disease Prevention Across the Lifespan (4 credits) — This course focuses on assessment of clients' health care status, including risk for disease. Students will learn to appraise current health habits, influences on health, motivators for change, and risk for illness. Students will gain experience with health risk assessments and screenings. Health appraisal of individual clients at all developmental ages and stages will be addressed. Students will learn and practice different methods to promote behavioral change and will learn strategies for effective client education.

RN to BSN (*continued*)

NURS 475 – Advanced Concepts in Professional Nursing: Capstone Experience (4 credits) — This culminating course will focus on a project of the student's choice that reflects synthesis of professional values, theoretical knowledge, clinical competence and leadership skills. The project should be comprehensive in nature and focused on one area of practice: Leadership, Research, Education or Service. The student is encouraged to collaborate on the project with either the clinical agency in which they are employed or with a community partner.

NURS 486 – Dimensions of Professional Practice (3 credits) — In this course, four areas of professional nursing practice will be considered: Leadership, Research, Education and Service. The student will explore the ways that these four aspects of nursing care are interrelated. The roles of nursing in each area and the impact of nursing care towards assuring optimal health care outcomes will be explored. This course will include a critical analysis of previous educational and experiential learning, integrating that learning into present learning goals. During this course, the student will begin socialization into the professional role of nursing and have the opportunity to pick a focus area for the educational experience and the capstone project.

NURS 488 – Community Health Nursing (4 credits) — Focuses on health promotion, disease prevention and the health maintenance needs of aggregates in populations. Acceptability, availability, and accessibility of needed services to improve the health status of aggregates and to identify barriers to health care will be studied.

NURS 526 – Informatics and the Principles of Evidence-Based Practice (3 credits) — This course helps the student integrate information sciences to manage and communicate data, information, knowledge and wisdom in nursing practice. In this course, information literacy, the use of computers in health care and the utilization of the electronic health record are explored. This course also reviews types of evidence to support practice. The student will learn mechanisms for the application of evidence to practice situations. Discussion of best practices and how these are determined will be discussed.

