

Northern Kentucky University

Name of Program: Chemistry Education

Certification Level: Initial Undergraduate Baccalaureate, Post Baccalaureate

Program Codes:

KCH (5)

Modes of Delivery: Face to Face Only

2016-17 Catalog URL: <http://nku.catalog.acalog.com/index.php?catoid=4>

Chemistry Education Undergraduate Initial Program Submission

Program Experiences

The chemistry education program is delivered as a face to face program on the main Northern Kentucky University (NKU) campus. The program facilitates the teacher candidates' construction of knowledge, the development of instructional skills, and the practice of professional dispositions that enhance the development of all learners. The secondary teacher preparation program has defined the content knowledge that its graduates must possess through the courses they are required to take and the grade point average they are required to maintain. These course requirements and their experiences are consistent with the essential knowledge of chemistry educators as defined by the appropriate NSTA Specialized Professional Association (SPA). Candidates must further demonstrate knowledge of their content, teaching skills, and dispositions through their coursework and field and clinical experiences.

The program experiences in the secondary education program include four major strands:

- A. **Liberal Arts Foundation:** Candidates develop a strong foundation in the liberal arts which includes experiences in communication and literature, history, natural sciences, mathematics, humanities and fine arts, philosophy, social and behavioral sciences, and race/gender perspectives. These experiences are defined by the University and by the College of Education and Human Services. All candidates must complete the general studies requirements for all majors in the University.
- B. **Content Knowledge:** A comprehensive series of courses and experiences in the pre-service teacher's areas of certification provides him/her with a current and sufficient knowledge of the major concepts and the skills needed to develop the candidates' certified subject area. The courses provide candidates with the necessary knowledge to demonstrate competency on Kentucky Teacher Standard I, Knowledge of Content, align their instruction with the Kentucky Academic Standards, and successfully complete the PRAXIS II content examinations. Refer to the curriculum contract for more detailed information.
- C. **Professional Knowledge:** A sequence of professional education courses and experiences based on the Kentucky Teacher Standards and NSTA SPA Standards are part of the curriculum. The courses are designed to prepare candidates to provide diverse students with the knowledge and skills required for the 21st century, as defined by the Kentucky Academic Standards, and to successfully complete the PRAXIS Principles of Learning and Teaching (PLT) examination.
- D. **Field and Clinical Experiences:** A series of high-quality field and clinical experiences, aligned with the Kentucky Teacher Standards, are designed to enable candidates to develop the knowledge, skills, and dispositions necessary to demonstrate positive impact on PK-12 students' learning and development. The clinical component of the chemistry education program is central to the candidates' professional learning. Prior to admission to their final clinical experience (student teaching), candidates complete a minimum of 200 field experience hours, providing them the opportunity to connect the theory of their coursework with practice in a secondary education setting. During the field experiences, candidates are placed in a variety of education settings, including schools with diverse populations of students. Prior to the final clinical experience, all candidates must demonstrate their ability to work with PK-12 students from different races or ethnic groups, students of varying socio-economic status, English language learners, and students with special needs. In addition, candidates must also complete a series of required experiences to help them better understand schooling at all levels and the profession they are about to enter. These experiences include engagement with students of all levels (i.e., elementary, middle,

secondary), student tutoring, interaction with families of students, attendance at school board and school-based council meetings, observation at a family resource center, and participation in a school-based professional learning community. All experiences are tracked through the Kentucky Field Experience Tracking System (KFETS) and Foliotek (electronic portfolio).

Candidates are required to write about their experiences in their end of semester reflection and include the mandated EPSB requirements they participated in, as well as the KTS they met, that semester. For example, if candidates worked with students with disabilities they write about that in their reflection. The university clinical educator reads and evaluates the semester reflections and KFETS spreadsheets and checks the completed requirement(s) on the Foliotek Cumulative Progress Report (CPR) at the end of each field and clinical experience. University clinical educators also use the KFETS spreadsheet and the signed time logs uploaded to Foliotek to determine the number of hours completed by the candidate and then records those hours on the Foliotek CPR Report at the end of the semester.

