

2012-2013 LONG SIGNATURE SHEET

Proposal Number: REEL-09-26-13b



Proposal Title: Addition of a Concentration for Science, Technology, Engineering, and Mathematics (STEM) Education to the MEd. In Elementary Education including the Addition of Five Courses

Originating Department: Reading and Elementary Education

TYPE OF PROPOSAL: UNDERGRADUATE _____ GRADUATE x _____ UNDERGRADUATE & GRADUATE _____
 (Separate proposals sent to UCC and Grad. Council)

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
10/25/13	10/28/13	10/28/13	Approved	<u>DEPARTMENT CHAIR</u> [print name here:] Dr. Janice Hinson
11/26/13	11/26/13	11/26/13	Approved	<u>COLLEGE CURRICULUM COMMITTEE CHAIR</u> [print name here:] Kelly Anderson
			Approved	<u>COLLEGE FACULTY CHAIR (if applicable)</u> [print name here:] Not applicable
			Approved	<u>COLLEGE DEAN</u> [print name here:]
			Approved	<u>GENERAL EDUCATION</u> (if applicable; for General Education courses) [print name here:]
			Approved	<u>UNDERGRADUATE COURSE & CURRICULUM COMMITTEE CHAIR</u> (for undergraduate courses only)
12-3-13	1-14-14	2-10-14	Approved	<u>GRADUATE COUNCIL CHAIR</u> (for graduate courses only) ALAN R. FREITAG
				<u>FACULTY GOVERNANCE ASSISTANT</u> (Faculty Council approval on Consent Calendar)



UNC CHARLOTTE

**LONG FORM
COURSE AND CURRICULUM PROPOSAL**

*To: Kelly Anderson, Chair of the College of Education Graduate Curriculum Committee

From: Drew Polly, Dept. of Reading and Elementary Education

Date: 10/8/13

Re: Adding a Concentration for Science, Technology, Engineering, and Mathematics (STEM) Education to the M.Ed. In Elementary Education (REEL 09-26-13b)

I. HEADING AND PROPOSAL NUMBER

University of North Carolina at Charlotte

New; Graduate Proposal

Course and Curriculum Proposal from: Department of Reading and Elementary Education

REEL-09-26-13-b

Addition of a Concentration for Science, Technology, Engineering, and Mathematics (STEM) Education to the M.Ed. In Elementary Education

II. CONTENT OF PROPOSALS

A. PROPOSAL SUMMARY.

The Department of Reading and Elementary Education has approved the addition of a Concentration for Science, Technology, Engineering, and Mathematics (STEM) Education to the M.Ed. Program in Elementary Education. Encompassed in this proposal is the addition of 5 new courses: ELED 6210: Current Issues in STEM Education (3), ELED 6211: Integrating Engineering into the Elementary School Curriculum (3), ELED 6212: Integrating Digital Learning and STEM with Elementary School Learners (3), ELED 6213: Global Awareness in STEM Education (3), ELED 6214: Designing and Developing STEM Curricula (3).

B. JUSTIFICATION.

1. Discuss prerequisites/corequisites for course(s) including class-standing, admission to the major, GPA, or other factors that would affect a student's ability to register.

In order to begin this program, students must be formally admitted to the M.Ed. in Elementary Education program.

2. Demonstrate that course numbering is consistent with the level of academic advancement of students for whom it is intended.

Course numbers are in the 6000 level and are consistent with current courses in the M.Ed. Program.

3. In general, how will this proposal improve the scope, quality and/or efficiency of programs and/or instruction?

This added concentration and proposed courses will add a needed program of study for elementary school teachers that we serve. The 100% online format will offer flexible delivery options and allow us to serve teachers across the State of North Carolina.

4. If course(s) has been offered previously under special topics numbers, give details of experience including number of times taught and enrollment figures.

None of these courses have been offered before.

C. IMPACT. Changes to courses and curricula often have impacts both within the proposing department as well as campus-wide. What effect will this proposal have on existing courses and curricula, students, and other departments/units? Submit an Impact Statement that fully addresses how you have assessed potential impacts and what the impacts of this proposal might be. Consider the following:

1. What group(s) of students will be served by this proposal? (Undergraduate and/or graduate; majors and/or non-majors, others? Explain). Describe how you determine which students will be served.

This proposed concentration and these courses will serve graduate students who are enrolled in the M.Ed. in Elementary Education program.

2. What effect will this proposal have on existing courses and curricula?
 - a. When and how often will added course(s) be taught?

Each course will be taught on a rotating basis with each course being offered approximately once every 2 years. The program's Student Learning Outcomes for the MEd. in Elementary Education program come from the core courses and not concentration courses. Therefore the SLO's will not be impacted.

- b. How will the content and/or frequency of offering of other courses be affected?

This program and courses will not influence the frequency of offering other courses.

- c. What is the anticipated enrollment in course(s) added (for credit and auditors)?

The faculty members plan to offer these courses with a course enrollment of no more than 24 students per course.

- d. How will enrollment in other courses be affected? How did you determine this?

Students currently in this program choose from seven different concentrations. We expect that students enrolling in this concentration will be new and will not take students away from other concentrations.

- e. Identify other areas of catalog copy that would be affected, including within other departments and colleges (e.g., curriculum outlines, requirements for the degree, prerequisites, articulation agreements, etc.)

This does not apply.

III. RESOURCES REQUIRED TO SUPPORT PROPOSAL.

When added resources are not required, indicate “none”. For items which require “none” explain how this determination was made.

- A. **PERSONNEL**. Specify requirements for new faculty, part-time teaching, student assistants and/or increased load on present faculty. List by name qualified faculty members interested in teaching the course(s).

The department currently has qualified faculty to teach these courses, including: Dr. Michael Putman, Dr. Drew Polly, Dr. Ian Binns, Dr. Amy Good, Dr. Leigh Ausband, and Dr. Tracy Rock. Further, the Department is hiring a new faculty member this year with expertise in Science Education, who will also be able to teach these courses.

- B. **PHYSICAL FACILITY**. Is adequate space available for this course?

These courses will be 100% online. Space is not needed for these courses.

- C. **EQUIPMENT AND SUPPLIES**: Has funding been allocated for any special equipment or supplies needed?

There is no need for additional equipment or supplies.

- D. **COMPUTER**. Specify any computer usage (beyond Moodle) required by students and/or faculty, and include an assessment of the adequacy of software/computing resources by available for the course(s).

There is no computer usage beyond Moodle needed.

- E. **AUDIO-VISUAL**. If there are requirements for audio-visual facilities beyond the standard classroom podiums, please list those here.

There are no audio-visual requirements.

- F. **OTHER RESOURCES**. Specify and estimate cost of other new/added resources required, e.g., travel, communication, printing and binding.

There are no additional resources needed.

- G. **SOURCE OF FUNDING**. Indicate source(s) of funding for new/additional resources required to support this proposal.

There is no need for additional resources or funding.

IV. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS OR UNITS

- A. **LIBRARY CONSULTATION**. Indicate written consultation with the Library Reference Staff at the departmental level to ensure that library holdings are adequate to support the proposal prior to its leaving the department. (Attach copy of [*Consultation on Library Holdings*](#)).

See attached.

- B. **CONSULTATION WITH OTHER DEPARTMENTS OR UNITS**. List departments/units consulted in writing regarding all elements outlined in IIC: Impact Statement, including dates consulted. Summarize results of

consultation and attach correspondence. Provide information on voting and dissenting opinions (if applicable).

This proposal does not impact other Departments or Colleges.

V. INITIATION, ATTACHMENTS AND CONSIDERATION OF THE PROPOSAL

- A. **ORIGINATING UNIT**. Briefly summarize action on the proposal in the originating unit including information on voting and dissenting opinions.

This proposal was voted on and approved unanimously by the Department of Reading and Elementary Education on September 26, 2013.

- B. **CREDIT HOUR**. (Mandatory if new and/or revised course in proposal)

The appropriate faculty committee has reviewed the course outline/syllabus and has determined that the assignments are sufficient to meet the University definition of a [credit hour](#).

C. **ATTACHMENTS**.

1. **CONSULTATION**: Attach relevant documentation of consultations with other units.
2. **COURSE OUTLINE/SYLLABUS**: For undergraduate courses attach course outline(s) including basic topics to be covered and suggested textbooks and reference materials with dates of publication. For Graduate Courses attach a course syllabus. Please see [Boiler Plate for Syllabi for New/Revised Graduate Courses](#).
3. **PROPOSED CATALOG COPY**: Copy should be provided for all courses in the proposal. Include current subject prefixes and course numbers, full titles, credit hours, prerequisites and/or corequisites, concise descriptions, and an indication of when the courses are to be offered as to semesters and day/evening/weekend. Copy and paste the [current catalog copy](#) and use the Microsoft Word “track changes” feature (or use red text with “~~strikethrough~~” formatting for text to be deleted, and adding blue text with “underline” formatting for text to be added).
 - a. For a new course or revisions to an existing course, check all the statements that apply:
 - This course will be cross listed with another course.
 - There are prerequisites for this course.
 - There are corequisites for this course.
 - This course is repeatable for credit.
 - This course will increase/decrease the number of credits hours currently offered by its program.

