Course Syllabus

Course #: MTH 2520 **Course Name:** Calculus and Analytic Geometry II

Division: Arts & Sciences

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Class Days: MTWRF **Class Time:**
Location: Classroom: Laboratory:
Credit Hours: 5 **Contact Hours:** 5 **Lab Hours:** 0 **Lecture Hours:** 5

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Instructor: **Office Location:**
Phone: **Email Address:**
Office Hours:
Division Office/Location: A202 **Division Fax:** 419.355.1248
Full-time Contact Person: **Phone(s):** 419.559.2307

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Course Description:
A continuation of differential and integral calculus including applications. This is part two of a three-part traditional calculus sequence. Study of the calculus of transcendental functions, techniques of integration, improper integrals, numerical methods, plane analytic geometry, and infinite sequences and series. Graphing calculator required.

Prerequisite(s): Grade of "C" or better in MTH 2510

Corequisite(s): None

Entry Level Skills and Knowledge:
Limits, continuity, derivatives, differentiation techniques, Mean Value Theorem, extrema, curve sketching, and applications of the derivative. Included are antiderivatives, definite and indefinite integrals, the Fundamental Theorems of Calculus, and applications of definite integrals.

Required Texts, Supplies and Equipment:
Calculus, Ninth Edition by Dale Varberg, Edwin J. Purcell, and Steven E. Rigdon. Published by Prentice Hall.

Hand-held Calculator: TI-83+ or TI-84+ required

Grading:
The final course grade will be determined as follows:

Daily Grades (quizzes, homework, class participation, etc.)	25%
Tests	50%
Comprehensive Final Exam	25%

Grading scale is as follows:

90 – 100 = A
80 – 89 = B
70 – 79 = C
60 – 69 = D
0 – 59 = F

Learning Outcomes:

General Education

Evaluate arguments in a logical fashion.

Technical Education

Course Outcomes:

Upon completion of this course, students should be able to perform these competencies:

1. Integrate and Differentiate transcendental functions.
2. Solve exponential growth and decay problems.
3. Solve first-order linear differential equations.
4. Approximate solutions to differential equations using Euler's Method.
5. Find derivatives of inverse trigonometric functions and use integration formulas producing inverse functions.
6. Find derivatives and integrals of hyperbolic functions and inverse hyperbolic functions.
7. Integrate functions using basic integration rules, integration by parts, rationalizing substitutions, trigonometric substitutions, partial fractions and tables of integrals.
8. Use L'Hopital's Rule to find limits of indeterminate forms.
9. Evaluate improper integrals
10. Test for the convergence of a sequence using the Squeeze Theorem and the Monotonic Sequence Theorem.
11. Determine whether an infinite series converges or diverges using the nth-term test for divergence, the integral test, the bounded sum test, the *p*-series test, the comparison test, the ratio test, the alternating series test, the absolute convergence test, and the absolute ratio test
12. Find power series representations for functions and specify the radius of convergence.
13. Find the Maclaurin series representation for a function.
14. Find Taylor polynomials and Maclaurin polynomials of order *n*; find a bound for the error of the calculation.
15. Find the coordinates of the focus, the equation of the directrix, and the equation of parabolas.
16. Find the foci and the equation of a ellipse and a hyperbola
17. Identify the eccentricity of a parabola, ellipse and hyperbola.
18. Rotate and translate the axes of a parabola, ellipse and hyperbola.
19. Graph, obtain a Cartesian equation, find a derivative and integrate parametric equations.
20. Graph, obtain a Cartesian equation, find a derivative and integrate polar equations.

Assessment of Student Learning:
This course may include a project that is one of several that will be used by faculty to assess student academic performance in the program. A panel of faculty will review all (projects or whatever assessment activity you are doing), then assess and summarize the academic performance of students at this point in the program. The results of this assessment will be shared among the department faculty, used to identify needed changes or improvements, and submitted to the Student Academic Assessment Committee as part of the college's overall student academic assessment effort.

