

Routing # 11 68-69

Resolution #11 1968-1969

TO: PRESIDENT ALBERT W. BROWN

FROM: THE FACULTY SENATE

Meeting on March 10, 1969
(Date)

RE: ✓ I. Formal Resolution (Act of Determination)
 II. Recommendation (Urging the fitness of)
 III. Other (Notice, Request, Report, etc.)

SUBJECT: Master's Program in Mathematics.

Moved that the Senate approve the M. A. in Mathematics with the condition that the department's request for new staff is satisfied and additional library holdings request is granted.

Motion carried.

no copy of Prop. avail

Signed E. Lize H. Hall Date Sent 3/14/69
(For the Senate)

TO: THE FACULTY SENATE

FROM: PRESIDENT ALBERT W. BROWN

RE: I. DECISION AND ACTION TAKEN ON FORMAL RESOLUTION

- a. Accepted. Effective Date _____
- 0 b. Deferred for discussion with the Faculty Senate on _____
- c. Unacceptable for the reasons contained in the attached explanation

II, III. a. Received and acknowledged

b. Comment: *no copy of prop. avail*

Allen, Bowden, Ruckow, Weyling

DISTRIBUTION: Vice-Presidents: _____

Others as identified: *Allen, Bowden, Ruckow, Weyling*

4/17/69

Distribution Date: _____

Signed: Albert W. Brown
(President of the College)

Date Received by the Senate: _____

PROPOSAL

MASTER OF ARTS DEGREE IN MATHEMATICS

SUC at Brockport

February 23, 1969

INTRODUCTION

In recognition of the growing demand for people with training in higher mathematics, and feeling keenly its responsibility both to the University and to the community as a whole, the Mathematics Department of the College at Brockport wishes to offer the degree of Master of Arts in Mathematics.

OBJECTIVES

The primary objective of the Program is to augment the supply of professionally trained mathematicians. This training will consist, in part, of introducing the student to the fundamental mathematical disciplines beyond the undergraduate level in a program of study which is commensurate with the first year of doctoral study. But the goal is to produce not only the knowledgeable but the involved mathematician. Hence, the training and guidance will deal as well with the following:

1. the creation of genuine interest in mathematics for its own sake,
2. understanding of and appreciation for mathematical rigor,
3. connections that exist among the three major branches of mathematics as well as connections that exist between mathematics and the other sciences,
4. opportunities to learn how to locate and to read mathematical works so as to make continued self-improvement possible,
5. opportunities to read and to discuss (and to attempt, perhaps, improvement upon) current published results in mathematics,
6. opportunities to prepare and to present material not only to a sophisticated audience but also to an immature group,
7. the ability to distinguish, for example in a proof, the essential from the inessential, the computational machinery from the key,
8. knowledge of the history of mathematics with some feeling for the continuing change, the flow and movements, in mathematics,
9. opportunities to use the computer as a tool in mathematics so as to recognize firsthand its expanding role,
10. awareness of the mathematical community as a whole, its organizations, its advisory groups, its journals, its leaders.

ADMISSION REQUIREMENTS

- A. The requirements of the Office of Graduate Studies are:
1. completion of the baccalaureate degree at an accredited four-year institution,
 2. submission of the completed application form,
 3. submission of an official transcript of the applicant's undergraduate record,
 4. submission of the Graduate Record Examination score.
- B. The requirements of the Department of Mathematics are:
1. completion of the equivalent of an undergraduate major in mathematics with an average of B or better, (This usually means a minimum of 30 hours. Deficiencies, which shall be determined by the Departmental Graduate Committee, can be removed at Brockport for no credit.)
 2. achievement of a satisfactory score on the Graduate Record Examination including the advanced test in mathematics,
 3. submission of two letters of recommendation from individuals who can attest to the applicant's qualifications for graduate study.
- C. The decision on each application will be made by the Graduate Committee of the Department of Mathematics. Its recommendation to the Graduate Office will be based primarily on the level of success which can reasonably be predicted from the application.

REQUIREMENTS FOR THE MASTER'S DEGREE

The requirements for the degree of Master of Arts in Mathematics are as follows.