_____ This proposal results in the deletion of an existing course(s) from the degree program and/or catalog.

For all items checked above, applicable statements and content must be reflected in the proposed catalog copy.

- b.* If overall proposal is for a new degree program that requires approval from General Administration, please contact the facultygovernance@uncc.edu for consultation on catalog copy.

This does not apply.

4. ACADEMIC PLAN OF STUDY (UNDERGRADUATE ONLY): Does the proposed change impact an existing Academic Plan of Study?
 - Yes. If yes, please provide updated [Academic Plan of Study](#) in template format.
5. STUDENT LEARNING OUTCOMES: Does this course or curricular change require a change in SLOs or assessment for the degree program?
 - No. The program's Student Learning Outcomes for the MEd. in Elementary Education program come from the core courses and not concentration courses. Therefore the SLO's will not be impacted.
6. TEXTBOOK COSTS: It is the policy of the Board of Governors to reduce textbook costs for students whenever possible. Have electronic textbooks, textbook rentals, or the buyback program been considered and adopted?
 - Yes. Briefly explain below.

When possible, we will use electronic materials that are available online for free.

IMPORTANT NOTE: A Microsoft Word version of the final course and curriculum proposal should be sent to facultygovernance@uncc.edu upon approval by the Undergraduate Course and Curriculum Committee and/or Graduate Council chair.

Attachment – Consultation



UNC CHARLOTTE
J. Murrey Atkins Library

Consultation on Library Holdings

To: Drew Polly, Dept. of Reading & Elementary Education

From: Judy Walker, Education/ Psychology Librarian

Date: September 25, 2013

Subject: STEM Concentration for Masters in Education

Summary of Librarian's Evaluation of Holdings:

Evaluator: Judy Walker

Date: September 25, 2013

Please Check One:

Holdings are superior _____

Holdings are adequate X

Holdings are adequate only if Dept. purchases additional items. _____

Holdings are inadequate _____

Comments:

The library is already supporting STEM education at the undergraduate level. The same resources will be able to support a graduate concentration.

Evaluator's Signature

September 25, 2013

Date

Attachment – Course Outlines



Course Outlines for the Master's Degree of Education in Elementary Education: STEM Concentration

- ELED 6210: Current Issues in STEM Education (3)
- ELED 6211: Integrating Engineering into the Elementary School Curriculum (3)
- ELED 6212: Integrating Digital Learning and STEM with Elementary School Learners (3)
- ELED 6213: Global Awareness in STEM Education (3)
- ELED 6214: Designing and Developing STEM Curricula (3)



Course Outline Template
For New or Revised Undergraduate and Graduate Courses
Updated May 2012

COURSE NUMBER: ELED 6210

CREDIT HOURS: 3

COURSE TITLE: Current Issues in STEM Education

CATALOG DESCRIPTION

Examination of current issues related to Science, Technology, Engineering, and Mathematics (STEM) Education. Students will examine current issues related to STEM Education in Elementary School settings. (Fall).

This 3-credit course requires approximately 6-9 hours each week for approximately 15 weeks. Out-of-class work may include but is not limited to: required reading, critical analysis of literature, research papers, and projects related to STEM issues in elementary schools.

COURSE PREREQUISITES and/or CO-REQUISITES: None.

COURSE RATIONALE

This survey course covers the current and cutting-edge issues of Science, Technology, Engineering, and Mathematics (STEM) Education. Students will engage in reading papers and examining issues related to STEM topics relevant to elementary school learners.

This course supports the following areas of the UNC Charlotte College of Education Conceptual Framework (<http://education.uncc.edu/conceptual-framework>).

Core Proficiency: Knowledge

Candidates will demonstrate the Knowledge that provides the foundation for transforming the lives of the children, youth, and families with whom they work. This knowledge includes elements such as:

- K1: Knowledge relevant to life in the 21st century
- K2: Specialty area knowledge
- K3: Pedagogical knowledge
- K4: Knowledge of learners and their contexts
- K5: Self-awareness

K6: Knowledge of policies, laws, standards, and issues

Core Proficiency: Effectiveness

Candidates will demonstrate Effectiveness in their work with children, youth, and families by applying knowledge and developing effective skills in areas such as:

- E1: 21st century skills
- E2: Planning, implementation, and evaluation
- E3: Research-based practice
- E4: Research skills
- E5: Culturally competent practice
- E6: Response to diverse learners
- E7: Reflective practice

Core Proficiency: Commitment

Candidates will demonstrate their Commitment to transforming the lives of others through their actions in areas such as:

- C1: Positive impact on learners
- C2: Ethics
- C3: Leadership
- C4: Collaboration
- C5: Advocacy
- C6: Professional identity and continuous growth

This course supports the following North Carolina Professional Teaching Standards:

Standard 1: Teacher Leadership

- 1.01- Teachers lead in their classrooms.

Standard 2: Respectful Learning Environments

- 2.03- Teachers treat students as individuals.

Standard 3: Content and Curriculum Expertise

- 3.01- Teachers align their instruction with the NC Standard Course of Study.
- 3.02- Teachers know the content appropriate to their teaching specialty.
- 3.03- Teachers recognize the interconnectedness of content areas/disciplines.
- 3.04- Teachers make instruction relevant to students.

Standard 4: Student Learning

- 4.01- Teachers know the ways in which learning takes place, and they know appropriate levels of intellectual, social, and emotional development of their students.
- 4.02- Teachers plan instruction appropriate for their students.
- 4.03- Teachers use a variety of instructional methods.
- 4.04- Teachers integrate and utilize technology in their instruction.
- 4.05- Teachers help students develop critical thinking and problem-solving skills.
- 4.05- Teachers help students work in teams and develop leadership qualities.

Standard 5: Reflection

- 5.01- Teachers analyze student learning.
- 5.02- Teachers link professional growth to their professional goals.
- 5.03- Teachers function effectively in a complex, dynamic environment.

COURSE OBJECTIVES

Upon successful completion of the course, the candidate will:

1. Examine the question, “What is Science, Technology, Engineering, and Mathematics (STEM) Education?” (Conceptual Framework K1, K2, K3, K5, K6, E2, E4, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
2. Analyze current trends and issues related to Science, Technology, Engineering, and Mathematics (STEM) Education. (Conceptual Framework K1, K2, K3, E2, E3, E4, C1, C2, C3, C5, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
3. Read and critically evaluate arguments in support of and against STEM Education. (Conceptual Framework K1, K2, K3, E2, E4, C1, C2, C3, C5, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
4. Identify critical and effective components of STEM education. (Conceptual Framework K1, K2, K3, E2, E4, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
5. Analyze curricula and instructional resources in regards to critical and effective components of STEM Education. (Conceptual Framework K1, K2, K3, E2, E4, C1, C3, C6; NCPTS 2.03, 3.01, 3.02, 3.03, 3.04, 4.01)
6. Examine models of the adoption of educational reform and consider how STEM education can be further adopted in their classroom and building. (Conceptual Framework K1, K2, K3, E2, E4, C1, C3, C4, C5, C6; NCPTS 1.01, 3.01, 3.02, 3.03, 3.04, 4.01)

INSTRUCTIONAL METHODS

- This is a 100% online course. Some sections of this course may be offered asynchronously (no online class meetings), while some sections of this course may be offered synchronously (pre-scheduled online course meetings).

COURSE CONTENT

Modules will be focused on the following essential questions:

- “What is Science, Technology, Engineering, and Mathematics (STEM) Education?”
- How does STEM education compare to other integrated approaches to education?
- What are critical components of STEM education?
- What does research say about effective instructional practices for STEM education?
- What is the quality of available instructional resources that promote STEM education?
- What are current trends and issues related to STEM education?
- How do we integrate STEM education into a literacy-focused climate in elementary schools?
- What do models of adopting new instructional practices (e.g., Concerns-Based Adoption Model) say about integrating new pedagogies into classrooms?
- How can I begin to integrate STEM Education into my own classroom and school?

ILLUSTRATIVE COURSE ACTIVITIES

- Reading and critically examining selected articles
- Interactive online discussions with instructor and classmates

- Examination of STEM curricula resources
- Analysis and alignment of related content standards for elementary school learners
- Proposing a plan to integrate STEM instruction into their classroom and school

ILLUSTRATIVE METHODS FOR EVALUATING CANDIDATE PERFORMANCE

Weekly course work: 25%

Projects (3): 75% total

Project 1: Analysis of critical issues and trends in STEM Education (25%). Candidates will write a paper in which they detail an overview of issues and trends, and then provide an in-depth analysis of 2 key issues that specifically relate to their work as an elementary school teacher. (SLO 1, 2, and 3).