Assessment Project and Measurement in course (if any):
TBA

Plan of Work:
Session Date Activities
See topical outline attached at back of this syllabus.

Course Requirements:
There will be an assignment given each class period. This should be completed by the next class meeting and will be discussed at that time.

Policies

Department Policies: The schedule of tests will be followed as closely as possible. Not all of the course work is in the text. It is important to be in class and to take notes. Students are expected to read the text before class discussion.

Tests must be taken on the scheduled day. Failure to do so will result in a ten percent (10%) penalty. Make-up tests must be taken within one (1) week of the date that the test is given in class.

It is expected that the student will participate by having assignments completed on time, answering questions in class, asking pertinent questions, being on time, and having a cooperative attitude.

Final Exam Policy: The final exam is comprehensive. All students, regardless of grade average, must take the comprehensive final exam for this course.

Course Withdrawing: If for any reason you need to withdraw from this course, be certain that you do so according to College procedure. It is your responsibility to know and follow this procedure. If you simply stop coming to class, without officially withdrawing from the course, your grade is an automatic "F." Please follow official College procedure for withdrawing from this or any course.

College Academic Policies are located in the College Catalog. A copy of the current catalog may be picked up in any of the division offices or admissions. The list of college policies is also available online at https://www.terra.edu/register/Collegecat/policies.asp.

Support Services: The College offers a number of support services to assist in your success in this course and all courses. Among these services are the Writing & Math Center in B105, the Office of Learning Support Services, which coordinates the campus disability services and tutoring programs, the computer labs, and the computers in the atriums.

Any student who feels he/she may need an accommodation based on the documentation of a disability should contact the Office of Learning Support Services privately to discuss his/her specific issues. Please contact the OLSS at (419) 334-8400 X 208 or visit 100 Roy Klay Hall (Building A) to coordinate reasonable accommodations.

If you have a documented disability and are receiving academic accommodations through the Office of Learning Support Services, please schedule a meeting with your instructor in a timely manner so that we may discuss how these services will be arranged.

Tutoring services are available to students beginning the second week of every quarter. Students requesting tutoring services should obtain a tutor request form from the OLSS in 100 Roy Klay Hall (Building A) or online at the Terra website. Please note that instructor verification and acceptance of the Student Learner Agreement is necessary for all tutoring requests. All requests should be submitted to 100 Roy Klay Hall (Building A).

MTH 2520 Topical Outline:

Session	Course Content	Reading Assignment	Activity
1	Course Introduction Review Differentiation and Integration		
2	Review Differentiation and Integration		
3	Review Differentiation and Integration 6.1 The Natural Logarithm Function	 pp. 325 – 330	 p. 330 – 1-29 odd, 31-34 all
4	6.1 The Natural Logarithm Function 6.2 Inverse Functions and Their Derivatives	pp. 325 – 330 pp. 331 – 335	p. 330 – 1-29 odd, 31-34 all p. 336 – 1-29 odd
5	6.2 Inverse Functions and Their Derivatives 6.3 The Natural Exponential Function	pp. 331 – 335 pp. 337 – 340	p. 336 – 1-29 odd p. 341 – 1-31 odd, 37-47 odd
6	6.3 The Natural Exponential Function 6.4 General Exponential and Logarithmic Functions	pp. 337 – 340 pp 342 – 346	p. 341 – 1-31 odd, 37-47 odd p. 346 – 1-37 odd
7	6.4 General Exponential and Logarithmic Functions	pp 342 – 346	p. 346 – 1-37 odd
8	6.5 Exponential Growth and Decay	pp. 347 – 352	p 353 – 1-31 odd
9	6.6 First-Order Linear Differential Equations	pp. 355 – 358	p. 358 – 1, 5, 7, 11, 13, 17, 19
10	6.6 First-Order Linear Differential Equations	pp. 355 – 358	p. 358 – 1, 5, 7, 11, 13, 17, 19
11	6.7 Approximations for Differential Equations	pp. 359 – 363	p. 363 – 1, 3, 5, 11, 13, 15
12	6.7 Approximations for Differential Equations	pp. 359 – 363	p. 363 – 1, 3, 5, 11, 13, 15
13	6.8 The Inverse Trigonometric Functions and Their Derivatives	pp. 365 – 371	p. 371 – 39-69 odd
14	6.8 The Inverse Trigonometric Functions and Their Derivatives	pp. 365 – 371	p. 371 – 39-69 odd
15	6.9 The Hyperbolic Functions and Their Inverses	pp. 374 – 378	p. 378 – 13-33 odd, 39-47 odd
16	**TEST I (Chapter Six)**		
17	**TEST I (Chapter Six)**		
18	7.1 Techniques of Integration	pp. 383 – 386	p. 386 – 1-53 odd
19	7.1 Techniques of Integration	pp. 383 – 386	p. 386 – 1-53 odd

