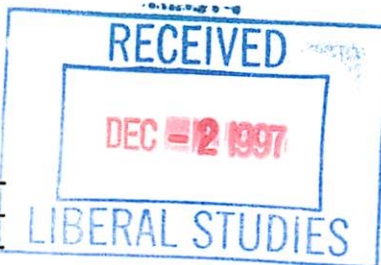


LSC Use Only
Number: _____
Submission Date: _____
Action-Date: _____



UWUCC USE Only
Number: 91-35e
Submission Date: App. 12/16/97
Action-Date: Snakeapp. 2/3/98

CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. CONTACT

Contact Person Gerald Buriok Phone 2608
Department Mathematics

II. PROPOSAL TYPE (Check All Appropriate Lines)

☒ COURSE MA 124 Calc II Phys/Chem
Suggested 20 character title
☐ New Course* _____
Course Number and Full Title
☐ Course Revision _____
Course Number and Full Title
☐ Liberal Studies Approval + _____
for new or existing course Course Number and Full Title
☐ Course Deletion _____
Course Number and Full Title
☒ Number and/or Title Change MA 124 Calculus II for Physics and Chemistry
Old Number and/or Full Old Title
MA 124 Calculus II for Physics, Chemistry, and
New Number and/or Full New Title Mathematics
☐ Course or Catalog Description Change _____
Course Number and Full Title
☐ PROGRAM: ☐ Major ☐ Minor ☐ Track
☐ New Program* _____
Program Name
☐ Program Revision* _____
Program Name
☐ Program Deletion* _____
Program Name
☐ Title Change _____
Old Program Name
New Program Name

III. Approvals (signatures and date)

Gerald Buriok 9/14/97
Department Curriculum Committee

Gerald Buriok 9/14/97
Department Chair

John S. Edr 10/15/97
College Curriculum Committee

John S. Edr 10/15/97
College Dean

* Director of Liberal Studies (owner)

* Provost (where applicable)

Part II. Description of Curriculum Change

1. New syllabus of record - attached.
2. A summary of the proposed revisions.

The Mathematics Department currently offers three calculus sequences:

MA 121/122 Calculus for Natural, Social Science, and Business (4 sh. each)
MA 123/124 Calculus for Physics and Chemistry (4 sh. each)
MA 127/128/227 Calculus (4 sh. each).

Majors in Mathematics and Applied Mathematics have been required to take the three semester sequence MA 127/128/227, while majors in Secondary Mathematics Education have had the option of taking this three semester sequence or taking the two semester sequence MA 123/124. The faculty of the Mathematics Department have chosen to eliminate the MA 127/128/227 sequence and require majors in all three programs to complete MA 123/124 instead. We are proposing that the course titles be changed to:

MA 123 Calculus I for Physics, Chemistry, and Mathematics
MA 124 Calculus II for Physics, Chemistry, and Mathematics

3. The current course titles will no longer be appropriate. In addition to Physics and Chemistry majors, students in the three mathematics programs will be required to take MA 123/124. Proposed name change would reflect the change in clientele for the courses.
4. The old syllabus of record
5. Liberal Studies course approval form and checklist (if appropriate).
This is a name change only. Course content will not be affected.

Part III. Letters of Support

See letters accompanying MA 123 revision proposal.

I Catalog Description

MA 124	Calculus II for Physics, Chemistry and Mathematics	4 credits 4 lecture hours (4c-0l-4sh)
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Prerequisites: MA 123 or the equivalent.

The second of a two semester sequence for math and science majors. Topics include: techniques of integration, sequences and series, Taylor polynomials, calculus of functions of several variables, polar coordinates, multiple integrals.

II Course Objectives

1. Students will develop skills in applying a variety of techniques of integration.
2. Students will learn the concept of an infinite series and techniques to determine the convergence or divergence of a given series.
3. Students will learn the extension of the concepts of limit, derivative and integral into multidimensional vector spaces.
4. Students will learn alternate coordinate systems for multidimensional spaces.
5. Students will continue to develop skills in converting written applied problems into mathematical models and solving them using methods of differential and integral calculus.
6. Students will continue to develop skills in using technology appropriately as an aid to problem solving.