Project 2: Curricula resource analysis (25%). Candidates will select a curricula unit and analyze it in regards to alignment with state content standards, the quality of instructional practices, and the quality of integrating STEM concepts. (SLO 1, 4, 5, and 6).

Project 3: STEM Integration plan (25%). Using their knowledge of models for adopting reform-based pedagogies, develop a plan for themselves and their colleagues for integrating more STEM concepts into their instruction (SLO 1, 4, 5, and 6).

GRADING SCALE

A: 90-100%, B: 80-89.9%, C: 70-79.9%, U: Below 70%

AN ILLUSTRATIVE CURRENT BIBLIOGRAPHY

Course readings will be selected by the instructor.

Examples of readings include:

Drew, D. E. (2011). *STEM the tide: Reforming science, technology, engineering, and math education in America*. Baltimore, MD: Johns Hopkins University Press.

National Academies Press (2011). *Successful K-12 STEM education: Identifying effective approaches in science, technology, engineering, and mathematics*. Washington, DC: National Academies Press.

Articles will also be selected from journals such as the *Journal of STEM Education*, the *Interdisciplinary Journal of Problem-Based Learning*, *Educational Researcher*, and other internationally-known journals. All journals are available through UNC Charlotte.

SPECIFIC POLICIES THAT APPLY TO THE COURSE

- Attendance and Student Behavior Policy: As this is an online course, your course participation includes, but is not limited to completing course assignments on time,

participating in collaborative activities, responding to classmates' discussion board posts.

- Inclement Weather Policy: This online course will not be impacted by inclement weather.
- UNC Charlotte Code of Student Academic Integrity. <http://www.legal.uncc.edu/policies/ps-105.html>
- College of Education Commitment to Diversity. http://education.uncc.edu/coe/diversity_statement.htm
- College of Education Technology Statement: <http://education.uncc.edu/faculty-resources/faculty-handbook/college-education-technology-statement>
- UNC Charlotte Religious Accommodations: <https://legal.uncc.edu/policies/up-409>
- UNC Charlotte Disability Accommodations: <https://diversity.uncc.edu/sites/diversity.uncc.edu/files/media/CampusDiversityPlan.pdf>
- Online Student Course Evaluation Process and Confidentiality: Course evaluations are anonymous and confidential. It is expected that students will complete the course evaluation at the end of the semester.
- Other policies relevant to the course. See <http://legal.uncc.edu/syllabus.html>

ATTACHMENTS

- None

NOTE: If both graduate and undergraduate versions of this course are to be offered, submit proposals to both the Undergraduate Course and Curriculum Committee and to the Graduate Council.

APPROVAL FOR NEW COURSES
OR SUBSTANTIALLY REVISED COURSES

Faculty Responsible for Developing This Course Outline

Drew Polly, Michael Putman, Ian Binns

APPROVAL BY THE APPROPRIATE COLLEGE OF EDUCATION CURRICULUM COMMITTEE:

Approved on _____ by the College Graduate Curriculum Committee

Date

Chair: _____



Course Outline Template
For New or Revised Undergraduate and Graduate Courses
Updated May 2012

COURSE NUMBER: ELED 6211

CREDIT HOURS: 3

COURSE TITLE: Integrating Engineering into the Elementary School Curriculum

CATALOG DESCRIPTION

An analysis of engineering concepts related to the science standards taught in Grades K-6 in North Carolina Public Schools. The Engineering is Elementary curriculum and other related resources will be examined in depth. Analysis of how science, technology, and mathematics can be integrated with engineering will be emphasized. (Spring).

This 3-credit course requires approximately 6-9 hours each week for approximately 15 weeks. Out-of-class work may include but is not limited to: required reading, critical analysis of literature, research papers, and projects related to engineering in elementary schools.

COURSE PREREQUISITES and/or CO-REQUISITES: ELED 6210.

COURSE RATIONALE

This course addresses engineering concepts and simultaneously will develop students' understanding of content and knowledge of research-based pedagogies related to engineering. Engineering is often the concept in STEM education that is not integrated well, and this course aims to address that need.

This course supports the following areas of the UNC Charlotte College of Education Conceptual Framework (<http://education.uncc.edu/conceptual-framework>).

Core Proficiency: Knowledge

Candidates will demonstrate the Knowledge that provides the foundation for transforming the lives of the children, youth, and families with whom they work. This knowledge includes elements such as:

K1: Knowledge relevant to life in the 21st century

K2: Specialty area knowledge

- K3: Pedagogical knowledge
- K4: Knowledge of learners and their contexts
- K5: Self-awareness
- K6: Knowledge of policies, laws, standards, and issues

Core Proficiency: Effectiveness

Candidates will demonstrate Effectiveness in their work with children, youth, and families by applying knowledge and developing effective skills in areas such as:

- E1: 21st century skills
- E2: Planning, implementation, and evaluation
- E3: Research-based practice
- E4: Research skills
- E5: Culturally competent practice
- E6: Response to diverse learners
- E7: Reflective practice

Core Proficiency: Commitment

Candidates will demonstrate their Commitment to transforming the lives of others through their actions in areas such as:

- C1: Positive impact on learners
- C2: Ethics
- C3: Leadership
- C4: Collaboration
- C5: Advocacy
- C6: Professional identity and continuous growth

This course supports the following North Carolina Professional Teaching Standards:

Standard 1: Teacher Leadership

- 1.01- Teachers lead in their classrooms.

Standard 2: Respectful Learning Environments

- 2.03- Teachers treat students as individuals.

Standard 3: Content and Curriculum Expertise

- 3.01- Teachers align their instruction with the NC Standard Course of Study.
- 3.02- Teachers know the content appropriate to their teaching specialty.
- 3.03- Teachers recognize the interconnectedness of content areas/disciplines.
- 3.04- Teachers make instruction relevant to students.

Standard 4: Student Learning

- 4.01- Teachers know the ways in which learning takes place, and they know appropriate levels of intellectual, social, and emotional development of their students.
- 4.02- Teachers plan instruction appropriate for their students.
- 4.03- Teachers use a variety of instructional methods.
- 4.04- Teachers integrate and utilize technology in their instruction.
- 4.05- Teachers help students develop critical thinking and problem-solving skills.
- 4.05- Teachers help students work in teams and develop leadership qualities.

Standard 5: Reflection

- 5.01- Teachers analyze student learning.
- 5.02- Teachers link professional growth to their professional goals.
- 5.03- Teachers function effectively in a complex, dynamic environment.

COURSE OBJECTIVES

Upon successful completion of the course, the candidate will:

1. Respond to the questions, “What is engineering?” and “How does engineering fit into the elementary school curriculum?” (Conceptual Framework K1, K2, K3, E2, E4, C1, C2, C3, C5, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
2. Explain and demonstrate the scientific concepts that are fundamental for understanding engineering and how it relates to other science concepts. (Conceptual Framework K1, K2, K5, E2, E4, C1, C3, C5, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
3. Write a critical analysis of articles related to engineering and STEM education. (Conceptual Framework K1, K2, K3, E2, E4, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
4. Analyze curricula resources and modify them to provide learning opportunities around engineering to elementary school students. (Conceptual Framework K1, K2, K3, E2, E4, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
5. Examine and assess the impact of engineering instruction on elementary school students. (Conceptual Framework K1, K2, K3, K4, E2, E4, E5, E6, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
6. Make long-range plans to integrate engineering concepts into instruction. (Conceptual Framework K1, K2, K3, K4, E1, E2, E3, E4, E5, E6, E7, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)

INSTRUCTIONAL METHODS

- This is a 100% online course. Some sections of this course may be offered asynchronously (no online class meetings), while some sections of this course may be offered synchronously (pre-scheduled online course meetings).

COURSE CONTENT

Modules will be focused on the following essential questions:

- What is engineering education?
- How do engineering concepts address or align to elementary school standards?
- What are the fundamental science concepts encompassed within elementary education?
- What are essential components of effective engineering curricula and instruction?
- How do I effectively plan a unit related to engineering concepts for elementary school students?
- How do I assess the impact of engineering education on my students?
- How do I use data to modify future engineering lessons and units?
- How can I make a long-term plan to address engineering concepts with elementary school students?

ILLUSTRATIVE COURSE ACTIVITIES

- Reading and critically examining selected articles
- Interactive online discussions with instructor and classmates
- Examination of engineering curricula resources
- Analysis and alignment of related content standards for elementary school learners
- Teaching engineering lessons to elementary school learners and examining the impact of instruction on student learning
- Proposing a plan to integrate engineering instruction into their classroom and school

ILLUSTRATIVE METHODS FOR EVALUATING CANDIDATE PERFORMANCE

Weekly course work: 25%

Projects (3): 75% total

Project 1: Analysis of critical issues in engineering education (25%). Candidates will write a paper in which they detail an overview of issues and trends, and then provide an in-depth analysis of 2 key issues that specifically relate to their work as an elementary school teacher. (SLO 1, 2, and 3).