Session	Course Content	Reading Assignment	Activity
20	7.2 Integration by Parts	pp. 387 – 391	p. 391 – 1-45 odd
21	7.2 Integration by Parts	pp. 387 – 391	p. 391 – 1-45 odd
22	7.3 Some Trigonometric Integrals	pp. 393 – 398	p. 399 – 1-27 odd
23	7.3 Some Trigonometric Integrals	pp. 393 – 398	p. 399 – 1-27 odd
24	7.4 Rationalizing Substitutions	pp. 399 – 403	p. 403 – 1-19 odd
25	7.4 Rationalizing Substitutions	pp. 399 – 403	p. 403 – 1-19 odd
26	7.5 Integration of Rational Functions Using Partial Fractions	pp. 404 – 410	p. 410 – 1-35 odd, 40
27	7.5 Integration of Rational Functions Using Partial Fractions	pp. 404 – 410	p. 410 – 1-35 odd, 40
28	7.6 Strategies for Integration	pp. 411 – 418	p. 479 – 1-29 odd
29	8.1 Indeterminate Forms of Type 0/0	pp. 423 – 427	p. 427 – 1-21 odd
30	8.1 Indeterminate Forms of Type 0/0	pp. 423 – 427	p. 427 – 1-21 odd
31	8.2 Other Indeterminate Forms	pp. 428 – 432	p. 432 – 1, 5, 11, 13, 15, 19, 21, 27, 29, 31, 34
32	8.2 Other Indeterminate Forms	pp. 428 – 432	p. 432 – 1, 5, 11, 13, 15, 19, 21, 27, 29, 31, 34
33	8.3 Improper Integrals: Infinite Limits of Integration	pp. 433 – 440	p. 441 – 1-19 odd, 25, 26
34	8.3 Improper Integrals: Infinite Limits of Integration	pp. 433 – 440	p. 441 – 1-19 odd, 25, 26
35	8.4 Improper Integrals: Infinite Integrands	pp. 442 – 445	p. 445 – 1-31 odd, 35
36	8.4 Improper Integrals: Infinite Integrands	pp. 442 – 445	p. 445 – 1-31 odd, 35
37	**TEST II (Chapter Seven and Eight)**		
38	**TEST II (Chapter Seven and Eight)**		
39	9.1 Infinite Sequences	pp. 449 – 453	p. 453 – 1, 3, 5, 7, 9, 13, 15, 17, 21, 29
40	9.1 Infinite Sequences	pp. 449 – 453	p. 453 – 1, 3, 5, 7, 9, 13, 15, 17, 21, 29
41	9.2 Infinite Series	pp. 455 – 460	p. 461 – 1, 3, 5, 8, 11, 13, 14, 22, 30
42	9.2 Infinite Series	pp. 455 – 460	p. 461 – 1, 3, 5, 8, 11, 13, 14, 22, 30
43	9.3 Positive Series: The Integral Test	pp. 463 – 467	p. 467 – 1-15 odd, 16, 18, 19, 20 24, 34
44	9.3 Positive Series: The Integral Test	pp. 463 – 467	p. 467 – 1-15 odd, 16, 18, 19, 20 24, 34
45	9.4 Positive Series: Other Tests	pp. 468 – 473	p. 473 – 1-19 odd
46	9.4 Positive Series: Other Tests	pp. 468 – 473	p. 473 – 1-19 odd
47	9.5 Alternating Series, Absolute Convergence, and Conditional Convergence	pp. 474 – 478	p. 478 – 1, 3, 13-21 odd, 27, 29, 40
48	9.5 Alternating Series, Absolute Convergence, and Conditional Convergence	pp. 474 – 478	p. 478 – 1, 3, 13-21 odd, 27, 29, 40