III Course Outline

Coverage: Chapters 9 through 15 with the some exceptions noted below. Chapter 10 material on polar coordinates will be incorporated into chapter 15 with polar integrals and chapter 12 material on vectors and parametric curves will be merged with chapter 13 as noted.

CHAPTER 9 TECHNIQUES OF INTEGRATION (4 hours)

The main focus here is on use of tables, integration by parts. Additional sections at the instructor's discretion. Possible problems to assign may include some of the following:

- 9.1 Introduction
- 9.2 Integral Tables and Simple Substitutions
Problems pp. 487-488 1-29 every other odd, 31-35 odd, 37-49 eoo.
- 9.3 Trigonometric Integrals (play up the fact that these are substitutions.)
Problems pp. 495-496 1-45 eoo, 49, 51
- 9.4 Integration by Parts
Problems pp. 501-502 1-31 odd, 37, 41, 43, 47, 51
- 9.8 Improper Integrals
Problems pp. 529-531 1-23 odd, 25, 26, 27

CHAPTER 10 POLAR COORDINATES AND CONIC SECTIONS (Integrated later.)

CHAPTER 11 INFINITE SERIES (7 hours)

- 11.1 Introduction
- 11.2 Infinite Sequences
Problems p. 587 1-35 odd 40, 44
- 11.3 Infinite Series and Convergence
Problems pp. 596-507 1-29 odd (e.o.o would suffice) 31,33, 47, 49. Avoid 36-40

- 11.4 Taylor Series and Taylor Polynomials
Problems pp. 610-611 1-19 odd(1, 7, 13, 15 suffice) 23, 27, 31, 35. Avoid 32, 37
- 11.5 Integral test Just for p-test. light on these if any. Many involve partial fractions.
Problems pp. 617-618 2,3,4, 17, 25 are ok.
- 11.6 Comparison test. Since we usually use limit comparison instead, light on these too.
Problems pp. 623-624 1, 5, 7, 9 are straight forward.
- 11.7 Alternating Series and Absolute Convergence
Problems p. 631 1-32 odd are ok, or: 1, 3, 5, 7, 9, 11, 13, 15, 17, 29, 33, 37
- 11.8 Power Series
Problems p. 641 1-19 odd are ok. 1, 3, 9, 13, 15, 21, 23, 27, 31, 33, 37

CHAPTER 12 PARAMETRIC CURVES AND VECTORS IN THE PLANE

Integrated into chapter 13 with vectors in 3-D.

CHAPTER 13 VECTORS, CURVES AND SURFACES IN SPACE (5 hours)

Here we work in the vectors in the plane from chapter 12 at the same time.

Cover 12.3 & 13.1 concurrently

- 12.3 Vectors in the Plane
Problems p. 675 1, 5, 9, 11, 15, 17, 19, 23, 25, 33, 35
- 13.1 Rectangular Coordinates and 3-D Vectors
Problems pp. 700-701 1, 5, 6, 10, 11, 15, (17, 19, 21)?, 31, 43, 52
- 13.2 The Vector Product of Two Vectors
Problems pp. 708-709 1, 3, 11, 13, 15, 21, 22
- 13.3 Lines and Planes in Space

They will not have seen parametric equations yet, so we use the parametric form of lines to introduce the concept.

Problems p. 715 3, 5, 9, 11, 15, 19, 23, 25, 33

Cover 12.4 & 13.4 concurrently: vector valued parametric curves.

- 12.4 Motion and Vector Valued Functions
Problems pp. 682-683 3, 5, 9, 13, 19, (projectile? 25, 27, 41
- 13.4 Curves and Motion in Space
Problems pp. 720-721 3, 5, 11, 15, 17, 27?
- 13.5 Omit
- 13.6 Omit
- 12.1 Parametric Curves
Problems p. 659 1, 3, 7, 9. (angle between curves?)
- 12.2 omit

CHAPTER 14 PARTIAL DIFFERENTIATION (8 hours)