The chemistry education program concludes with a comprehensive, full-time clinical experience that is 16 weeks in duration. All field and clinical experiences are completed in a co-teaching environment with the expectation that candidates learn from their PK-12 clinical educator by co-planning instruction, co-teaching when appropriate, and co-assessing their students' progress. Throughout all field and clinical experiences, candidates' experiences are closely aligned with their corresponding coursework, and candidates' knowledge, skills, and dispositions are continuously assessed by both PK-12 clinical educators and university clinical educators using performance-based measures.

Professional Education Courses

A sequence of professional education courses and experiences based on the Kentucky Teacher Standards and NSTA SPA Standards are designed to prepare chemistry teacher candidates with the knowledge and skills required to demonstrate mastery of the Kentucky Academic Standards. The four semesters of the professional education sequence – Admission, Professional I, Professional II, and Clinical Experience – are described below.

Candidates must receive at least a "C" or a "P" in all education/pedagogy courses listed below to be eligible to enroll in the next professional semester. In addition, all education candidates are required to take EDU 104, Orientation to the Education Profession, before enrolling in any education course. This is a one-credit hour course that introduces candidates to NKU's education program requirements, including the Code of Ethics, the professional dispositions' survey, and discussion and observations in the elementary, middle school, and secondary education levels.

Undergraduate students must apply for admission to the teacher education program. This is a two-step process. The first step is to enroll in the Admission Field Experience (EDU 311 or 334). The second step is to be admitted to the education program. To enter the admission field experience, a candidate must have:

- * Completed the required application for admission;
- * Successfully completed a background check;
- * Successfully completed EDU 104, Orientation to the Education Profession, with a "C" or better;
- * Earned a cumulative grade point average of 2.75 or higher on a 4.0 scale OR a grade point average of 3.0 on a 4.0 scale on the last thirty (30) hours of credit completed;

- * Earned a minimum of 45 semester hours of course work;
- * Achieved the KY EPSB required passing scores on the Praxis CASE tests administered by the Educational Testing Service (ets.org) with the current minimum scores:
 - Core Academic Skills for Educators: Reading (5712)- 156
 - Core Academic Skills for Educators: Writing (5722)- 162
 - Core Academic Skills for Educators: Mathematics (5732)- 150

To achieve admission to the teacher education program, a candidate must have successfully completed all of the above plus the following:

- * Earned 60 semester hours of course work;
- * Earned a cumulative grade-point average of at least 2.75 on a 4.00 scale OR a grade point average of 3.0 on a 4.0 scale on the last thirty (30) hours of credit completed;
- * Earned at least a “B” in ENG 291 or equivalent;
- * Earned at least a “B” in CMST 101 or equivalent;
- * Earned at least a “C” in EDU 300, EDU 305, EDU 313, and EDS 360 or equivalent
- * Earned a “P” in the Admission Field Experience course (EDU 303, EDU 307, EDU 309, EDU 311, or EDU 334).
- * Demonstrated the following skills: critical thinking, communication, creativity, and collaboration, as follows:
 - **Communication:** Completion of CMST 101 and ENG 291 with a grade of “B” or better;
 - **Creativity:** Completion of any course under "Culture & Creativity: Arts and Humanities" with a grade of “C” or better;
 - **Critical Thinking:** Completion of any course under "Scientific & Quantitative Inquiry: Natural Science OR Mathematics & Statistics" OR any course from "Self & Society: Individual and Society" with a grade of “C” or better;
 - **Collaboration:** Completion of Admissions Field Experience, EDU 311, with a grade of “P”;
- * Signed a curriculum contract;
- * Completed an approved ePortfolio during the Admission Field Experience;
- * Received approval of the teacher education committee.

A. Admission Semester

Once candidates have met the above described criteria, they may enroll in the Admission Field Experience course, EDU 311. Teacher candidates complete at least 50 hours in their assigned school during the admission field experience. The courses included in the Admission Semester focus candidates’ attention on reading about and critically analyzing many dimensions of professional education. In addition, through field placements, candidates have the opportunity to observe and collaborate with biology teachers in specific school activities and experiences. The courses included in the Admission Semester are listed below. Co-requisite courses to the EDU 311 Field Experience are noted. If the course is not designated as a co-requisite course, then it may be completed before enrolling in EDU 311.