1. Thirty semester hours of course work must be completed. (A maximum of six hours may be allowed as transfer credit by the Graduate Committee.) An average grade of B must be earned for all courses taken. Each student will take at least the following:

Real Analysis (MTH 551 and 552)	6 hrs
Abstract Algebra (MTH 521 and 522)	6 hrs
Complex Analysis (MTH 553)	3 hrs
Topology (MTH 554)	3 hrs
Seminar (MTH 591)	<u>3 hrs</u>
	21 hrs

Electives (by advisement)	<u>9 hrs</u>
Total	30 hrs

2. A reading knowledge of one foreign language, usually French, German or Russian, must be demonstrated to the Department of Foreign Languages in consultation with the Mathematics Department. The choice of any other language must be approved by the Departmental Graduate Committee.
3. A written (and/or oral) comprehensive examination in mathematics must be passed. The student is expected to demonstrate his ability to integrate the knowledge that he has acquired in different courses.
4. Each student must be enrolled as a full-time student (12 hrs.) for one regular semester (not summer). A graduate assistant can fulfill this requirement by enrolling for 6 hours in each of two consecutive regular semesters.
5. All requirements must be met within four years of the date of admission to degree candidacy but not more than six years from the date of initiation of the graduate program. (A student shall achieve the status of degree candidate by the completion of 6 hours of 500 level courses in mathematics on the Brockport Campus with the grades of A or B.)

THE DEPARTMENTAL GRADUATE COMMITTEE

The initial Departmental Graduate Committee will be appointed by the Chairman of the Mathematics Department. In the future, the committee will be elected by the Graduate Faculty of the Department. The duties of the Departmental Graduate Committee include:

1. accepting or rejecting applicants to the program and making suitable recommendations to the Graduate Office,
2. administering the Comprehensive Examination and making the final pass-fail decision,
3. advising the Chairman of the Mathematics Department on the selection of graduate assistants,
4. determining the date as of which a student is a degree candidate,
5. assigning an academic advisor to each student,
6. making decisions on matters affecting the graduate curriculum.

STUDENT ADVISEMENT

An orientation meeting for the new graduate students will be conducted by the Graduate Committee during the first week of each regular semester in which there is at least one new graduate student. At this time the program will be explained fully, advisors will be assigned and questions will be answered.

At an appropriate later time, information sheets describing the general area of responsibility and format of the Comprehensive Examination will be distributed to the students by the Departmental Graduate Committee.

Specific matters of advisement will be handled by the assigned advisor who will be a graduate faculty member. He will assist the student in organizing a program of study and will review his academic progress periodically.

An effort will be made to keep the student fully apprised of all matters affecting him although the final responsibility for fulfilling requirements rests with the student.

GRADUATE FACULTY MEMBERS

Mou-ta Chen, Ed.D., *Geometry and Linear Algebra*

Robert E. Hall, Ph.D. in Math expected 6/69,
Algebra and Semigroups

Aziz T. Ibrahim, M.S., *Differential Equations and History of
Mathematics*

Richard T. J. Mahoney, Ph.D. *Algebra and Group Theory*

Theron Rockhill, Ed.D. in Math Ed. expected 6/69,
Linear Algebra

Edward O. Stephany, Ph.D., *Probability and Statistics*

Richard A. Stroud, Jr., M.A., *Categorical Algebra*

Carol E. Wolf, Ph.D., *Symbolic Logic, Foundations of Math and
Recursive Function Theory*

Richard J. Peeis, M.A., *Computer Science*

Norman V. Plyter, M.S., *Computer Science*

There will be at least one additional new staff member, holding the Ph.D. degree, joining the Department in September, 1969.

Mr. Norman V. Plyter and Mr. Richard J. Peeis of the Department of Computer Science are presently developing new courses, some of which will be appropriate for inclusion in the Program.

VITAE OF GRADUATE FACULTY MEMBERS

Name: Mou-ta Chen (Professor of Mathematics)

Education:

<u>College</u>	<u>Degree</u>	<u>Major</u>	<u>Year</u>
Chengchi University, China	B.A.	Political Science	1945
Pacific University	M.A.	Education	1950
University of Wyoming	Ed.D.	Education	1952
New York University	M.S.	Mathematics	1966

Field of special interest: Linear Algebra, Geometry

Teaching experience:

1952-60	LeMoyn College	Memphis, Tenn.	Assoc. Prof. & Prof. of Ed.
1952-60	Tennessee State Univ.		Instructor
1961-	SUC at Brockport		Professor

Scientific and professional societies:

Mathematical Association of America
Phi Delta Kappa

Other pertinent data:

N.S.F. Science Faculty Fellow in the Department of Mathematics of SUNY at Buffalo, 1967-68.

