Routing for On-Campus Approval of Graduate Degree Actions for New Degree Programs, New Certificate Programs, New Minor Programs, Change in Degree Program Title or Discontinuation of Existing Degree Programs

Type of Action: Enter "X" for Action Type(s) and list Title and Prefix(s) as indicated

_____ New Degree Program — Proposed Program Title _____

__X__ New Certificate Program — Proposed Certificate Program Title Postbaccalaureate Graduate Certificate in Mathematics (online track)

_____ New Minor Program — Proposed Minor Program Title _____

_____ Change in Degree Program Title — Current Degree Program Title _____

_____ Change in Certificate Program Title — Current Certificate Program Title _____

_____ Change in Minor Program Title — Current Minor Program Title _____

_____ Program Discontinuation

Routing of Action: Indicate by date when the following occurs

10/18/16 Dept Head *endorses* (signature required on action)

11/11/16 College Graduate Studies Committee *recommends* (signature required on action)

1/5/17 College Dean *endorses* and submits to Graduate School (signature required on action)

TAM 1/18/17 *Recommended* by Vice Provost, DELTA (if DE degree) (signature required on action)

_____ Administrative Board of the Graduate School *recommends*

_____ Graduate Operations Council *informed*

_____ University Planning and Analysis *informed* (Southern Associate of Colleges & Schools notified if necessary)

_____ Dean of the Graduate School *approves* (signature required on action)

_____ *Presented* to Vice Provosts

_____ Deans' Council *recommends*

_____ Provost *approves*

_____ *Recommended* by Chancellor's Executive Officer's (EOM)

_____ University Council *informed*

_____ Presented to Board of Trustees subcommittees (Academic & Personnel and Finance & Planning)

_____ Chancellor *approves*

_____ *Submitted* to UNC-General Administration by Graduate School

Notes:

This proposal is for the creation of a new on-line track of the existing Postbaccalaureate Graduate Certificate in Mathematics.

Postbaccalaureate Graduate Certificate in Mathematics

North Carolina State University

This request has been reviewed and approved by the appropriate campus committees and authorities.

Endorsed By:

Head, Department — Date: 10/18/16

Recommended By:

Chair, College Graduate Studies Committee — Date: 11/11/16

Endorsed By:

College Dean — Date: 1/5/17

Recommended By:

Vice Provost, DELTA (if DE degree) — Date: 1/18/17

Approved By:

Dean of the Graduate School — Date

Recommended By:

Dean's Council — Date

Approved By:

Provost — Date

Approved By:

Chancellor — Date

N. C. STATE UNIVERSITY

GRADUATE CERTIFICATE PROGRAM FORM

COLLEGE/DEPARTMENT/PROGRAM NAME:
College of Sciences
DEPARTMENT/PROGRAM NAME:
Mathematics
CERTIFICATE TITLE:
Postbaccalaureate Graduate Certificate in Mathematics

TYPE OF PROPOSAL:
New: ☒
Revision: ☐
Discontinuation: ☐

CIP DISCIPLINE#: 270101

CERTIFICATE TYPE: On-campus ☐ Distance ☐ On-campus & Distance ☒

PROPOSED OR CURRENT PROGRAM CODE: by Graduate School

PROPOSED EFFECTIVE DATE: August 2017 APPROVED EFFECTIVE DATE:

GRADUATE CATALOG DESCRIPTION
The Graduate Certificate in Mathematics provides students with graduate level academic credentials in Pure or Applied Mathematics. The program is aimed at satisfying broad needs in professional development and can be tailored to individual needs.

PROJECTED ENROLLMENT

On campus	Yr 1	5	Yr 2	5	Yr 3	5	Yr 4 5
Distance Education	Yr 1	15	Yr 2	30	Yr 3	40	Yr 4 50

PROGRAM COORDINATOR: Director of Graduate Program in Mathematics

Attachments:
☒ 1. Graduate Certificate Proposal
☒ 2. Statement on Other Departments Likely to be Affected and Summary of Consultations with those Departments

Proposal for an online track of the Postbaccalaureate Graduate Certificate in Mathematics

Program Justification

The Department of Mathematics at North Carolina State University wishes to establish an online track of the existing Graduate Certificate in Mathematics. This new track is aimed at individuals who desire to increase their knowledge and skills in Mathematics either for future job opportunities or in preparation for graduate studies. Students who complete the certificate will gain an in-depth knowledge of not only mathematical methods and concepts but also of how Mathematics plays a key role in current developments in the Sciences and technology.

