

## **MAT 220 Syllabus**

<b>CREDIT HOURS:</b>	<b>4.0</b>
<b>EQUATED HOURS:</b>	<b>4.5</b>
<b>CLASS HOURS:</b>	<b>4.5</b>
<b>PREREQUISITE:</b>	<b>MAT 210 (Calculus 1) with a grade of C or higher.</b>
<b>REQUIRED TEXTS:</b>	<b>Thomas, Weir &amp; Hass: Calculus, Early Transcendentals, Single Variable, 14<sup>th</sup> Edition, Pearson</b>

**DESCRIPTION:** This course provides skills in differential and integral calculus. Topics: definite integral and its properties, numerical integration, applications of definite integrals to: areas between curves, volume of solids of revolution, arc length and surfaces. Sequences and infinite series. Tests for convergence. Taylor and Maclaurin series and applications.

**EXAMINATIONS:** There will be four full period tests, and will drop the lowest of the 4, the 3 tests will account for 75% of the final grade. Final Exam: in class, full period, will account for 25% of the final grade

**GRADES:** A, A<sup>-</sup>, B<sup>+</sup>, B, B<sup>-</sup>, C<sup>+</sup>, C, D, I, F.

### **Math 220 (Calculus II) Student Learning Outcomes**

MAT 220 SLO:

1. Interpret and draw appropriate inferences of integrals of functions and their properties from quantitative representations such as graphs of polynomial, rational, exponential, and logarithmic and trigonometric functions including surface area and arc length
2. Use algebraic, numerical, and graphical methods to solve mathematical problems including finding the anti-derivative of a function, determining indefinite integrals, calculating definite integrals, determining the area between curves, volumes between curves and determining if sequences or series converge.
3. Represent quantitative problems expressed in natural language in suitable algebraic, functional, and graphical form. Such problems include determining area between two graphs and finding the volume of solids of revolution.

4. Effectively communicate solutions to mathematical problems in written, graphical, or analytic form.
5. Evaluate solutions to problems, graphs of functions and convergence of sequences or series for reasonableness by inspection.
6. Apply calculus-based methods to problems in other fields of study such as Physics, Economics, Geometry, Chemistry or Biology.

**Pathways Learning Outcomes:**

Mathematical and Quantitative Reasoning:

MAT 220 will meet all the following Pathways Learning Outcomes from “Mathematical and Quantitative Reasoning”. A student will:

1. Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.
2. Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.
3. Represent quantitative problems expressed in natural language in a suitable mathematical format.
4. Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.
5. Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.
6. Apply mathematical methods to problems in other fields of study.

<b>Student Learning Outcomes**</b>	<b>Mathematical and Quantitative Reasoning Outcomes**</b>	<b>Assessments and topics***</b>
SLO 1	MQR 1	Test#1,and Final
SLO 2	MQR 2	Test#1,2,3,and Final
SLO 3	MQR 3	Test#1,and Final
SLO 4	MQR 4	Test#3,and Final
SLO 5	MQR 5	Test#4,and Final
SLO 6	MQR 6	Test#1,and Final

\*\* Please see above for the list of SLO and MQR Outcomes

\*\*\* Please see blow for the list of topics that will be assessed in each unit test and final exam

**SLO#1, MOR#1:**

- Unit Test #1: Definite integral, Indefinite integral, integration by substitution, arc length, area of surface of revolution
- Departmental Final Exam: Cumulative

**SLO#2, MOR#2:**

- Unit Test #1: Logarithm defined as an integral, integration by substitution
- Unit Test #2: Integration by parts, trigonometric integrals, trigonometric substitution, partial fractions
- Unit Test #3: Improper integrals
- Departmental Final Exam: Cumulative

**SLO#3, MOR#3:**

- Unit Test #1: Area between curves, volume using cross-sections, volume using cylindrical shells
- Departmental Final Exam: Cumulative

**SLO#4, MOR#4:**

- Unit Test #3: Infinite series, sequences, the integral test for convergence
- Departmental Final Exam: Cumulative

**SLO#5, MOR#5:**

- Unit Test #3: Infinite series, sequences, the integral test for convergence
- Unit Test #4: Comparison test for convergence, limit comparison test for convergence, ratio test for convergence, root test for convergence, absolute convergence, conditional convergence, power series, Taylor and Maclaurin Series
- Departmental Final Exam: Cumulative

**SLO#6, MOR#6:**

- Unit Test #1: Applications to work, movement and center of mass, volume using cross-sections, volume using cylindrical shells
- Departmental Final Exam: Cumulative

## SUGGESTED COURSE OUTLINE

WEEK	CLASS	TOPICS
1	1	Review of the Definite Integral
	2	The Indefinite Integral and the Substitution Rule
	3	Integration by Substitution
2	4	Area Between Curves
	5	Volumes using Cross-Sections
	6	Volumes using Cross-Sections, continued
3	7	Volumes using Cylindrical Shells
	8	More on Volumes
	9	Arc Length and Areas of Surfaces of Revolution
4	10	Applications to Work, Moments and Centers of Mass
	11	<b>Review For Exam 1</b>
	12	<b>EXAM 1</b>
5	13	The Logarithm Defined as an Integral. Hyperbolic Functions*
	14	Integration by Parts
	15	Trigonometric Integrals
6	16	Trigonometric Substitution
	17	Partial Fractions
	18	Partial Fractions, continued
7	19	Integral Tables*
	20	Review of Techniques of Integration
	21	<b>Review for Exam 2</b>
8	22	<b>EXAM 2</b>
	23	Improper Integrals
	24	Improper Integrals, continued
9	25	Applications of Improper Integrals
	26	Sequences
	27	Infinite Series
10	28	The Integral Test
	29	<b>Review For Exam 3</b>
	30	<b>EXAM 3</b>
11	31	Comparison Tests
	32	Ratio and Root Test
	33	Alternating Series
12	34	Absolute and Conditional Convergence
	35	Power Series
	36	Power Series, continued
13	37	Taylor and Maclaurin Series
	38	Convergence of Taylor Series
	39	Binomial Series*. Applications of Taylor Series*
14	40	<b>Review For Exam 4</b>
	41	<b>EXAM 4</b>
	42	<b>Review for Final</b>
15		<b>Final Exam</b>

\* Denotes Optional Material