Project 2: Curricula resource analysis (25%). Candidates will select a curricula unit and analyze it in regards to alignment with state content standards, the quality of instructional practices, and the quality of integrating STEM concepts. (SLO 1, 4, 5, and 6).

Project 3: Engineering education plan (25%). Using their knowledge of models for adopting reform-based pedagogies, develop a plan for themselves and their colleagues for integrating more STEM concepts into their instruction (SLO 1, 4, 5, and 6).

GRADING SCALE

A: 90-100%, B: 80-89.9%, C: 70-79.9%, U: Below 70%

AN ILLUSTRATIVE CURRENT BIBLIOGRAPHY

Course readings will be selected by the instructor.

Examples of readings include:

The Engineering is Elementary Books and curriculum. Available online: <http://www.eie.org/>

Articles will also be selected from journals such as the Journal of STEM Education, the Interdisciplinary Journal of Problem-Based Learning, Educational Researcher, and other internationally-known journals. All journals are available through UNC Charlotte.

SPECIFIC POLICIES THAT APPLY TO THE COURSE

- Attendance and Student Behavior Policy: As this is an online course, your course participation includes, but is not limited to completing course assignments on time,

participating in collaborative activities, responding to classmates' discussion board posts.

- Inclement Weather Policy: This online course will not be impacted by inclement weather.
- UNC Charlotte Code of Student Academic Integrity. <http://www.legal.uncc.edu/policies/ps-105.html>
- College of Education Commitment to Diversity. http://education.uncc.edu/coe/diversity_statement.htm
- College of Education Technology Statement: <http://education.uncc.edu/faculty-resources/faculty-handbook/college-education-technology-statement>
- UNC Charlotte Religious Accommodations: <https://legal.uncc.edu/policies/up-409>
- UNC Charlotte Disability Accommodations: <https://diversity.uncc.edu/sites/diversity.uncc.edu/files/media/CampusDiversityPlan.pdf>
- Online Student Course Evaluation Process and Confidentiality: Course evaluations are anonymous and confidential. It is expected that students will complete the course evaluation at the end of the semester.
- Other policies relevant to the course. See <http://legal.uncc.edu/syllabus.html>

ATTACHMENTS

- None

NOTE: If both graduate and undergraduate versions of this course are to be offered, submit proposals to both the Undergraduate Course and Curriculum Committee and to the Graduate Council.

**APPROVAL FOR NEW COURSES
OR SUBSTANTIALLY REVISED COURSES**

Faculty Responsible for Developing This Course Outline

Drew Polly, Michael Putman, Ian Binns. Consultation with Alissa Wickliff, National Professional Developer with *Engineering is Elementary* Curriculum

APPROVAL BY THE APPROPRIATE COLLEGE OF EDUCATION CURRICULUM COMMITTEE:

Approved on _____ by the College Graduate Curriculum Committee
Date

Chair: _____



Course Outline Template
For New or Revised Undergraduate and Graduate Courses
Updated May 2012

COURSE NUMBER: ELED 6212

CREDIT HOURS: 3

COURSE TITLE: Integrating Digital Learning and STEM with Elementary School Learners

CATALOG DESCRIPTION

Examination of digital learning (e.g., web-based tools, digital videos) to support the teaching of STEM education. Students will analyze a real-world problem, analyze digital learning tools, plan and implement a lesson around the real-world problem using digital learning tools. (Fall).

This 3-credit course requires approximately 6-9 hours each week for approximately 15 weeks. Out-of-class work may include but is not limited to: required reading, critical analysis of literature, research papers, and projects related to digital learning in elementary schools.

COURSE PREREQUISITES and/or CO-REQUISITES: ELED 6210.

COURSE RATIONALE

This course addresses the increased access to digital learning tools in elementary schools and teachers' lack of understanding about how to effectively integrate them into their classroom.

This course supports the following areas of the UNC Charlotte College of Education Conceptual Framework (<http://education.uncc.edu/conceptual-framework>).

Core Proficiency: Knowledge

Candidates will demonstrate the Knowledge that provides the foundation for transforming the lives of the children, youth, and families with whom they work. This knowledge includes elements such as:

- K1: Knowledge relevant to life in the 21st century
- K2: Specialty area knowledge
- K3: Pedagogical knowledge
- K4: Knowledge of learners and their contexts

K5: Self-awareness

K6: Knowledge of policies, laws, standards, and issues

Core Proficiency: Effectiveness

Candidates will demonstrate Effectiveness in their work with children, youth, and families by applying knowledge and developing effective skills in areas such as:

E1: 21st century skills

E2: Planning, implementation, and evaluation

E3: Research-based practice

E4: Research skills

E5: Culturally competent practice

E6: Response to diverse learners

E7: Reflective practice

Core Proficiency: Commitment

Candidates will demonstrate their Commitment to transforming the lives of others through their actions in areas such as:

C1: Positive impact on learners

C2: Ethics

C3: Leadership

C4: Collaboration

C5: Advocacy

C6: Professional identity and continuous growth

This course supports the following North Carolina Professional Teaching Standards:

Standard 1: Teacher Leadership

1.01- Teachers lead in their classrooms.

Standard 2: Respectful Learning Environments

2.03- Teachers treat students as individuals.

Standard 3: Content and Curriculum Expertise

3.01- Teachers align their instruction with the NC Standard Course of Study.

3.02- Teachers know the content appropriate to their teaching specialty.

3.03- Teachers recognize the interconnectedness of content areas/disciplines.

3.04- Teachers make instruction relevant to students.

Standard 4: Student Learning

4.01- Teachers know the ways in which learning takes place, and they know appropriate levels of intellectual, social, and emotional development of their students.

4.02- Teachers plan instruction appropriate for their students.

4.03- Teachers use a variety of instructional methods.

4.04- Teachers integrate and utilize technology in their instruction.

4.05- Teachers help students develop critical thinking and problem-solving skills.

4.05- Teachers help students work in teams and develop leadership qualities.

Standard 5: Reflection

5.01- Teachers analyze student learning.

5.02- Teachers link professional growth to their professional goals.

5.03- Teachers function effectively in a complex, dynamic environment.

COURSE OBJECTIVES

Upon successful completion of the course, the candidate will:

1. Examine the question, “What is digital learning and how can it enhance and support STEM education?” (Conceptual Framework K1, K2, K3, K6, E1, E2, E3, E4, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
2. Analyze current trends and issues related to digital learning and technology integration in elementary school settings. (Conceptual Framework K1, K2, K3, K4, K6, E1, E2, E3, E4, E5, E6, C1, C2, C3, C5, C6; NCPTS 1.01, 3.01, 3.02, 3.03, 3.04, 4.01)
3. Read and critically evaluate arguments in support of and against digital learning. (Conceptual Framework K1, K2, K3, E2, E4, C1, C2, C3, C6; NCPTS 2.03, 3.01, 3.02, 3.03, 3.04, 4.01)
4. Identify critical and effective components of technology integration. (Conceptual Framework K1, K2, K3, E2, E4, C1, C3, C6; NCPTS 2.03, 3.01, 3.02, 3.03, 3.04, 4.01)
5. Design lessons that effectively integrate digital learning opportunities into STEM lessons. (Conceptual Framework K1, K2, K3, K5, E1, E2, E4, C1, C3, C6; NCPTS 1.01, 2.03, 3.01, 3.02, 3.03, 3.04, 4.01)
6. Examine and reflect on using digital learning with elementary school learners. (Conceptual Framework K1, K2, K3, E1, E2, E4, C1, C3, C6; NCPTS 2.03, 3.01, 3.02, 3.03, 3.04, 4.01)
7. Design professional development for other elementary school teachers about the benefit of digital learning. (Conceptual Framework K1, K2, K3, E1, E2, E4, C1, C3, C6; NCPTS 1.01, 2.03, 3.01, 3.02, 3.03, 3.04, 4.01)

INSTRUCTIONAL METHODS

- This is a 100% online course. Some sections of this course may be offered asynchronously (no online class meetings), while some sections of this course may be offered synchronously (pre-scheduled online course meetings).

COURSE CONTENT

Modules will be focused on the following essential questions:

- What is digital learning and how can it enhance and support STEM education?
- What are current digital (internet-based) tools that can support students’ interaction with STEM concepts?
- How do digital videos and simulations support STEM education?
- How can I use digital learning to support elementary school students’ research of real-world problems?
- How can I effectively critique and evaluate digital learning tools?
- What are critical components of creating opportunities for digital learning?
- What does research say about effective instructional practices for digital learning?
- How can I assess the impact of using digital learning to teach STEM concepts to elementary school learners?
- How can I support my colleagues’ use of digital learning to teach STEM concepts?

