MATH 152 – Calculus II

Course Description from Bulletin: Transcendental functions and their calculus. Integration techniques. Applications of the integral. Indeterminate forms and improper integrals. Polar coordinates. Numerical series and power series expansions. (4-1-5) (C)

Enrollment: Required for AM majors and all engineering majors

Textbook(s): James Stewart, *Calculus* (9th Ed.), Cengage (2021), ISBN:9781337624183 (Recommended if the entire Calculus sequence will be taken. For MATH 151 and 152 only, Stewart's *Single Variable Calculus* suffices.)

Other required material: WebAssign access (comes bundled with Stewart Calculus), Mathematica (free download from OTS for IIT students)

Prerequisites: Grade of "C" or better in MATH 151 or MATH 149, or Advanced Placement

Objectives:

1. The student should acquire a sound understanding of the common transcendental functions.
2. The student should become proficient in the basic techniques of integration for the evaluation of definite, indefinite, and improper integrals.
3. The student should learn to solve first-order separable and linear differential equations with initial values.
4. The student should learn parametric curves and polar curves and their calculus.
5. The student should learn infinite series, power series and Taylor polynomial and series, and their convergence properties.
6. The student should be able to utilize the computer algebra system Mathematica to explore mathematical concepts, illustrate them graphically, and solve problems numerically or symbolically.
7. The student should become a more effective communicator by developing his/her technical writing skills in the preparation of several Mathematica lab reports.

Lecture schedule: Three 75 minute lectures per week

Laboratory/Recitation schedule: One 75 minute period per week, alternating laboratory with recitation.

Course Outline:	Hours
1. Inverse Functions and their derivatives; Exponential and logarithmic functions; Indeterminate forms and L'Hospital's rule	12
2. Techniques of integration; Improper integrals	12
3. Differential equations: Euler's method; 1st order separable DE's, exponential growth and decay; The logistic equation; 1st order linear DE's	8
4. Parametric equations and polar coordinates for plane curves	10
5. Sequences; Numerical series; Convergence tests; Power series; Taylor series; Applications of power/Taylor series	12
6. Complex numbers	3

Assessment:	Homework/Quizzes	30%
	Mathematica Lab	5%
	3 Tests	30%
	Common Final Exam	35%

Syllabus prepared by: Xiaofan Li and Dave Maslanka
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