Graduate study includes 75 semester hours in mathematics.

Name: Robert E. Hall (Assistant Professor in Mathematics, effective 6/69)

Education:

<u>College</u>	<u>Degree</u>	<u>Major</u>	<u>Year</u>
Slippery Rock State College	B.S. (Magna cum laude)	Math. Educ.	1964
Pennsylvania State University	M.A.	Mathematics	1966
Pennsylvania State University	[Ph.D. in Math expected 6/69]		

Field of special interest: Algebra and Semigroups

Teaching experience:

1964-69 Pennsylvania State University Teaching Ass't

Scientific and professional societies:

American Mathematical Society

Other pertinent data:

Received a National Science Foundation Fellowship for Summer Term, 1967 at Pennsylvania State University.

Name: Aziz T. Ibrahim (Associate Professor in Mathematics)

Education:

<u>College</u>	<u>Degree</u>	<u>Major</u>	<u>Year</u>
Ein Shams Univ., Cairo, Egypt	B.Sc. (Hons)	Mathematics	1953
Alexandria Institute of Psych., Alexandria, Egypt	M.A.	Educ. Psych.	1954
Ohio State University	M.S.	Mathematics	1962
Ohio State University (Courses for Ph.D. completed)		Math. Educ.	1962-65
SUNY at Buffalo		Math. Educ.	1966-

Field of special interest: Differential equations, History of Math.

Teaching experience:

1954-60	Alexandria Secondary School	Alexandria, Egypt	Secondary Teacher Math
1962-65	Ohio State Univ.		Instructor
1965-	SUC at Brockport		Assoc. Prof.

Scientific and professional societies:

Association of Mathematics Teachers of New York State
Mathematical Association of America
National Council of Teachers of Mathematics

Other pertinent data:

Presently completing doctoral degree at SUNY at Buffalo.

Graduate study includes approximately 90 semester hours in mathematics.

Name: Richard T. J. Mahoney (Assistant Professor in Mathematics)

Education:

<u>College</u>	<u>Degree</u>	<u>Major</u>	<u>Year</u>
Univ. of Buffalo	B.S.	Mathematics	1956
Univ. of Buffalo	M.A.	Mathematics	1958
Washington Univ. (St. Louis)	Ph.D.	Mathematics	1963

Field of special interest: Algebra, Group Theory

Teaching experience:

1955-57	Univ. of Buffalo	Teaching fellow
1957-58	U.S. Naval Academy	Ass't. Prof.
1958-63	Washington Univ.	Instructor
1963-68	Syracuse Univ.	Ass't. Prof.
1968-	SUC at Brockport	Ass't. Prof.

Scientific and professional societies:

Mathematical Association of America
American Mathematical Society
Pi Mu Epsilon

Other pertinent data:

Served as Master's Examination Chairman, Syracuse Univ., Fall, 1966 and very familiar with the master's program there.

Organized and conducted New Math Workshops for Parents in Syracuse during the fall of 1965 as a community service for 250 parents.

Now directing a Syracuse Univ. student in her Ph.D. program in College Teaching.

Name: Theron Rockhill (Assistant Professor in Mathematics)

Education:

<u>College</u>	<u>Degree</u>	<u>Major</u>	<u>Year</u>
Houghton College	B.A.	Mathematics	1959
Syracuse University	M.S.	Mathematics	1962
SUNY at Buffalo	[Ed.D. degree in Math Ed. expected 6/69]		

Field of special interest: Linear Algebra

Teaching experience:

1959-61	Newfield Central School	High School Math
1962-	SUC at Brockport	Ass't. Prof.

Scientific and professional societies:

Mathematical Association of America
National Council of Teachers of Mathematics
Association of Mathematics Teachers of New York State
Phi Delta Kappa

Other pertinent data:

Awarded a National Science Foundation Science Faculty Fellowship, 1966
Graduate study includes approximately 70 semester hours in mathematics.