Endnotes

- ¹ U.S. Department of Education, U.S. Department of Health & Human Services, & U.S. Department of Labor. (2012, April). *Joint letter and guiding principles for developing comprehensive career pathways systems*. Washington, DC: Authors.
- ² As defined under the Carl D. Perkins Career and Technical Education Improvement Act of 2006, Section 122[c][1][A]. See also U.S. Department of Education, Office of Career and Technical Education. (2010). *OCTAE's programs of study design framework*. Washington, DC: Author. <http://cte.ed.gov/initiatives/octaes-programs-of-study-design-framework>
- ³ Blanco, C., & Spence, D. (2015). *Community colleges in the South: Strengthening readiness and pathways*. Atlanta, GA: SREB. <http://www.sreb.org/community-college-commission> Bottoms, G., & Sundell, K. (2015). *Credentials for all: An imperative for SREB states*. Atlanta, GA: SREB. <http://www.sreb.org/cte-commission>. Both commissions shared concerns raised by the Council of Chief State School Officers in its 2014 report on state career pathway initiatives. Council of Chief State School Officers. (2014, December). *Opportunities and options: Making career preparation work for students*. Washington, DC: Author. <http://www.ccsso.org/documents/2014/EmbargoedCCSSOTaskForceonCareerReadiness120114.pdf>
- ⁴ Bottoms, G., & Sundell, K. (2017). Career pathways: A blueprint for the future. *Techniques*, 92(2), 34-39. Bottoms, G., & Sundell, K. (2016, July). *Career pathways: Accelerating access to the middle class*. Atlanta, GA: SREB. <http://www.sreb.org/accelerate>
- ⁵ See <http://www.sreb.org/senioryearredesign>.
- ⁶ See, for example, U.S. Department of Education, Office of Career, Technical, and Adult Education. (2015, April). *The evolution and potential of career pathways*. Washington, DC: Author. See also the six-element framework graphic designed by the U.S. Department of Labor, Employment and Training Administration (May 2011), a product of the one-year Career Pathways Initiative funded by the U.S. Departments of Education and Labor in 2010 to help nine states and two tribal entities develop sustainable career pathways. See also Jobs for the Future. (2014, March). *Advancing career and technical education in state and local career pathways systems: Model for the provision of technical assistance*. Boston, MA: Author.
- ⁷ U.S. Bureau of Labor Statistics. (2016). Healthcare occupations. *Occupational outlook handbook*. Washington, DC: Author. <http://www.bls.gov/ooh/healthcare/home.htm>
- ⁸ U.S. Bureau of Labor Statistics, 2016.
- ⁹ Carnevale, A. P., Smith, N., & Strohl, J. (2013). *Recovery: Job growth and education requirements through 2020*. Washington, DC: Georgetown University Center on Education and the Workforce.
- ¹⁰ Carnevale, A. P., & Smith, N., & Gulish, A. (2015). *Nursing: Supply and demand through 2020*. Washington, DC: Georgetown University Center on Education and the Workforce. <https://cew.georgetown.edu/wp-content/uploads/Nursing-Supply-Final.pdf> See also Grant, R. (2016, February 3). The U.S. is running out of nurses. *The Atlantic*. <http://www.theatlantic.com/health/archive/2016/02/nursing-shortage/459741/>
- ¹¹ U.S. Bureau of Labor Statistics, 2016.
- ¹² Total employment for the period 2014-2024 is projected to increase by 326,097 jobs (15.2 percent). Kentucky Education and Workforce Development Cabinet. (2016, June). *Kentucky occupational outlook to 2024: A statewide analysis of wages, employment, growth and training*. Frankfort, KY: Kentucky Education and Workforce Development Cabinet, Department for Workforce Investment, Office of Employment and Training, Workforce Intelligence Branch. <https://kylmi.ky.gov/admin/gsipub/htmlarea/uploads/Outlook.pdf>
- ¹³ KentuckianaWorks. (2016, June). *State of the Louisville regional labor market – Labor market quarterly report: First quarter 2016*. Louisville, KY: Author. <http://www.kentuckianaworks.org/Portals/2/KW-QR1-2016.pdf>. See also Mann, D. M. (2015, September 11). How Louisvillians earn their pay. *Louisville Business First*. <http://www.bizjournals.com/louisville/print-edition/2015/09/11/how-louisvillians-earn-their-pay.html>
- ¹⁴ An SREB consultant interviewed representatives of these workforce boards: Barren River, Cumberslands, Eastern Kentucky Concentrated Employment Program, KentuckianaWorks, Lincoln Trail, Northern Kentucky and TENCO, named for its 10 counties.
- ¹⁵ For 2010 – 2015, using data from region's seven postsecondary nursing programs. Kentucky Board of Nursing. (2016). *NCLEX pass rates by nursing program*. Louisville, KY: Author. <http://kbn.ky.gov/education/Documents/NCLEX%20Pass%20Rates,%202011-2015%20for%20website.pdf>
- ¹⁶ For the period 2011-2015. Researchers at the National Research Center for Career and Technical Education (NRCCTE) at SREB examined Consolidated Annual Reporting data reported to the U.S. Department of Education by states as part of their accountability requirements under the federal Perkins legislation. These data can be found at: <https://perkins.ed.gov/pims/DataExplorer/Performance>
- ¹⁷ Overall, 59 percent met English benchmarks, 40 percent met reading benchmarks, 31 percent met math benchmarks and 30 percent met science benchmarks. ACT. (2016). *The condition of college and career readiness: Kentucky*. Iowa City, IA: Author.
- ¹⁸ Overall, 245 Kentucky seniors (vs. 26,844 seniors nationally) responded to the survey; 48 students (22 percent) were health science concentrators.