EDU 300 Human Growth and Development - 3 semester hours

EDU 305 Introduction to Education - 2 semester hours

EDU 311 Admission Field Experiences for Secondary Grades - 2 semester hours

EDU 313 Computer Applications for Teachers - 2 semester hours – **Co-requisite with EDU 311**

EDS 360 Children with Exceptionalities in the School - 3 semester hours- **Co-requisite with EDU 311**

In the Admission Semester, teacher candidates complete at least 50 hours in their assigned school. Activities are structured to ensure that teacher candidates are fully integrated in the school setting. For

example, to help them begin to better understand the diversity of school populations, candidates are asked to: 1) look for strategies teachers use to effectively teach diverse populations, 2) study and identify growth patterns and distinctive behaviors across cultures, and 3) discuss cultural patterns in society and how these patterns have altered the ways schools are organized and instruction is delivered. Candidates grow in their knowledge of multiple assessments through: 1) an introduction to standardized assessment and state accountability, 2) an introduction to the Kentucky Teacher Standards, 3) assisting teachers as needed during their hours in the school, and 4) working with students individually and in small groups. Intellectual vitality is promoted as candidates gain a framework from which to view education. The candidates use professional knowledge related to educational philosophies, school structures, human growth and development, and field experiences to build their own philosophies of education. Productive membership in a professional community is stressed by asking candidates to observe interactions in schools where they are placed, contact area agencies which impact the study and application of Human Growth and Development, and observe and evaluate governance patterns in the schools where they are placed. Candidates learn about technology and its importance in the classroom and workplace through the EDU 313 class. Candidates are asked to review and learn to use technology hardware and software and develop class projects that require the use of computer probes and internet communications.

During the admission semester, field experience candidates are introduced to the college's Code of Ethics as well as the state of Kentucky's Professional Code of Ethics. Candidates are required to read and sign each Code of Ethics, indicating their understanding and agreement to adhere to the codes. Candidates are required to electronically sign a copy of each Code of Ethics in their Foliotek ePortfolio, which is one of the criteria candidates are evaluated on for successful completion of their admission semester ePortfolio.

Candidates are typically placed in a diverse school, with two certified PK-12 clinical educators, for a minimum of 50 hours. During these 50 hours candidates are required to document which of the following requirements they meet:

- At least 200 field experience hours
 - Observations in schools
 - Observation in related agencies including Family Resource Centers or Youth Service Centers
 - Student tutoring
 - Interactions with families of students
 - Attendance at school board meetings
 - Attendance at school-based council meetings
 - Participation in a school-based professional learning community
 - Opportunities to assist teachers or other school professionals
 - At least one diverse placement
 - Working with students with Socio-Economic Diversity
 - Working with Students with Disabilities
 - Working with students who are English Language Learners
 - Working with students with Racial/Ethnic Diversity, from a minimum of 2 different ethnic or cultural groups
 - Engagement with elementary, middle school, and secondary students
 - Kentucky Teacher Standards

The candidate documents the above requirements through logging the hours and experiences on the Kentucky Field Experience Tracking System (KFETS) and writing about their experiences in the required semester reflection paper, which they upload to Foliotek. The university clinical educator reviews the

reflection paper and KFETS log to determine which EPSB (16 KAR 5:040) and NKU requirements the candidate has met and then systematically records the candidate's experiences on the Foliotek CPR.

The university and PK-12 clinical educators collaborate to provide meaningful experiences, enabling candidates to meet NKU program requirements and Kentucky Teacher and NSTA Standards. The field experience for all chemistry education candidates in the Admissions Semester is designed to provide experiences related to the courses in the block. To advance to Professional Semester I, teacher candidates must successfully complete all Admissions Semester requirements and receive a satisfactory dispositions' evaluation from the PK-12 and university clinical educators, as well as a satisfactory ePortfolio evaluation from the university clinical educator.

B. Professional Semester I

Once candidates complete the Admission Semester and meet all requirements for admission to the Chemistry Education Program, they enroll in Professional Semester I. The purpose of Professional Semester I is to continue to assist the teacher candidate toward mastery of the Kentucky Teacher Standards, NSTA Standards, and other NKU program requirements. Specifically, Professional Semester I focuses on the development of knowledge and skills for adapting instruction for children with disabilities, exploring various individual and group management techniques, and understanding the foundations of the secondary education level.