ILLUSTRATIVE COURSE ACTIVITIES

- Reading and critically examining selected articles
- Interactive online discussions with instructor and classmates
- Examination of a real-world problem using digital/internet-based tools
- Analysis and alignment of related content standards for elementary school learners
- Designing, teaching, and assessing a lesson in which digital tools support elementary school learners' examination of a real-world problem
- Designing professional development for other elementary school teachers about how digital learning can support STEM education

GRADING SCALE

A: 90-100%, B: 80-89.9%, C: 70-79.9%, U: Below 70%

ILLUSTRATIVE METHODS FOR EVALUATING CANDIDATE PERFORMANCE

Weekly course work: 25%

Projects (3): 75% total

Project 1: Analysis of digital tools (10%). Candidates will conduct a detailed analysis of digital tools that can be used to support STEM education. (SLO 1, 2, and 3).

Project 2: Digital Learning in Elementary School Classrooms (25%). Candidates will select a real-world problem related to STEM education, and design opportunities for elementary school students to use digital tools to research and learn about the problem. (SLO 1, 4, 5, and 6).

Project 3: Professional Development Workshop (40%). Using their knowledge of digital learning, candidates will design and implement a professional development workshop for other teachers about the benefits of digital learning (SLO 1, 2, 6, and 7).

AN ILLUSTRATIVE CURRENT BIBLIOGRAPHY

Course readings will be selected by the instructor.

Readings will be selected online readings from Education Week (free website), Learning and Leading with Technology, and other publications about digital learning.

Articles will also be selected from journals such as the Journal of STEM Education, the Interdisciplinary Journal of Problem-Based Learning, Educational Researcher, and other internationally-known journals. All journals are available through UNC Charlotte.

SPECIFIC POLICIES THAT APPLY TO THE COURSE

- Attendance and Student Behavior Policy: As this is an online course, your course participation includes, but is not limited to completing course assignments on time,

participating in collaborative activities, responding to classmates' discussion board posts.

- Inclement Weather Policy: This online course will not be impacted by inclement weather.
- UNC Charlotte Code of Student Academic Integrity. <http://www.legal.uncc.edu/policies/ps-105.html>
- College of Education Commitment to Diversity. http://education.uncc.edu/coe/diversity_statement.htm
- College of Education Technology Statement: <http://education.uncc.edu/faculty-resources/faculty-handbook/college-education-technology-statement>
- UNC Charlotte Religious Accommodations: <https://legal.uncc.edu/policies/up-409>
- UNC Charlotte Disability Accommodations: <https://diversity.uncc.edu/sites/diversity.uncc.edu/files/media/CampusDiversityPlan.pdf>
- Online Student Course Evaluation Process and Confidentiality: Course evaluations are anonymous and confidential. It is expected that students will complete the course evaluation at the end of the semester.
- Other policies relevant to the course. See <http://legal.uncc.edu/syllabus.html>

ATTACHMENTS

- None

NOTE: If both graduate and undergraduate versions of this course are to be offered, submit proposals to both the Undergraduate Course and Curriculum Committee and to the Graduate Council.

APPROVAL FOR NEW COURSES
OR SUBSTANTIALLY REVISED COURSES

Faculty Responsible for Developing This Course Outline

Drew Polly, Michael Putman, Ian Binns

APPROVAL BY THE APPROPRIATE COLLEGE OF EDUCATION CURRICULUM COMMITTEE:

Approved on _____ by the College Graduate Curriculum Committee
Date

Chair: _____

Date

Chair: _____



Course Outline Template
For New or Revised Undergraduate and Graduate Courses
Updated May 2012

COURSE NUMBER: ELED 6213

CREDIT HOURS: 3

COURSE TITLE: Global Awareness in STEM Education

CATALOG DESCRIPTION

Examination of global awareness, humanities and the environment in the context of STEM Education. Students will research, reflect on, and apply knowledge related to Earth and the environment in relationship to issues and trends related to STEM. (Spring).

This 3-credit course requires approximately 6-9 hours each week for approximately 15 weeks. Out-of-class work may include but is not limited to: required reading, critical analysis of literature, research papers, and projects related to global awareness in elementary schools.

COURSE PREREQUISITES and/or CO-REQUISITES: ELED 6210.

COURSE RATIONALE

This course addresses the need for elementary school teachers to be global citizens that are concerned with the future of the environment. Social studies concepts related to global issues will be integrated into STEM concepts.

This course supports the following areas of the UNC Charlotte College of Education Conceptual Framework (<http://education.uncc.edu/conceptual-framework>).

Core Proficiency: Knowledge

Candidates will demonstrate the Knowledge that provides the foundation for transforming the lives of the children, youth, and families with whom they work. This knowledge includes elements such as:

- K1: Knowledge relevant to life in the 21st century
- K2: Specialty area knowledge
- K3: Pedagogical knowledge
- K4: Knowledge of learners and their contexts
- K5: Self-awareness
- K6: Knowledge of policies, laws, standards, and issues

Core Proficiency: Effectiveness

Candidates will demonstrate Effectiveness in their work with children, youth, and families by applying knowledge and developing effective skills in areas such as:

- E1: 21st century skills
- E2: Planning, implementation, and evaluation
- E3: Research-based practice
- E4: Research skills
- E5: Culturally competent practice
- E6: Response to diverse learners
- E7: Reflective practice

Core Proficiency: Commitment

Candidates will demonstrate their Commitment to transforming the lives of others through their actions in areas such as:

- C1: Positive impact on learners
- C2: Ethics
- C3: Leadership
- C4: Collaboration
- C5: Advocacy
- C6: Professional identity and continuous growth

This course supports the following North Carolina Professional Teaching Standards:

Standard 1: Teacher Leadership

- 1.01- Teachers lead in their classrooms.

Standard 2: Respectful Learning Environments

- 2.03- Teachers treat students as individuals.

Standard 3: Content and Curriculum Expertise

- 3.01- Teachers align their instruction with the NC Standard Course of Study.
- 3.02- Teachers know the content appropriate to their teaching specialty.
- 3.03- Teachers recognize the interconnectedness of content areas/disciplines.
- 3.04- Teachers make instruction relevant to students.

Standard 4: Student Learning

- 4.01- Teachers know the ways in which learning takes place, and they know appropriate levels of intellectual, social, and emotional development of their students.
- 4.02- Teachers plan instruction appropriate for their students.
- 4.03- Teachers use a variety of instructional methods.
- 4.04- Teachers integrate and utilize technology in their instruction.
- 4.05- Teachers help students develop critical thinking and problem-solving skills.
- 4.05- Teachers help students work in teams and develop leadership qualities.

Standard 5: Reflection

- 5.01- Teachers analyze student learning.
- 5.02- Teachers link professional growth to their professional goals.
- 5.03- Teachers function effectively in a complex, dynamic environment.

COURSE OBJECTIVES

Upon successful completion of the course, the candidate will:

1. Examine the question, “How do global issues and environmental issues relate to STEM education?” (Conceptual Framework K1, K2, K3, K6, E1, E3, E4, C1, C2, C3, C5, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
2. Critically evaluate research and theoretical papers about global awareness. (Conceptual Framework K1, K2, K3, K6, E1, E2, E3, E4, C1, C2, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
3. Discuss and write about the key science concepts related to environmental and energy education. (Conceptual Framework K1, K2, K3, K6, E1, E2, E3, E4, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
4. Analyze and write about key issues related to global awareness and STEM education. (Conceptual Framework K1, K2, K3, K6, E1, E2, E3, E4, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
5. Consider implications for how elementary school students are taught about issues related to global awareness. (Conceptual Framework K1, K2, K3, K6, E1, E2, E3, E4, E5, E6, E7, C1, C3, C6; NCPTS 1.01, 2.03, 3.01, 3.02, 3.03, 3.04, 4.01)
6. Plan a service learning initiative related to global awareness, environmental, and/or energy education. (Conceptual Framework K1, K2, K3, K6, E1, E2, E3, E4, E5, E6, E7, C1, C3, C4, C6; NCPTS 1.01, 2.03, 3.01, 3.02, 3.03, 3.04, 4.01)

INSTRUCTIONAL METHODS

- This is a 100% online course. Some sections of this course may be offered asynchronously (no online class meetings), while some sections of this course may be offered synchronously (pre-scheduled online course meetings).

COURSE CONTENT

Modules will be focused on the following essential questions:

- How do global issues and environmental issues relate to STEM education?
- What are key global and environmental issues that should be addressed in elementary school classrooms?
- How does energy education relate to global awareness?
- What are the fundamental science concepts encompassed in environmental and energy education?
- What are the fundamental concepts that elementary school learners should explore related to global awareness, environmental, and energy education?
- What are the research-based pedagogies that should be used to design learning environments for elementary school learners to explore global awareness, environmental, and energy education?
- How can teachers support initiatives related to global awareness in their classroom, school, and school district?