- 14.1 Introduction
- 14.2 Functions of Several Variables
Problems pp. 761-762 3, 4, 15, 19, 21, 25, 27, 37, 40, 41. (Omit 31-36, since we omit 13.6)
- 14.3 Limits and Continuity
Problems pp. 767-768 3, 5, 7, 9, 11, 17, 19, 21, 27
- 14.4 Partial Derivatives
Problems pp. 774-775 1-19 odd, 21, 23, 31, 35, 43(long), 45, 47a.
- 14.5 Maxima and Minima of Functions of Several Variables
Problems pp. 784-785 1, 7, 11*, 15, 19, 21, 23, 31, 35...more? 55
- 14.6 omit
- 14.7 The Chain Rule
Problems pp. 800-801 5, 7, 11, 13, 21, 26, 29
- 14.8 Directional Derivatives and the Gradient Vector
Problems pp. 809-810 1, 3, 7, 11, 15, 18, 21, 23, 27, 35, 42, 43

- 14.9 Lagrange Multipliers and Constrained Maximum-Minimum Problems
Problems pp. 818-819 3, 7, 15, 18
- 14.10 The Second Derivative Test for Functions of Two Variables
Problems pp. 827-828 5, 7, 13, 21, 23

CHAPTER 15 MULTIPLE INTEGRALS (9 hours)

Here we work in other coordinate systems (polar, cylindrical, spherical) as needed.

- 15.1 Double Integrals
Problems p. 839 1-29 odd are ok. Perhaps e.o.o
- 15.2 Double Integrals over More General Regions
Problems pp. 845-846 1, 3, 9, 11, 15, 20, 21
- 15.3 Area and Volume by Double Integration
Problems pp. 851-852 11, 13, 21, 27, 33. (omit areas by double integral)
- 15.5 omit
- 15.6 Triple Integrals
Problems pp. 876-877 1, 5, 9 centroids, moments?
- 10.2 Polar Coordinates
Problems pp. 548-549 1, 2, 11, 13, 21, 19, 29-38 39-51 e.o.o (use techn) 53, 55, 57
- 10.3 Area Computations in Polar Coordinates
Problems pp. 554-555 1, 5, 13, 16, 19, 23
- 13.7 Cylindrical and Spherical Coordinates
Problems pp. 747-748 1, 59, 9, 11, 13, 15, 25, 27, 33
- 15.4 Double Integrals in Polar Coordinates
Problems pp. 858-859 (omit areas using double integrals) 9, 11, 13, 17, 26, 29
- 15.7 Integration in Cylindrical and Spherical Coordinates
Problems pp. 884-885 some

IV Evaluations Methods

Evaluation for the course will typically consist of following breakdown:

3 or 4 exams	60%
Quizes	10%
Projects/Assingments	10%
Comprehensive Final	20%

Reading Program: The following should be required reading.

1. Morris Kline: The Creation of the Calculus.
2. Philip J Davis and Reuben Hersh: Introduction, Overture, Chapter 1 and Chapter 6 from *The Mathematical Experience*.

V Required Text Book

Edwards, C.H. Jr & Penney, David, *Calculus with Analytic Geometry* (Early Transcendental Version), 4th Ed. Prelice Hall, 1994.

VI Special Resource Requirements

None

VII Bibliography

Swokoswki, Earl, et.al., *Calculus*, 6th Edition, PWS Publishing Co., 1994.
Anton, Howard, *Calculus 5/E.*, John Wiley & Sons, 1995.
Stewart, James, *Calculus*, 3rd Ed., Brooks/Cole Publishing Co., 1994.

From: GROVE::JBURIOK
To: CCULLUM
CC: JBURIOK
Subj: More on Math LS Questions

Charles: I contacted Darlene Richardson again, and here is a memo regarding MA 123/124 name changes. Please let me know if I have satisfied the request from the Screening Committee or not.

Jerry_Buriok

From: GROVE::DRCHRDSN "Darlene Richardson, Liberal Studies" 14-NOV-1997 16:23:26.22
To: GROVE::JBURIOK
CC: DRCHRDSN
Subj: RE: LS questions - Screening Committee

i, Gerry. The Liberal Studies Office accepts the change in the titles of MA 123 and MA 124. The content, objectives, and statements regarding liberal studies criteria are not changing. Thanks for the memo. Darlene