The courses included in Professional Semester I are:

EDU 319 1 semester hour	Classroom Climate Management: Secondary
EDS 324 3 semesters hours	Instructional Planning for Inclusive Secondary Classrooms
EDU 324 2 semester hours	Fundamentals of Secondary Education
EDU 393 2 semester hours	Secondary Field Experience I

This field experience is coordinated with coursework so candidates have the opportunity to implement and evaluate many of the recommended practices. In EDU 393 Secondary Field Experience I, NKU teacher candidates are assigned to their cooperating teachers for six hours per week in two three-hour blocks. During the first few weeks, they are instructed to observe and get to know the students and their PK-12 clinical supervisors. They are asked to learn as much as they can about course content, appropriate instructional strategies, classroom organization and management, and the school rules and policies during this time. Teacher candidates also look for ways they can be helpful to their PK-12 clinical supervisors (i.e., working with individuals or small groups, grading, helping to prepare materials, etc.). They also begin planning and co-teaching short segments of the lessons with their PK-12 clinical supervisors in preparation for the time they are ready to co-teach a full lesson. One week of the semester is designated as an "immersion" week, when teacher candidates report daily (for three hours) to their PK-12 clinical supervisors. During this period, they are expected to co-teach daily. At the end of the semester candidates again update their Foliotek ePortfolio with a reflection of the current semester and corresponding artifacts. Foliotek documents are evaluated by the university clinical educator using the ePortfolio evaluation rubric. The appropriate EPSB mandated experiences and KTS are recorded on the Foliotek CPR, such as working with ELL students, collaborating in a professional learning community, and interacting with families of students. The number of field hours completed are also recorded on the Foliotek CPR.

In addition, during Professional Semester I and/or II, chemistry education candidates complete their methods course: EDU 330: Teaching Science in Secondary Schools. They also complete the required

literacy course, either EDU 304: Reading and Writing Across the Curriculum: Middle Grades or EDU 530- Reading in the Junior and Senior High School.

C. Professional Semester II

Following the completion of Professional Semester I candidates may enroll in the second professional semester. The courses in Professional Semester II are:

EDU 325	2 semester hours	Educational Assessment Secondary Schools
EDU 396	2 semester hours	Secondary Field Experience II

In EDU 396 Secondary Field Experience II, NKU teacher candidates are assigned to their cooperating teachers for six hours per week in two three-hour blocks. During the first few weeks, they are instructed to observe and get to know the students and their PK-12 clinical supervisors. They are asked to learn as much as they can about course content, appropriate instructional strategies, classroom organization and management, and the school rules and policies during this time. Teacher candidates are asked to look for ways they can be helpful to their PK-12 clinical supervisors (i.e., working with individuals or small groups, grading, helping to prepare materials, etc.). After this initial orientation period, teacher candidates co-plan and co-teach with their PK-12 clinical supervisors. Two weeks of the semester are designated as “immersion” weeks, when the teacher candidates report daily (for three hours) to their PK-12 clinical supervisors. During this period, they are expected to co-teach daily in preparation for their clinical experiences.

Candidates in Professional Semester II implement a series of lessons designed to promote candidates’ mastery of the Kentucky Teacher Standards and chemistry education students’ mastery of the Kentucky Academic Standards. Candidates design instruction in their content area, based on the Kentucky Academic Standards. They implement lessons in their field experience and reflect on their teaching and impact on student learning. During this semester, candidates again take classes in a cohort and collaborate with peers and clinical educators to plan, implement, and evaluate lessons and units. Technology is used throughout the semester to locate instructional resources and use content related software. Assessment is addressed through discussion of norm-referenced and criterion-referenced tests, summative assessment, formative assessment, pre-assessment and self-assessment, as well as interpretation of assessment data. As in Professional Semester I, the PK-12 and university clinical educators evaluate the chemistry education candidates on the quality of their lesson plans, teaching ability, and dispositions. The same EPP-wide assessment rubrics are used for the evaluations and uploaded in Foliotek. At the end of the semester candidates again update their Foliotek ePortfolio with a reflection of the current semester and corresponding artifacts. Using the ePortfolio evaluation rubric, Foliotek documents are evaluated by the university clinical educator. The EPSB and NKU mandated experiences are recorded on the Foliotek CPR, such as observing in Family Resource Centers, assisting teachers, working with students from different ethnic/racial backgrounds and completing all ten Kentucky Teacher Standards. The number of field hours completed are also recorded on the Foliotek CPR.