The proposed new track will make it possible for students with job commitments to receive an advanced mathematical education; the resulting diversification and extension of the student pool is in agreement with NC State's land grant mission.

Program Objectives

1. The students will learn about current mathematical concepts and methods; they will acquire a graduate level working knowledge of at least one field of Mathematics among algebra, analysis, mathematical modeling and computational methods

2. The certificate program will provide an educational experience that satisfies the expectations of its graduates.

Graduate Catalog Description

The Graduate Certificate in Mathematics provides students with graduate level academic credentials in Pure and Applied Mathematics. The program is aimed at satisfying broad needs in professional development and can be tailored to individual needs.

Projected Enrollment

On campus	Yr 1 5	Yr 2 5	Yr 3 5	Yr 4 5
Distance Education	Yr 1 15	Yr 2 30	Yr 3 40	Yr 4 50

These projections are based on (i) repeated unsolicited questions and requests received by our graduate program and (ii) a promising market demand study conducted by EAB, under the auspices of DELTA, in Spring 16. The EAB market analysis identified a strong long term growth potential for the program. The program will be initially geared toward high school teachers and will progressively be expanded to other professionals as more online courses become available.

Admission Requirements

Applicants must meet one of the two following requirements:

- Be a graduate of a regionally accredited four-year college or university and have a GPA of at least 3.00 on a 4-point scale.
- Be a degree student in good standing in a NC State University graduate program.

Provisional Admission

Applicants who do not meet the GPA requirements may be admitted provisionally based on relevant work experience and/or educational background. Students who are admitted provisionally must complete two of the courses required for the program with a grade of B or higher in each course in order obtain full admission.

Program of Study

Students take a combination of graduate and undergraduate mathematics courses that are tailored to the individual student. The certificate requires 12 hours of NC State mathematics courses, taken for a grade. There is no specific list of courses for the certificate. Of the 12 hours, 3 hours may be at the 400 level; the other 9 hours will be at the 500 level or above. The following classes are suggested; the status of completion of an online version is mentioned for each.

MA402 – Mathematics of Scientific Computing; being developed in S17
MA405 – Introduction to linear algebra; to be developed in Summer 17
MA501 – Advanced Mathematics for Engineers and Scientists, I; available
MA502 – Advanced Mathematics for Engineers and Scientists, II; to be developed in Summer 17
MA508 – Geometry for Secondary Teachers; being developed in S17
MA513 – Introduction to Complex Variables; to be developed in F17
MA523 – Linear Transformation and Matrix Theory; being developed in S17
MA580 – Numerical Analysis, I; available
MA591 – Fundamentals of Linear Algebra and Differential Equations; available

Academic Performance

1. Award of a Graduate Certificate requires a minimum overall GPA of 3.000. A minimum grade of C- is required for a course to be included in the certificate.
2. None of the required 12 hours may be taken for S/U or "credit only".
3. No transfer credits from other institutions are allowed for the certificate.
4. All students must be registered through NC State University.
5. All Graduate Certificate requirements must be completed within four (4) calendar years of the date the student begins the course work for the certificate.

Application and Completion Processes

1. An application for acceptance into a certificate program is required for all new applicants. The applicant must apply via the Graduate School application, found at http://www.ncsu.edu/grad/applygrad.htm.

2. Those applicants who are currently enrolled in an NC State graduate program need only provide the Graduate student Certificate Plan Data Entry form, found at http://www.ncsu.edu/grad/faculty-and-staff/docs/grad-cert-plan-data-entry.pdf.