Name: Edward O. Stephany (Mathematics Department Chairman)

Education:

<u>College</u>	<u>Degree</u>	<u>Major</u>	<u>Year</u>
Univ. of Rochester	A.B.	Mathematics	1937
Univ. of Rochester	A.M.	Mathematics	1938
Cornell University		Mathematics	1938-41
Syracuse University	Ph.D.	Statistics	1956

Field of special interest: Probability and Statistics

Teaching experience:

1938-41	Cornell Univ.	Instructor	
1945-47	Rochester Public Schools	High School	Math
1947-	SUC at Brockport		

Scientific and professional societies:

American Mathematical Society
Mathematical Association of America
National Council of Teachers of Mathematics
Association of Mathematics Teachers of New York State
American Association for the Advancement of Science

Other pertinent data:

Phi Beta Kappa
Phi Delta Kappa

Name: Richard A. Stroud, Jr. (Instructor in Mathematics)

Education:

<u>College</u>	<u>Degree</u>	<u>Major</u>	<u>Year</u>
Trinity College	B.A.	Mathematics	1961
Yale University	M.A.	Mathematics	1963

Field of special interest: Categorical Algebra

Teaching experience:

1962-63	Yale & Univ. of Rochester (63-67)	Teaching Ass't.
1965-67	Univ. of Rochester	Evening Session Lecturer
1967-	SUC at Brockport	Instructor

Scientific and professional societies:

American Mathematical Society
Mathematical Association of America

Other pertinent data:

Currently on leave, completing Ph.D. in Math at University of Rochester

Name: Carol E. Wolf (Assistant Professor in Mathematics)

Education:

<u>College</u>	<u>Degree</u>	<u>Major</u>	<u>Year</u>
Swarthmore	B.A.	Mathematics	1958
Cornell University	M.A.	Mathematics	1962
Cornell University	Ph.D.	Mathematics	1964

Field of special interest: Symbolic Logic and Foundations of Math;
Recursive Function Theory

Teaching experience:

1958-64	Cornell	Teaching and Research Ass't.
1965-66	Univ. of Illinois	Instructor.
1968-	SUC at Brockport	Ass't Prof.

Scientific and professional societies:

Association for Symbolic Logic
American Mathematical Society

- MTH 451, 452 Advanced Calculus I, II
A study of continuous functions, functions of several variables, implicit functions, transformations and mappings, line and surface integrals, improper integrals, power series, and uniform convergence.
Prerequisite: MTH 203 (Calculus III) 3, 3 semester hours
Ibrahim, Rockhill
- MTH 454 Topology
Introduction to the basic notions of topology: topological spaces, continuous functions, compactness, connectivity and separation.
Prerequisite: MTH 451 or MTH 457 3 semester hours
R. Stroud, Wolf
- MTH 455 Differential Equations
Includes ordinary differential equations with applications to problems of engineering, physics, and chemistry.
Prerequisite: MTH 203 (Calculus III) 3 semester hours
Ibrahim, R. Stroud
- MTH 456 Complex Variables
This course is to serve as an introduction to the more advanced Complex Analysis. Much attention is given to concrete examples and to computational skills. Topics dealt with include: the complex plane, analytic functions, the elementary functions and their geometries, line integrals, Cauchy's Theorem, Cauchy's Formula, power series, residues and poles with applications to the summing of real series and real integrals, conformal mappings.
Prerequisite: MTH 451 or MTH 457 3 semester hours
Ibrahim, Mahoney
- MTH 457, 458 Introduction to Real Analysis
A study of sequences, Euclidean spaces, Bolzano-Weierstrass and Heine-Borel Theorems, continuity, Riemann-Stieltjes integral, series of functions and power series.
Prerequisite: MTH 203 (Calculus III) 3, 3 semester hours
Rockhill, Mahoney
- MTH 517 Mathematical Logic
A study of informal logic, predicate calculus, and first order theories.
Prerequisite: MTH 202 (Calculus II) 3 semester hours
Wolf
- MTH 521 Abstract Algebra I
An axiomatic development of groups, rings and modules (including vector spaces) is given. Topics covered include: the Sylow Theorems, Euclidean rings, the Fundamental Theorem on finitely generated modules. The central concept of homomorphism is used throughout. The course is meant to be self-contained although a certain mathematical maturity is assumed.
Prerequisite: MTH 323 (Modern Algebra) 3 semester hours
Mahoney, Hall