D. Clinical Experience Semester

Professional Semester III is the candidate’s student teaching semester and they enroll in the following course: EDU 496 Clinical Experiences in the Secondary School (12 semester hours).

As candidates move through the chemistry education program, they complete requirements in their Foliotek ePortfolio each semester. The ePortfolios are reviewed and checked by the candidates’ university clinical educators at the end of each semester. The candidates cannot move to the next

professional semester unless they have met the ePortfolio requirements. The requirements for the ePortfolio include several criteria, such as identifying and uploading artifacts, writing a semester reflection and documenting the EPSB requirements for field experiences (e.g., completing 200 field experience hours, observing in schools, and working with students from diverse backgrounds). As stated in the previous descriptions of Admissions, Professional Semesters I and II, all candidates write a reflection paper at the end of each semester where they document the various experiences they have engaged in, such as observing in schools, and attendance at school board meetings. The experiences are added to KFETS by the candidates and then checked by the university clinical educator. In addition, each field experience clinical educator updates the Foliotek CPR with the experiences candidates have participated in during the semester to meet the requirements of 16 KAR 5:040, as well as the Kentucky Teacher Standards candidates met during the semester. In addition to each of the field experience semester checks, each candidate's Foliotek CPR and academic records are reviewed by the coordinator of clinical experiences to determine if they have met all entrance requirements for the clinical experience semester.

These requirements include the following:

- Clinical experience application, with medical exam and background check
- At least 200 field experience hours
- Observations in schools
- Observation in related agencies including Family Resource Centers or Youth Service Centers
- Student tutoring
- Interactions with families of students
- Attendance at school board meetings
- Attendance at school-based council meetings
- Participation in a school-based professional learning community
- Opportunities to assist teachers or other school professionals
- At least one diverse placement
- Working with students with Socio-Economic Diversity
- Working with Students with Disabilities
- Working with students who are English Language Learners
- Working with students with Racial/Ethnic Diversity, from a minimum of 2 different ethnic or cultural groups
- Engagement with elementary, middle school, and secondary students
- 2.75 overall GPA
- 2.75 pedagogy GPA
- 2.75 content GPA
- Completed all required coursework

If the candidate meets all of the above requirements, they meet with the coordinator of clinical experiences to finalize their admission to the clinical experience semester. The coordinator of clinical experiences then begins to work on placing the candidate in approved placements. Chemistry education candidates are placed in a secondary school for sixteen weeks. A final check of the above criteria is made at the end of the semester PRIOR to beginning the clinical experience.

Once enrolled in the clinical experience, candidates are engaged in co-teaching for an entire school day, five days per week, for a period of 16 weeks. The candidates are required to work with PK-12 students for the semester and teach lessons aligned to the Kentucky Academic Standards. If the candidate's clinical experience is in either Ohio or Indiana, the candidate also aligns his/her instruction to meet the

standards established by that state. During the clinical experience semester the candidate is assigned to a PK-12 clinical educator within a 50-mile radius of NKU.

