

Course Syllabus

1. Course Code and Course Title SCMA 174 Calculus and Systems of Ordinary Differential Equations

2. Number of Credits 3 (3-0-6) (Lecture-Lab-Self Study)

3. Instructor Dr. Ruth J. Skulkhu

4. Session First semester/ 2022

5. Course Description

Review of calculus, chain rule and derivatives of inverse functions, derivatives of trigonometric, inverse trigonometric, exponential and logarithmic functions, implicit differentiation and related rates, applications of derivatives, antiderivatives, definite and indefinite integrals, fundamental theorems of calculus, techniques of integration, applications of integration, systems of ordinary differential equations, direction fields and phase portraits, matrix representation, stationary solutions, solutions by eigenvalue method, applications of systems of ordinary differential equations.

6. Course Outline

Week	Topics	Hours	Instructor
1	Review of calculus, chain rule and derivatives of inverse functions	3	Dr. Ruth J. Skulkhu
2	derivatives of trigonometric, inverse trigonometric,	3	
3	Derivatives of exponential and logarithmic functions, implicit differentiation	3	
4	Related rates, applications of derivatives, L'Hopital's rule, other applications	3	
5	Review of Integral Calculus, antiderivatives, definite and indefinite integrals, fundamental theorems of calculus, techniques of integration	3	

6	Techniques of integration	3	
7	Improper Integration	3	
8	Applications of integration	3	
9	Midterm Examination		
10	Definition of differential equations; Classification of differential equations; Solutions and initial value problems; Sketching solutions directly from differential equations; Autonomous equations; Direction fields and phase portraits; Equilibrium solutions	3	
11	Solutions of separable and first order linear equations	3	
12	Solutions of second order linear differential equations with constant coefficients	3	
13	Introduction to ordinary differential equations and Wronskian General solutions of homogenous and nonhomogeneous systems	3	
14	Solving linear systems with eigenvalue and eigenvector method	3	
15	Solutions of systems of non-homogenous linear equations Variation of parameters Introductory to autonomous equations	3	
16	Phase portraits and stabilities of systems of linear system of equations	3	
17	Final Examination		

7. Teaching Methods

Lecture, in-class activities and problem-solving practice

12. Teaching Media

Transparencies, whiteboards, blackboards, computerized presentations and occasionally distributed sheets

13. Measurement and Evaluation of Student Achievement

Student achievement will be graded according to the faculty and university standard using the symbols: A, B+, B, C+, C, D+, D, and F.

Evaluation criteria

1. Assignments / Class participation / Quiz	20%
2. Midterm Examination	40%
3. Final Examination	40%
Total	100%

Total percentage of evaluation	Grade
80 – 100	A
75 – 79	B+
70 – 74	B
60 – 69	C+
50 – 59	C
45 – 49	D+
40 – 44	D
0 – 39	F

14. References

- 1) Stewart J. Calculus: Early Transcendentals. 6th ed., Brooks Cole; 2007.
- 2) Anton H, Bivens I, Davis S. Calculus. 7th ed., New York: Wiley; 2002.
- 3) Boyce WE, Diprima RC. Elementary Differential Equations and Boundary Value Problems. 7th ed., Wiley. 2000.
- 4) Zill DG, Cullen MR. Differential Equations with Boundary-Value Problems. 7th ed. Cengage; 2008.

15. Instructor

Dr. Ruth J. Skulkhu
 Department of Mathematics,
 Faculty of Science
 Mahidol University
 E-mail: ruthj.sku@mahidol.ac.th