ILLUSTRATIVE COURSE ACTIVITIES

- Reading and critically examining selected articles
- Interactive online discussions with instructor and classmates

- Researching and analyzing global awareness issues
- Examination of curricula resources
- Analysis and alignment of related content standards for elementary school learners
- Proposing a global awareness initiative for their classroom, school, or school district

ILLUSTRATIVE METHODS FOR EVALUATING CANDIDATE PERFORMANCE

Weekly course work: 25%

Projects (3): 75%

Project 1: Analysis of issues and concepts related to global awareness, environmental, and/or energy education (15%). Candidates will write a critical analysis paper where they synthesize research and information related to global awareness, environmental, and/or energy education. (SLO 1, 2, 3, and 4).

Project 2: Global awareness teaching project (30%). Candidates will design and teach 2 lessons related to global awareness, environmental, and/or energy education. (SLO 5).

Project 3: Global awareness initiative (30%). Using their knowledge of global awareness, environmental, and/or energy education., they will plan an initiative for their classroom, school, or school district. (SLO 1, 2, 3, 4, and 5).

GRADING SCALE

A: 90-100%, B: 80-89.9%, C: 70-79.9%, U: Below 70%

AN ILLUSTRATIVE CURRENT BIBLIOGRAPHY

Course readings will be selected by the instructor.

Examples of readings include:

Blake, R., Frederick, J. A., Haines, S., Lee, S. C. (2010). Inside out: Environmental science in the classroom and field. Washington ,DC: National Science Teachers Association.

Articles will also be selected from journals such as the Journal of STEM Education, the Interdisciplinary Journal of Problem-Based Learning, Educational Researcher, and other internationally-known journals. All journals are available through UNC Charlotte.

SPECIFIC POLICIES THAT APPLY TO THE COURSE

- Attendance and Student Behavior Policy: As this is an online course, your course participation includes, but is not limited to completing course assignments on time, participating in collaborative activities, responding to classmates' discussion board posts.
- Inclement Weather Policy: This online course will not be impacted by inclement weather.
- UNC Charlotte Code of Student Academic Integrity.
<http://www.legal.uncc.edu/policies/ps-105.html>

- College of Education Commitment to Diversity.
http://education.uncc.edu/coe/diversity_statement.htm
- College of Education Technology Statement: <http://education.uncc.edu/faculty-resources/faculty-handbook/college-education-technology-statement>
- UNC Charlotte Religious Accommodations: <https://legal.uncc.edu/policies/up-409>
- UNC Charlotte Disability Accommodations:
<https://diversity.uncc.edu/sites/diversity.uncc.edu/files/media/CampusDiversityPlan.pdf>
- Online Student Course Evaluation Process and Confidentiality: Course evaluations are anonymous and confidential. It is expected that students will complete the course evaluation at the end of the semester.
- Other policies relevant to the course. See <http://legal.uncc.edu/syllabus.html>

ATTACHMENTS

- None

NOTE: If both graduate and undergraduate versions of this course are to be offered, submit proposals to both the Undergraduate Course and Curriculum Committee and to the Graduate Council.

APPROVAL FOR NEW COURSES
OR SUBSTANTIALLY REVISED COURSES

Faculty Responsible for Developing This Course Outline

Drew Polly, Michael Putman, Ian Binns

**APPROVAL BY THE APPROPRIATE COLLEGE OF EDUCATION
CURRICULUM COMMITTEE:**

Approved on _____ by the College Graduate Curriculum Committee

Date

Chair: _____



Course Outline Template
For New or Revised Undergraduate and Graduate Courses
Updated May 2012

COURSE NUMBER: ELED 6214

CREDIT HOURS: 3

COURSE TITLE: Designing and Developing STEM Curricula

CATALOG DESCRIPTION

Analysis of critical components of designing, developing, and implementing a multi-lesson unit related to a real-world issue in STEM education. Candidates will design, teach, and assess the impact of STEM curricula that they develop. Candidates will also design professional development around the curricula they developed. (Fall).

This 3-credit course requires approximately 6-9 hours each week for approximately 15 weeks. Out-of-class work may include but is not limited to: required reading, critical analysis of literature, research papers, and projects related to STEM curricula in elementary schools.

COURSE PREREQUISITES and/or CO-REQUISITES: ELED 6210, 6211, 6212, and 6213.

COURSE RATIONALE

This capstone course of the STEM concentration for the Masters of Education Degree in Elementary Education focuses on the application of knowledge and concepts that students have learned in the previous four courses in the concentration.

This course supports the following areas of the UNC Charlotte College of Education Conceptual Framework (<http://education.uncc.edu/conceptual-framework>).

Core Proficiency: Knowledge

Candidates will demonstrate the Knowledge that provides the foundation for transforming the lives of the children, youth, and families with whom they work. This knowledge includes elements such as:

- K1: Knowledge relevant to life in the 21st century
- K2: Specialty area knowledge
- K3: Pedagogical knowledge
- K4: Knowledge of learners and their contexts
- K5: Self-awareness
- K6: Knowledge of policies, laws, standards, and issues

Core Proficiency: Effectiveness

Candidates will demonstrate Effectiveness in their work with children, youth, and families by applying knowledge and developing effective skills in areas such as:

- E1: 21st century skills
- E2: Planning, implementation, and evaluation
- E3: Research-based practice
- E4: Research skills
- E5: Culturally competent practice
- E6: Response to diverse learners
- E7: Reflective practice

Core Proficiency: Commitment

Candidates will demonstrate their Commitment to transforming the lives of others through their actions in areas such as:

- C1: Positive impact on learners
- C2: Ethics
- C3: Leadership
- C4: Collaboration
- C5: Advocacy
- C6: Professional identity and continuous growth

This course supports the following North Carolina Professional Teaching Standards:

Standard 1: Teacher Leadership

1.01- Teachers lead in their classrooms.

Standard 2: Respectful Learning Environments

2.03- Teachers treat students as individuals.

Standard 3: Content and Curriculum Expertise

3.01- Teachers align their instruction with the NC Standard Course of Study.

3.02- Teachers know the content appropriate to their teaching specialty.

3.03- Teachers recognize the interconnectedness of content areas/disciplines.

3.04- Teachers make instruction relevant to students.

Standard 4: Student Learning

4.01- Teachers know the ways in which learning takes place, and they know appropriate levels of intellectual, social, and emotional development of their students.

4.02- Teachers plan instruction appropriate for their students.

4.03- Teachers use a variety of instructional methods.

4.04- Teachers integrate and utilize technology in their instruction.

4.05- Teachers help students develop critical thinking and problem-solving skills.

4.05- Teachers help students work in teams and develop leadership qualities.

Standard 5: Reflection

5.01- Teachers analyze student learning.

5.02- Teachers link professional growth to their professional goals.

5.03- Teachers function effectively in a complex, dynamic environment.

COURSE OBJECTIVES

Upon successful completion of the course, the candidate will:

1. Write about essential components of a unit on a STEM topic. (Conceptual Framework K1, K2, K3, K4, K6, E1, E2, E3, E4, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
2. Critically evaluate readings about STEM issues and instruction in STEM education. (Conceptual Framework K1, K2, K3, K6, E1, E2, E3, E4, C1, C2, C3, C5, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
3. Synthesize knowledge from previous courses in the outline and design of a curricula unit. (Conceptual Framework K1, K2, K3, K6, E1, E2, E3, E4, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
4. Design a five to seven lesson unit that allows elementary school learners to examine and learn about STEM issues. (Conceptual Framework K1, K2, K3, K4, K5, K6, E1, E2, E3, E4, E5, E6, E7, C1, C3, C6; NCPTS 3.01, 3.02, 3.03, 3.04, 4.01)
5. Evaluate and modify the curricula after teaching it to elementary school learners. (Conceptual Framework K1, K2, K3, K4, K5, K6, E1, E2, E3, E4, C1, C3, C6; NCPTS 1.01, 2.03, 3.01, 3.02, 3.03, 3.04, 4.01)
6. Design a professional development workshop to disseminate their curricula to colleagues in their school and/or school district. (Conceptual Framework K1, K2, K3, K5, K6, E1, E2, E3, E4, C1, C3, C6; NCPTS 1.01, 2.03, 3.01, 3.02, 3.03, 3.04, 4.01)

INSTRUCTIONAL METHODS

- This is a 100% online course. Some sections of this course may be offered asynchronously (no online class meetings), while some sections of this course may be offered synchronously (pre-scheduled online course meetings).