3. New applications will be reviewed at the department/program level and new applicants will pay a $25 application fee.

Each semester, students should contact the Certificate Coordinator to determine registration procedures, course availability and registration dates. When all certificate coursework is satisfactorily completed, the Certificate Coordinator forwards appropriate information to the Director of Graduate Programs for Mathematics who then notifies the Graduate School.

Admission to other graduate programs

Academic success might have a strong bearing on admission to a degree program however completion of a certificate program in no way guarantees entry into a graduate degree program which is done through a separate application process.

Responsibility for Administration and Resources

This certificate program resides in the College of Sciences. It will be administered by the Director of Graduate Programs in the Mathematics Department in conjunction with the Certificate Coordinator. The certificate coordinator will:

- Make all admission decisions to the certificate program
- Notify the Dean of the Graduate School of the student's completion of certificate requirements
- Update program website and program listings as needed on University websites
- Coordinate scheduling of courses with the Dept. of Mathematics Course Coordinator
- Assess learning outcomes
- Function as liaison with academic departments/colleges

Existing resources will be used to support the administration of this program.

Program or Policy Changes for this Certificate
Changes in the graduate certificate and related policies will be determined by the faculty and channeled through the appropriate college committees. Changes will be reported to the Graduate School.

Outcomes Assessment Plan

Objectives

1. The students will learn about current mathematical concepts and methods; they will acquire a graduate level working knowledge of at least one field of Mathematics among algebra, analysis, mathematical modeling and computational methods.
2. The certificate program will provide an educational experience that satisfies the expectations of its graduates.

Objectives and Outcomes

1. By the time they complete this certificate program, graduates should be able to:

    - Identify and describe the major foundational principles and methods of one field of Mathematics.

    - Apply the concepts and methods learned during the completion of the certificate in their own professional activities.

    - Describe the role played by Mathematics in the Sciences and Technology through concrete examples.

2. At the time they complete this certificate program, graduates are expected to be:
    - Satisfied with the usefulness of the certificate program in enabling them to achieve their professional goals.
    - Satisfied with the appropriateness of the courses in providing the knowledge or training they anticipate needing for their professional goals.
    - Satisfied with the frequency and timeliness of courses offered for the certificate.
    - Satisfied with the quality of teaching in certificate courses.
    - Satisfied with the overall educational experience of the certificate program.
    - Sufficiently positive about the certificate program to recommend it to others with similar professional goals.

Objective 1:

Outcome	**Evidence to be Collected**	**Source of Evidence**	**Frequency of Collection**
Graduates should be able to identify and describe the major foundational principles and methods of one field of Mathematics	Final exams for corresponding courses	Student	At end of semester
Graduates should be able to apply the concepts and methods learned during the completion of the certificate in their own professional activities	Projects in corresponding courses	Student	At end of semester
Graduates should be able to describe the role played by Mathematics in the	Exit interview administered by the	Student	Upon certificate

Sciences and Technology through concrete examples.	Department of Mathematics		completion

Objective 2: The certificate program will provide an educational experience that satisfies the expectations of its graduates.

Outcome	Evidence to be Collected	Source of Evidence	Frequency of Collection
To be satisfied with the usefulness of the certificate program in enabling them to achieve their professional goals	Exit survey administered by Graduate School	Students	Upon certificate completion
To be sufficiently satisfied with the certificate program to recommend it to others with the same professional goals	Exit survey administered by Graduate School	Students	Upon certificate completion
To be satisfied with the appropriateness of the courses in providing the knowledge or training they anticipate needing for their professional goals	Exit survey administered by Graduate School	Students	Upon certificate completion
To be satisfied with the frequency and timeliness of courses offered for the certificate	Exit survey administered by Graduate School	Students	Upon certificate completion
To be satisfied with the quality of teaching in certificate courses	Exit survey administered by Graduate School	Students	Upon certificate completion
To be satisfied with the overall educational experience of the certificate program	Exit survey administered by Graduate School	Students	Upon certificate completion

Statement on Other Departments Likely to be Affected and Summary of Consultations with those Departments

No other departments or programs are likely to be affected by this proposed change.