LIBRARY

As of April 1, 1968, the collection of Drake Memorial Library at State University College at Brockport numbered approximately 154,000 volumes. It also holds over 550,000 microform units and currently subscribes to 1,600 periodical titles. The Library presently has an annual book budget of \$134,000 and is adding approximately 30,000 volumes per year.

A new library is in the planning process to be ready for occupancy early in 1972. It is assigned to hold 500,000 volumes and seat 2,100 students.

As of November 25, 1968, Drake Memorial Library had 2,098 books in mathematics on the shelf and 752 books on order. The titles cover the full range of scholarly activity in mathematics from Euclid to the frontiers of today. Special emphasis has recently been placed upon acquiring major titles in German and French.

Research and expository periodicals currently received by Drake Memorial Library are listed below.

American Journal of Mathematics
American Mathematical Monthly
American Mathematical Society Bulletin
American Mathematical Society Proceedings
American Mathematical Society Transactions
Annals of Mathematics
Arithmetic Teacher
Canadian Journal of Mathematics
Duke Mathematical Journal
Illinois Journal of Mathematics
Journal D'Analyse Mathématique
Journal of Symbolic Logic
London Mathematics Society Journal
Mathematical Gazette
Mathematical Reviews
Mathematics Magazine
The Mathematics Teacher
Michigan Mathematical Journal
Notre Dame Journal of Formal Logic
Pacific Journal of Mathematics
Philosophia Mathematica
Scripta Mathematica
S.I.A.M. Journal on Numerical Analysis
S.I.A.M. Review

In addition, the Mathematics Department has requested that the following thirty-three periodicals be ordered:

ACTA Mathematica (Hungary)
ACTA Mathematica (Sweden)
Advances in Mathematics
American Statistician

American Statistical Association Journal
American Mathematical Society Memoirs
American Mathematical Society Notices
Annals of Mathematical Statistics
Canadian Mathematics Bulletin
Chinese Mathematics - ACTA
Comptes Rendus
Fundamenta Mathematicae
Indagationes Mathematicae
Israel Mathematical Journal
Journal de Mathematique Pure et Appliquees
Journal of Algebra
Journal of Combinatorial Theory
Journal of Differential Equations
Journal of Mathematics and Mechanics
Kyoto University Journal of Mathematics
Mathematical Systems Theory
Mathematical Society of Japan Journal
Mathematische Annalen
Mathematische Zeitschrift
Osaka Mathematical Journal
Quarterly Journal of Mathematics
Royal Society Proceedings Series A
Russian Mathematical Surveys
S.I.A.M. Journal
S.I.A.M. Journal on Applied Mathematics
Soviet Mathematics - Doklady
Topology
Zentralblatt Fur Mathematik und Ihre Grenzgebiete

SYLLABI OF GRADUATE COURSES

Title: MTH 517 Mathematical Logic

Outline: I. Informal Logic: Translation into symbolic logic, informal set theory, truth tables, use of quantifiers, rules for proofs by natural inference

II. Predicate Calculus:

A. Propositional Calculus: Formulation, deduction theorem, completeness theorem (tautology theorem)

B. Full Predicate Calculus: Formulation, equivalence theorem, normal forms, equality

III. First Order Theories: Model theory, Gödel's completeness theorem (Henkin's proof), number theory, recursive functions (definition from Turing machines), Gödel's incompleteness theorem

Possible Text: Margaris, A., First Order Mathematical Logic, Blaisdell

COURSE SYLLABUS

- Title: MTH 521 and MTH 522 Abstract Algebra I and II
- Outline:
- I. Set Theory: sets, mappings, relations, equivalence relations, the integers
 - II. Group Theory: normal subgroups and quotient groups, the isomorphism theorems, Sylow Theory, permutation groups, direct products
 - III. Ring Theory: ideals and quotient rings, Euclidean rings, chain conditions, the Jacobson radical
 - IV. Vector Spaces: linear independence, bases, dual space, linear transformations
 - V. Modules: submodules, quotient modules, finitely generated modules over a Euclidean ring, Abelian groups
 - VI. Linear Transformations: determinants, eigenvectors and eigenvalues, the Jordan Canonical form, the Rational Canonical form, quadratic forms
 - VII. Field Theory: finite fields, extension fields, Galois Theory
- Possible Text: Herstein, I.N., Topics in Algebra, Blaisdell