COURSE CONTENT

Modules will be focused on the following essential questions:

- What are real-world STEM topics that should be explored by elementary school learners?
- What are effective research-based pedagogies that should be incorporated into a STEM curricula unit?
- How can a unit incorporate digital learning, research-based pedagogies, and also the real-world content of STEM issues?
- How can I sequentially map out a cohesive set of lessons for elementary school learners to explore a STEM concept?
- How do I use data to modify a STEM curriculum unit?
- What are the essential components of a STEM curriculum unit that teachers should engage in during professional development?
- What types of supports should I give teachers to support their implementation of a previously-designed STEM curricula unit?

ILLUSTRATIVE COURSE ACTIVITIES

- Reading and critically examining selected articles
- Interactive online discussions with instructor and classmates
- Examination of STEM curricula resources
- Analysis and alignment of related content standards for elementary school learners

- Designing and teaching a STEM curricula unit to elementary school learners
- Developing professional development workshops for teachers to support their use of a curricula unit

ILLUSTRATIVE METHODS FOR EVALUATING CANDIDATE PERFORMANCE

Weekly course work: 30%

Projects (2): 70% total

Project 2: Curricula unit (40%). Candidates will develop, teach, and modify a five-lesson curricula unit focused on allowing elementary school learners to examine a real-world concept. (SLO 1, 2, 3, 4, and 5).

Project 3: Professional development project (30%). Candidates will design a professional development project focused on supporting teachers' implementation of the curricula unit that candidates designed. (SLO 4, 5, and 6).

GRADING SCALE

A: 90-100%, B: 80-89.9%, C: 70-79.9%, U: Below 70%

AN ILLUSTRATIVE CURRENT BIBLIOGRAPHY

Course readings will be selected by the instructor.

Possible readings:

Vasquez, J., Comer, M., Sneider, C. (2013). STEM lesson essentials, Grades 3-8: Integrating science, technology, engineering, and mathematics. New York: Heinemann.

Articles will also be selected from journals such as the Journal of STEM Education, the Interdisciplinary Journal of Problem-Based Learning, Educational Researcher, and other internationally-known journals. All journals are available through UNC Charlotte.

SPECIFIC POLICIES THAT APPLY TO THE COURSE

- Attendance and Student Behavior Policy: As this is an online course, your course participation includes, but is not limited to completing course assignments on time, participating in collaborative activities, responding to classmates' discussion board posts.
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- College of Education Commitment to Diversity.
http://education.uncc.edu/coe/diversity_statement.htm
- College of Education Technology Statement: <http://education.uncc.edu/faculty-resources/faculty-handbook/college-education-technology-statement>
- UNC Charlotte Religious Accommodations: <https://legal.uncc.edu/policies/up-409>

- UNC Charlotte Disability Accommodations:
<https://diversity.uncc.edu/sites/diversity.uncc.edu/files/media/CampusDiversityPlan.pdf>
- Online Student Course Evaluation Process and Confidentiality: Course evaluations are anonymous and confidential. It is expected that students will complete the course evaluation at the end of the semester.
- Other policies relevant to the course. See <http://legal.uncc.edu/syllabus.html>

ATTACHMENTS

- None

NOTE: If both graduate and undergraduate versions of this course are to be offered, submit proposals to both the Undergraduate Course and Curriculum Committee and to the Graduate Council.

APPROVAL FOR NEW COURSES
OR SUBSTANTIALLY REVISED COURSES

Faculty Responsible for Developing This Course Outline

Drew Polly, Michael Putman, Ian Binns

**APPROVAL BY THE APPROPRIATE COLLEGE OF EDUCATION
CURRICULUM COMMITTEE:**

Approved on _____ by the College Graduate Curriculum Committee
Date

Chair: _____

Attachment – Proposed Catalog Copy

MASTER OF EDUCATION (M.ED.) IN ELEMENTARY EDUCATION

Description of Program

The M.Ed. in Elementary Education is designed for experienced teachers who wish to become instructional leaders, advanced practitioners, and global educators. Upon completion of the program, students will qualify for the North Carolina advanced Standard Professional II teaching license in Elementary Education.

1) Instructional Leader

This degree program enables graduates to develop leadership skills as well as specialized content knowledge to effectively impact elementary education. Graduates of this program will also be advocates for students' cultural and academic needs as well as advocates for effective and relevant educational practices and policies.

2) Advanced Practitioners

Completion of this degree program will enable graduates to acquire deep theoretical and content knowledge to become advanced practitioners in specific emphasis areas. Graduates will have the capacity to facilitate student learning through inquiry-based practices. Graduates will also possess knowledge and practice that will prepare them to enter Ph.D. programs throughout the country and world.

3) Global Educators

Graduates of this degree program will contribute to a rigorous and critical analysis of learning in their classroom, the school, and global society. The program enables graduates to promote an educational milieu that values culture, reflective practice, and multiple worldviews.

Program Goals

- Master teachers are self-directed and ethical in their personal and professional growth as educators.
- Master teachers are responsive to children's differences as influenced by development, exceptionalities, and diversity.
- Master teachers are well-grounded in the technology, content, and pedagogy of the elementary curriculum and emphasis area.
- Master teachers are effective in urban, rural, and suburban cultural contexts
- Master teachers are self-reflective, educational advocates, and educational researchers.
- Master teachers are collaborative and impactful educational leaders.
Master teachers are globally aware of the impact of local education.

General Requirements for Admission to the Graduate School

Please refer to the information found in The Graduate School section of this *Catalog*.

Additional Admission Requirements

- 1) Official transcripts of all previous academic work beyond high school with a minimum undergraduate GPA of 2.75
- 2) Completion of a Bachelors in Elementary Education from an approved program
- 3) Official reports of GRE or MAT examination
- 4) An essay describing statement of purpose for undertaking graduate study
- 5) Apply online: graduateschool.uncc.edu

Degree Requirements

The M.Ed. in Elementary Education is a 33-hour program. The Programs of Study include 18 hours of required courses and 11-15 hours of courses from one of the following concentrations: Academically or Intellectually Gifted, Elementary Mathematics, Instructional Systems Technology, [Literacy](#), Science Technology Engineering and Mathematics Education (STEM), Special Education, and Teaching English to Second Language Learners.

Core Courses (18 hours)

Phase I. Developing Perspectives (9 hours)

ELED 6200 Current Issues in Global and Urban Elementary Schools (3)
 ELED 6201 Theories of Human Development and Learning in Cultural Contexts (3)
 ELED 6202 Classroom Management and Leadership for Diverse Learners (3)

Phase II. Collaborative Inquiry (6 hours)

ELED 6203 Instructional Differentiation for 21st Century Learners (3)
 RSCH 6101 Research Methods (3)

Phase III. Investigative Leadership (3 hours)

ELED 6303 Teacher Inquiry and Data Analysis in the Elementary Classroom (3)

Concentrations (11-15 hours)

Academically or Intellectually Gifted*

SPED 5211 Nature and Needs of Gifted Students (3)
 SPED 6124 Methods of Instructing Gifted Students (3)
 SPED 6161 Social and Emotional Needs of Gifted Students (3)
 SPED 6224 Adapting Curriculum Material and Classroom Differentiation (3)

Elementary Mathematics*

ELED 6311 Number Systems and Operations: K-5 Mathematical Tasks (3)
 ELED 6312 Geometry and Spatial Visualization: K-5 Assessment (3)
 ELED 6313 Algebraic Reasoning: K-5 Discourse and Questioning (3)
 ELED 6314 Rational Numbers and Operations: K-5 Learning Trajectories (3)
 ELED 6315 Data Analysis and Measurement: K-5 Classroom Interactions (3)

Note: ELED 6316 (Mathematical Modeling: K-5 Leadership) must also be completed in order to earn the North Carolina Add-On License

Instructional Systems Technology (Technology Integration)*

EIST 6101 The Adult Learner (3)
 EIST 6100 Readings in EIST (3)
 EIST 6110 Instructional Design (3)
 EIST 6135 Learning, Media, Resources, & Technology (3)

Literacy

READ 6100 Current Issues and Practices in Literacy Education (3)
 READ 6252 K-12 Writing Development and Instruction (3)
 READ 6265 Multi-literacies in a Global World: Reading and Writing Texts in New Times (3)
 READ 6250 Emergent and Elementary Literacy (3)
 READ 6204 Teaching Reading to English Language Learners (3)

NOTE: PENDING APPROVAL

Special Education

EDUC 6254 Individualizing Instruction for Diverse Learners (3)
 SPED 6502 Advanced Classroom Management (3)
 SPED 6503 Instructional Design in Special Education (3)
 SPED 6690 Consultation and Collaboration (2)

Teaching English as a Second Language*

ENGL 6161 Introduction to Linguistics (3)
 TESL 5104 Authentic Assessment (3)
 TESL/FLED 5130 Second Language Methods (3)
 TESL 6205 Second Language Acquisition in K-12 Settings (3)

Science, Technology, Engineering, and Mathematics (STEM)

ELED 6210: Current Issues in STEM Education (3)
 ELED 6211: Integrating Engineering into the Elementary School Curriculum (3)

ELED 6212: Integrating Digital Learning and STEM with Elementary School Learners (3)

ELED 6213: Global Awareness in STEM Education (3)

ELED 6214: Designing and Developing STEM Curricula (3)

Elective (3 hours)

Elective may include any non-required course selected from a variety of course offerings designed to support concentration, additional research courses, and advanced knowledge in specific content.