- ¹⁹ HSTW's 2014 Literacy Index includes 10 items. Students who reported 8 to 10 indicators of challenging literacy assignments experienced literacy-based learning at an *intensive* level; 5 to 7 indicators, *moderate*; 0 to 4 indicators, *low*.
- ²⁰ HSTW's 2014 Science Index includes 8 indicators. Students who reported 7 to 8 indicators challenging science assignments experienced science assignments at an *intensive* level; 4 to 6 indicators, *moderate*; 0 to 3 indicators, *low*.
- ²¹ HSTW's 2014 Numeracy Index includes 8 indicators. Students who reported 7 to 8 indicators of challenging math assignments experienced math assignments at an *intensive* level; 4 to 6 indicators, *moderate*; 0 to 3 indicators, *low*.
- ²² HSTW's 2014 Rigorous CTE Assignments Index includes 10 indicators. Students who reported 7 to 10 indicators of rigorous CTE assignments experienced CTE assignments at an *intensive* level; 4 to 6 indicators, *moderate*; 0 to 3 indicators, *low*.
- ²³ The state allows students to enroll in dual credit courses provided they meet the postsecondary institution's requirements for admission as a dual credit student; meet requirements for placement into college-level, credit-bearing courses or courses in a program of study that aligns with a career pathway; and complete the institution's dual credit application forms. Kentucky Council on Postsecondary Education & Kentucky Department of Education. (2016). *Dual credit policy for Kentucky public and participating postsecondary institutions and secondary schools*. Frankfort, KY: Authors. <http://cpe.ky.gov/policies/academicaffairs/dualcreditpolicy.pdf> See also Council on Postsecondary Education. (2016). *Kentucky college readiness indicators 2016*. Frankfort, KY: Author. <http://cpe.ky.gov/policies/academicaffairs/collegereadinessindicators2016.pdf>
- ²⁴ iLEAD is Kentucky's first regional high school to blend college- and career-preparatory studies leading to high-demand careers. Operated by the Ohio Valley Educational Cooperative, iLEAD will be open to students from Carroll, Gallatin, Henry, Owen and Trimble counties. In 2014, the Kentucky General Assembly approved a \$250,000 appropriation to develop iLEAD under the supervision of a regional CTE advisory council. Rodriguez, N. (2015, February 10). KY first regional career academy offers students a competitive advantage in global economy. *Kentucky Teacher*. <http://www.kentuckyteacher.org/news/2015/02/ky-first-regional-career-academy-offers-students-a-competitive-advantage-in-global-economy/>
- ²⁵ Kemple, J. J., & Willner, J. (2008). *Career academies: Long-term impacts on labor market outcomes, educational attainment, and transitions to adulthood*. New York, NY: MDRC.
- ²⁶ <http://www.sreb.org/post/qa-advanced-career-stem-pathways>
- ²⁷ Bottoms & Sundell, 2015.
- ²⁸ Other requirements include one credit of history and appreciation of the arts and a half-credit each of physical education, health and digital literacy. <http://education.ky.gov/curriculum/hsgradreq/Pages/default.aspx>
- ²⁹ Markham, T., Larmer, J., & Ravitz, J. (2003) *Project based learning handbook: A guide to standards-focused project based learning for middle and high school teachers*. Novato, CA: Buck Institute for Education.
- ³⁰ For a description of how health occupations and science teachers in Bryson City, North Carolina, team-taught Applied Biology and Chemistry and Health Occupations I to enhance student achievement, see Bottoms, G., & Sharpe, D. (1996). *Teaching for understanding through integration of academic and technical education*. Atlanta, GA: SREB.
- ³¹ Stone, J. R. III, & Lewis, M. (2012). *College and career ready for the 21st century: Making high school matter*. New York, NY: Teachers College Press.
- ³² See <http://www.ctsos.org/ctsos-2/>
- ³³ SREB's Ready for High School courses offer an early intervention for underprepared students as they begin the ninth grade. Ready for High School Literacy utilizes a disciplinary literacy approach that teaches students strategies for reading and understanding complex texts in different subject areas. Ready for High School Math emphasizes understanding math concepts rather than memorizing procedures. SREB's Literacy Ready and Math Ready courses help 12th-grade students avoid developmental education in college. Literacy Ready empowers students with strategies for reading and understanding complex technical texts. Math Ready promotes higher order reasoning skills and helps students apply math skills, functions and concepts across settings. http://www.sreb.org/page/1508/sreb_readiness_courses.html
- ³⁴ Kentucky Council on Postsecondary Education & Kentucky Department of Education, 2016.
- ³⁵ All state postsecondary institutions are required to accept general education and CTE dual credit courses for transfer and credit. CTE dual credit courses must be accepted "if the course has the same competencies and learning outcomes as that of a course offered at the receiving institution" (Kentucky Council on Postsecondary Education & Kentucky Department of Education, 2015, pp. 4-5). Further, CTE dual credit courses "shall be transferrable to any participating community and technical college offering those courses and shall be accepted as meeting requirements for a certificate, diploma, or associate degree within the related program of study" (p. 5).
- ³⁶ The Kentucky Higher Education Assistance Authority (KHEAA) offers these scholarships through funding provided by the General Assembly. See https://www.kheaa.com/website/kheaa/dual_credit?main=1
- ³⁷ Exec. Order No. 2016-378, Related to the Creation of Kentucky Dual Credit Scholarship Program. June 24, 2016. http://education.ky.gov/districts/tech/sis/Documents/EO_2016-378_Dual_Credit_Reorganization.pdf

“It’s exciting to see employers and educators working together to strengthen an existing pathway that provides enhanced dual credit and work-based learning opportunities for students. Kentucky’s new nursing pathway is just one of many steps the state is taking to create a stronger career preparation system leading to a talented state workforce.”

— Laura Arnold,
Associate Commissioner, Office of
Career and Technical Education, KDE

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