COURSE SYLLABUS

Title: MTH 533 Projective Geometry

Outline:

- I. Transformations and Invariance
- II. Projective Spaces
- III. Cross Ratios
- IV. Projective Coordinatizations
- V. The Principle of Duality
- VI. Triangles, Quadrangles, and Quadrilaterals
- VII. Projectivities and Perspectivities
- VIII. Collineations
- IX. Polarities
- X. Conics
- XI. Quadratic Forms

Possible Text: Levy, H., Projective and Related Geometries,
Macmillan

COURSE SYLLABUS

Title: MTH 535 Differential Geometry

Outline:

- I. Manifolds
- II. Differentiable Structures
- III. Tensor Algebra
- IV. Lie Groups
- V. Frame Bundles
- VI. Differential Invariants of Surfaces and Curves
- VII. Local and Global Study of Surfaces
- VIII. Integration of Forms
- IX. Gauss-Bonnet Theorem

Possible Text: Auslander, L., Differential Geometry, Harper and Row

COURSE SYLLABUS

Title: MTH 541 Mathematical Statistics

Outline:

- I. Probability Review
- II. Frequency functions
 - A. Discrete
 - B. Continuous
- III. Statistical Methods
- IV. Frequency Distributions of One Variable
 - A. Empirical
 - B. Theoretical
 - 1. Discrete variable
 - 2. Continuous variable
- V. Sampling Theory for One Variable
- VI. Bivariate Distributions

Possible Text: Hoel, P., Introduction to Mathematical Statistics,
Wiley

COURSE SYLLABUS

Title: MTH 551, MTH 552 Real Analysis

Outline:

- I. Set Theory
- II. Real Number System
- III. Lebesgue Measure
- IV. The Lebesgue Integral
- V. Differentiation and Integration
- VI. L^p Spaces, Hölder and Minkowski Inequalities
- VII. Metric Spaces
- VIII. Banach Spaces
- IX. General Measure and Integrations Theory

Possible Text: Royden, H. L., Real Analysis, Macmillan

COURSE SYLLABUS

- Title: MTH 553 Complex Analysis
- Outline:
- I. Complex Numbers: arithmetic, geometry, linear transformations
 - II. Complex Functions: elementary functions, topological concepts, analytic functions, conformal mappings
 - III. Complex Integration: line integrals, Cauchy's Theorem, Cauchy's Integral Formula
 - IV. Meromorphic Functions: zeros and poles, the Maximum Principle, the Argument Principle, the calculus of residues
 - V. Power Series: radius of convergence, Taylor series, Laurent series
- Possible Text: Ahlfors, L.V., Complex Analysis, McGraw-Hill

COURSE SYLLABUS

Title: MTH 554 Point Set Topology

Outline:

- I. Axiom of Choice, Zorn's Lemma and the Well-Ordering Principle
- II. Topological Spaces
- III. Separation Axioms
- IV. Connectedness
- V. Product and Quotient Topologies
- VI. Imbeddings and Metrizations
- VII. Compactness, Local Compactness and Compactification
- VIII. Uniform Topology
- IX. Complete Spaces

Possible Text: Kelley, J.L., General Topology, Van Nostrand

COURSE SYLLABUS

Title: MTH 591 Mathematics Seminar

Each class will meet three times per week and be limited to, roughly, ten students. Although the specific activity of each seminar group will be determined by the professor in charge, the objective of each seminar will be the same: it is to give each student a chance to work as a mathematician.

He will be given the responsibility of locating an assigned current paper in the library, working it through and presenting it in clear, lecture form to the rest of the group. He will be encouraged to involve himself with the topic. That is, to find related papers in the library, to attempt improvement of some of the latest results and in consultation with his professor, to submit for publication any significant improvements.