**This concentration leads to the North Carolina Licensure if the student successfully completes all of the related licensure requirements.*

Admission to Candidacy

The Candidacy form supplied by the Graduate School must be received no later than the eighth instructional day of the semester in which completion of all degree requirements is expected.

Application for Degree

The Application for Degree/Graduation form supplied by the Graduate School must be received early in the last semester of your program.

Clinical Field Experiences

Students in the M.Ed. program participate in structured field experiences that require them to apply coursework in their classroom settings, analyze K-6 student learning, and reflect on their practice in the context of theories on teaching and learning. Students deepen their understanding of the knowledge, skills, and professional dispositions that foster student learning. These experiences broaden their ability to help all students learn, including children with exceptionalities and students from diverse ethnic/racial, linguistic, gender, and socioeconomic groups. These structured field experiences are designed to take place in multiple settings within the candidate's school community or districts, after-school programs, alternate youth centers, or in the schools and classrooms in which the candidates work.

Capstone Requirements

The capstone experience for the M.Ed. will be fulfilled by successfully completing the Teacher Inquiry Project in the ELED 6303 course.

Advising

All students are assigned an advisor upon formal admission to the program. Students are required to attend the advising seminar at the start of each semester.

Assistantships

The Program typically has a limited number of graduate assistantships with salaries starting at \$8,000/academic year. Applications are available from the Department of Reading and Elementary Education.

Licensure

The master's (M.Ed.) program in Elementary Education is a K-6 instructional degree that leads to the "M" level teaching license.

Research Opportunities/Experiences

Faculty members in the Department of Elementary Education faculty are deeply committed to research in urban schools. As a result, candidates will have opportunities to become involved in classroom-based research.

Financial Aid/Financial Assistance

Information is available from the Office of Teacher Education Advising, Licensure, and Recruitment (TEALR). See education.uncc.edu/TEALR for details. Additional information is available from the Office of Student Financial Aid at finaid.uncc.edu.

Program Approval

All teacher education programs at UNC Charlotte are accredited by the National Council for Accreditation of Teacher Education. The M.Ed. in Elementary Education is awaiting approval by North Carolina State Board of Education.

Course Catalog Descriptions

COURSES IN SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS

ELED 6210: Current Issues in STEM Education. (3). Examination of current issues related to Science, Technology, Engineering, and Mathematics (STEM) Education. Students will (3). This online 3-credit course requires approximately 8-9 hours each week for approximately 15 weeks. Out-of-class work may include but is not limited to: required reading, critical analysis of literature, research papers, and projects related to STEM issues related to elementary school learners. (*Fall*).

ELED 6211: Integrating Engineering into the Elementary School Curriculum. (3). An analysis of engineering concepts related to the science standards taught in Grades K-6 in North Carolina Public Schools. The Engineering is Elementary curriculum and other related resources will be examined in depth. Analysis of how science, technology, and mathematics can be integrated with engineering will be emphasized. (*Spring*).

ELED 6212: Integrating Digital Learning and STEM with Elementary School Learners. (3). Examination of digital learning (e.g., web-based tools, digital videos) to support the teaching of STEM education. Students will analyze a real-world problem, analyze digital learning tools, plan and implement a lesson around the real-world problem using digital learning tools. (*Fall*).

ELED 6213: Global Awareness in STEM Education. (3). Examination of global awareness, humanities and the environment in the context of STEM Education. Students will research, reflect on, and apply knowledge related to Earth and the environment in relationship to issues and trends related to STEM. (*Spring*).

ELED 6214: Designing and Developing STEM Curricula. (3). Analysis of critical components of designing, developing, and implementing a multi-lesson unit related to a real-world issue in STEM education. Candidates will design, teach, and assess the impact of STEM curricula that they develop. Candidates will also design professional development around the curricula they developed. (*Fall*).



UNC CHARLOTTE

Master of Education in Elementary Education
Department of Reading and Elementary Education
College of Education, UNC Charlotte

Name _____ ID _____

Phase I. Developing Perspectives.	
Requirements (9 hrs)	Planning & Documentation
ELED 6200: Current Issues in Global and Urban Elementary Schools (3) ELED 6201: Theories of Human Development and Learning in Cultural Contexts (3) ELED 6202 Classroom Management and Leadership for Diverse Learners (3)	<u>Sem/Yr?</u> <u>Compd.</u> <u>Grade</u> _____ _____ _____
Phase II. Collaborative Inquiry. Complete requirements of Phase II <i>before</i> Phase III.	
Requirements (6 hrs)	Planning & Documentation
RSCH 6101: Introduction to Educational Research (3) ELED 6203: Instructional Differentiation for 21st Century Learners (3)	<u>Sem/Yr?</u> <u>Compd.</u> <u>Grade</u> _____ _____
Phase III. Investigative Leadership. Complete requirements of Phases I and II <i>before</i> Phase III.	
Requirements (3 hrs)	Planning & Documentation
ELED 6303: Teacher Inquiry & Data Analysis in the Elementary Classroom (3)	<u>Sem/Yr?</u> <u>Compd.</u> <u>Grade</u> _____
Electives	
Requirements (3 hrs)	Planning & Documentation
Any non-required course in the Concentration can be taken as an elective, e.g. SPED 6241: Advanced Curriculum for Gifted Students (3). Note: Concentrations in Elementary Mathematics and Literacy require specific courses that fulfill the Elective requirement.	<u>Sem/Yr?</u> <u>Compd.</u> <u>Grade</u> _____

Concentrations		
Requirements (11-15 hrs)	Planning & Documentation	
Academically or Intellectually Gifted SPED 5211: Nature and Needs of Gifted Students (3) SPED 6124: Methods of Instructing Gifted Students (3) SPED 6161: Social and Emotional Needs of Gifted Students (3) SPED 6224: Adapting Curriculum Material and Classroom Differentiation (3)	<u>Sem/Yr?</u>	<u>Compd.</u> <u>Grade</u>
Education in Instructional Systems Technology EIST 6101: The Adult Learner (3) EIST 6100: Readings in EIST (3) EIST 6110: Instructional Design (3) EIST 6135: Learning, Media, Research and Technology (3)	<u>Sem/Yr?</u>	<u>Compd.</u> <u>Grade</u>
Special Education EDUC 6254: Individualizing Instruction for Diverse Learners (3) SPED 6503: Instructional Design in Special Education (3) SPED 6690: Consultation and Collaboration (3) SPED 6502: Advanced Classroom Management (3)	<u>Sem/Yr?</u>	<u>Compd.</u> <u>Grade</u>
Teaching English as Second Language ENGL 6161: Introduction to Linguistics (3) TESL 5103: Second Language Methods (3) TESL 6205: Second Language Acquisition in K-12 Schools (3) TESL 5104: Authentic Assessment (3)	<u>Sem/Yr?</u>	<u>Compd.</u> <u>Grade</u>
Literacy* READ 6100: Current Issues and Practices in Literacy Education (3) READ 6252: K-12 Writing Development and Instruction (3) READ 6265: Multi-literacies in a Global World: Reading and Writing Texts in New Times (3) READ 6250: Emergent and Elementary Literacy (3) READ 6204: Teaching Reading to English Language Learners (3)	<u>Sem/Yr?</u>	<u>Compd.</u> <u>Grade</u>
Elementary Mathematics ELED 6311: Number Systems & Operations: K-5 Mathematical Tasks (3) ELED 6312: Geometry & Spatial Visualization: K-5 Assessment (3) ELED 6313: Algebraic Reasoning: K-5 Discourse & Questioning (3) ELED 6314: Rational Numbers & Operations: K-5 Learning Trajectories (3) ELED 6315 Data Analysis and Measurement: K-5 Classroom Interactions (3)	<u>Sem/Yr?</u>	<u>Compd.</u> <u>Grade</u>

Science, Technology, Engineering, and Mathematics (STEM)	<u>Sem/Yr?</u>	<u>Compd.</u>	<u>Grade</u>
ELED 6210: Current Issues in STEM Education (3)			
ELED 6211: Integrating Engineering into the Elementary School Curriculum (3)			
ELED 6212: Integrating Digital Learning and STEM with Elementary School Learners (3)			
ELED 6213: Global Awareness in STEM Education (3)			
ELED 6214: Designing and Developing STEM Curricula (3)			

***NOTE: Literacy concentration is pending approval.**