Session	Course Content	Reading Assignment	Activity
49	9.6 Power Series	pp. 479 – 482	p. 483 – 1-13 odd, 14, 20, 21, 24-28 all
50	9.6 Power Series	pp. 479 – 482	p. 483 – 1-13 odd, 14, 20, 21, 24-28 all
51	9.7 Operations on Power Series	pp. 484 – 487	p. 487 – 1, 5, 7, 14, 15, 17, 19, 21, 22
52	9.7 Operations on Power Series	pp. 484 – 487	p. 487 – 1, 5, 7, 14, 15, 17, 19, 21, 22
53	9.8 Taylor and Maclaurin Series	pp. 489 – 495	p. 495 – 1, 3, 7, 9, 17, 18, 19, 20
54	9.8 Taylor and Maclaurin Series	pp. 489 – 495	p. 495 – 1, 3, 7, 9, 17, 18, 19, 20
55	9.9 The Taylor Approximation to a Function	pp. 197 – 502	p. 503 – 1, 3, 5, 9, 11, 31, 33, 35, 37, 54
56	9.9 The Taylor Approximation to a Function	pp. 197 – 502	p. 503 – 1, 3, 5, 9, 11, 31, 33, 35, 37, 54
57	**TEST III (Chapter Nine)**		
58	**TEST III (Chapter Nine)**		
59	10.1 The Parabola	pp. 509 – 512	p. 512 – 1-15 odd, 21, 34, 36
60	10.2 Ellipses and Hyperbolas	pp. 513 – 521	p. 521 – 1-19 odd, 23, 45, 47
61	10.2 Ellipses and Hyperbolas	pp. 513 – 521	p. 521 – 1-19 odd, 23, 45, 47
62	10.3 Translation and Rotation of Axes	pp. 523 – 528	p. 528 – 1-21 odd, 12, 25, 30, 32, 43-47 odd
63	10.3 Translation and Rotation of Axes	pp. 523 – 528	p. 528 – 1-21 odd, 12, 25, 30, 32, 43-47 odd
64	10.4 Parametric Representation of Curves in the Plane	pp. 530 – 534	p. 534 – 1-15 odd, 21, 23, 25, 31, 35, 55, 56
65	10.4 Parametric Representation of Curves in the Plane	pp. 530 – 534	p. 534 – 1-15 odd, 21, 23, 25, 31, 35, 55, 56
66	10.5 The Polar Coordinate System	pp. 537 – 541	p. 541 – 3, 7, 9, 11, 15, 19, 22, 23-35 odd
67	10.5 The Polar Coordinate System	pp. 537 – 541	p. 541 – 3, 7, 9, 11, 15, 19, 22, 23-35 odd
68	10.6 Graphs of Polar Equations	pp. 542 – 545	p. 545 – 5, 9, 15, 17, 19, 21, 23, 27, 29, 31, 38
69	10.6 Graphs of Polar Equations	pp. 542 – 545	p. 545 – 5, 9, 15, 17, 19, 21, 23, 27, 29, 31, 38
70	10.7 Calculus in Polar Coordinates	pp. 547 – 550	p. 550 – 1, 3, 5, 9, 11, 13, 15, 18, 19
71	10.7 Calculus in Polar Coordinates	pp. 547 – 550	p. 550 – 1, 3, 5, 9, 11, 13, 15, 18, 19
72	Course Review		
73	Course Review		
74	**COMPREHENSIVE FINAL EXAM**		
75	**COMPREHENSIVE FINAL EXAM**		