With the guidance of their PK-12 and university clinical educators, candidates are required to demonstrate competency in meeting all of the Kentucky Teacher Standards and the NKU program requirements. Candidates are required to complete a teacher work sample during the first eight weeks of the clinical experience semester. The cornerstone of the teacher work sample is the candidates' analysis of their respective students' pre- and post-assessment data. Candidates analyze and reflect on the data to determine the impact their instruction had on PK-12 student learning and state what steps they will take to improve student learning during future instruction. Candidates analyze data for the entire class in addition to at least one identified gap group within that class. During the last eight weeks of the student teaching semester, candidates complete a leadership project to meet Kentucky Teacher Standard 10. Once this project is approved by the clinical educators the candidate plans, implements, and analyzes the data to determine the impact the project had on PK-12 student learning. At specified times during the clinical experience, candidates' knowledge, skills, and dispositions are evaluated by both the PK-12 clinical educator and university clinical educator using performance-based criteria. Candidates must successfully complete all clinical experience requirements, receive an acceptable rating on his/her Foliotek portfolio, and receive a satisfactory dispositions evaluation by the university clinical educator in order to successfully complete the clinical experience. At specified times during the clinical experience, candidates' knowledge, skills, and dispositions are evaluated by the PK-12 and university clinical educators using performance-based criteria. Candidates are formally observed at least four times by their university clinical educator and at least twice by their PK-12 clinical educator. Both clinical educators complete the lesson plan and lesson implementation rubrics, as part of their evaluation of the candidate, and submit their evaluations to Foliotek for candidate review and program data analysis. Both rubrics have been aligned to the KTS, InTASC, and KFFT standards. The PK-12 and university clinical educators also evaluate the candidate on his/her dispositions using the Disposition Survey, which is aligned to KTS, InTASC, and KFFT standards. The Disposition Survey is submitted to Foliotek for candidate review and program data analysis. **In addition to the above, candidates are required to submit and successfully complete all of their Foliotek requirements, which include a semester reflection that focuses on their experiences during the semester, such as the students they worked with, the co-teaching they did, and the technology they used. Candidates also align their reflection information to the KTS. Once the candidate has successfully completed all of the clinical experience requirements they are eligible for graduation from the program.**

EPP Wide Continuous Improvement

Data are systematically collected, analyzed, monitored, and reported within each education program and across the EPP. Prior to the start of each academic year, the associate dean and the technology coordinator generate reports from the data housed on the NKU Student Information System (SAP), Survey Monkey database, and the Foliotek assessment system. Those reports, as well as reports from Educational Testing Services (ETS) and the Kentucky Education Professional Standards Board (EPSB), are then shared with faculty during the fall semester to initiate the continuous improvement and reporting cycle.

During the first step in the cycle data are summarized by the associate dean, who also serves as the data coordinator, and then analyzed by program faculty and stakeholders. Faculty in each program review and discuss data at their monthly program meetings to determine strengths and areas for growth in developing teacher candidates who positively impact PK-12 student learning. Possible changes are regularly reviewed with external advisory committees and include such items as course or curriculum changes and additional or revised assessment rubrics.

After program level analysis, the process moves to an EPP wide process through the Teacher Education Committee (TEC). The TEC, comprised of internal and external stakeholders, meets monthly to review and discuss various items, including EPP wide data included on the agenda. Finally, at the end of the academic year, the dean, associate dean, department chair, and a representative from each program serve on the Quality Assurance Committee to review and discuss program data. Each program representative develops a Quality Assurance Report which is then reviewed by the Quality Assurance Committee (QAC) during its annual meeting. Based on the most current data, the QAC discusses findings and makes recommendations for EPP wide changes for the upcoming academic year, thus closing the continuous improvement loop. All program and EPP wide data are displayed on the College of Education and Human Services' (COEHS) website through its [Education Data Dashboard](#), and disseminated to all internal and external stakeholders. The data dashboard, comprised of data from Foliotek, Praxis, Survey Monkey, and SAP, allows for disaggregation of data by specialty licensure area and other dimensions.

Examples of EPP wide changes over the past three years include the following:

- Review and revisions to the Professional Dispositions Survey;
- Review and revisions to the Lesson Plan Evaluation rubric;
- Review and revisions to the Lesson Implementation Evaluation rubric;
- Tagging all rubrics with CAEP, InTASC, KTS, and KFFT standards;
- Development and implementation of literacy rubric;
- Development and implementation of technology rubric;
- Development and implementation of clinical experience reflection rubric;
- Development and implementation of protocol to determine inter-rater reliability of final clinical experience observation;
- Development of content validity, using the Lawshe method, of various evaluation rubrics;
- Revision of the Teacher Work Sample data analysis spread sheet; and
- Development and implementation of program advisory committees.