COUNTY COLLEGE OF MORRIS
COURSE INFORMATION OUTLINE

Course Differential Equations Cat. No. MAT 232

Class Hours 45 Clinical / Laboratory Hours 0 / Recitation Credit Hours 3 Course Fee None

Faculty Course Coordinator None

Department Chairperson Approval J. R. Monaghan Approval Date 8-18-97

Division Dean Approval M. C. Ayres Approval Date 8/21/97

1. Prerequisite (Last Course or Courses) MAT 132

2. Co-requisite None

3. Textbooks: Ross, Introduction to Ordinary Differential Equations, 4th ed. (Wiley), ISBN 0-471-09881-7

4. Supplementary Books : None

5. Supplementary Materials: None

6. Specialized equipment, supplies, facilities, for classes limited by enrollment or restricted by accreditation and/or equipment limitations. (Information will be used to determine differential funding category.): None

7. Statement Course Objectives: MAT 232 prepares students to solve many of the differential equations which arise in mathematics, other sciences, engineering and technology. It forms a basis for further study of differential equations in higher mathematics courses.

8. Statement of Relation to Curriculum(s): MAT 232 is sometimes required in the mathematics program.

9. Catalog Course Description (Please include when course will be offered -- Fall, Spring, Summer, etc.): "Ordinary differential equations and methods of solution. Introduction to classical equations and their solutions, with some applications to geometry, physics and engineering." This course is offered in the evenings in the spring and summer sessions.

Cat. No. MAT 232

10. Course Outline

Syllabus

Period	Text sections	Topics
1	Ch. 1	Introduction
2- 4	Ch. 2	Variable separable and homogeneous equations, exact equations and integrating factors, linear equations, Bernoulli's, Riccati's and Clairaut's equations
5- 6	Ch. 3	Trajectories, applications, rate problems
7		Quiz no. 1
8-11	4.1-5	Linear; homogeneous, constant coefficients; undetermined coefficients, variation of parameters, Cauchy-Euler equation
12-14	Ch. 5	Applications: undamped, damped and forced behavior, resonance
15		Quiz no. 2
16-18	Ch. 6	Power series, Frobenius, Legendre's equation,* Laguerre's equation,* Chebychev's equation,* Hermite equation,* the gamma function, Bessel's functions and Bessel's differential equation
19-21	7.1-4	Operator method, applications, normal form, homogen. sys.
22		Quiz no. 3
23-26	Ch. 8	Graphical and power series methods, Picard, numerical methods (important for computer solutions)
27-30	Ch. 9	Laplace transforms (important for engineering majors)

*Supplementary material from almost any other textbook; these are examples of equations with finite series solutions, generating important polynomials.

Quizzes may be open-book if instructor wishes, but students should be warned that subsequent courses they take may have closed-book quizzes.

Note: Some students may not have completed MAT230 (Calculus III) before enrolling in this course. Therefore, the use of partial derivatives is unwise and the teacher may have to define them and/or avoid them. Students who find they cannot cope with MAT230 and MAT232 simultaneously should complete MAT230 before attempting MAT232.

COUNTY COLLEGE OF MORRIS
Route 10 & Center Grove Rd., Randolph, New Jersey 07869 (201) 361-5000

MAT232 - DIFFERENTIAL EQUATIONS 7/16/85
3 hrs/wk - 3 cr.

Catalog description: Ordinary differential equations and methods of solution. Introduction to classical equations and their solutions, with some applications to geometry, physics and engineering.

Pre-requisite: MAT132.

Text: Ross, Introduction to Ordinary Differential Equations, 3rd ed. (Wiley).

Supplementary materials: None.

Role of course: Required in the Mathematics program (2150) and the Engineering Science program (2180). Elective in the following programs: Business Administration (2110), Humanities/Social Science (1130), Humanities/Art (1140), Mathematics/Physical Science (2151), Humanities/Music (1190), and these Honors programs: the Humanities/Social Science option (1131) and the Mathematics/Science option (2153).

Syllabus

Period	Text sections	Topics
1	Ch. 1	Introduction
2- 4	Ch. 2	Variable separable and exact equations, integrating factors, linear equations, Clairaut's, Bernoulli's and Riccati's equations
5- 6	Ch. 3	Trajectories, applications, rates
7		Quiz no. 1
8-11	4.1-5	Linear; homogeneous, constant coefficients; undetermined coefficients, variation of parameters, Cauchy-Euler equation
12-14	Ch. 5	Applications: undamped, damped and forced behavior
15		Quiz no. 2
16-18	Ch. 6	Power series, Legendre's equation,* Frobenius, Laguerre's equation,* the gamma function, Bessel's functions and Bessel's d.e.
19-21	7.1-4	Operator method, applications, normal form, homogen. sys.
22		Quiz no. 3
23-25	Ch. 8	Graphical and power series methods, Picard, numerical methods
26-29	Ch. 9	Laplace transforms (important for engineering majors)
30		Summary, review

*Supplementary material from almost any other textbook.

Quizzes may be open-book if instructor wishes, but students should be warned that subsequent courses they take may have closed-book quizzes.

Note: Some students may not have completed MAT230 (Calculus III) before enrolling in this course. Therefore, the use of partial derivatives and the summation notation is unwise and the teacher may have to define them and/or avoid them. Also, the teacher may have to make claims about the Taylor's series, since it may not have been derived yet in a calculus course. Students who find they cannot cope with MAT230 and MAT232 simultaneously should complete MAT230 before attempting MAT232.