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MCC Honors Course: **MAT 131H Analytic Geometry and Calculus I**

An honors course is no different in course content or course expectation than a non-Honors course of the same name. Rather, it is **the student** enrolled in the Honors section which differentiates it from a non-honors section.

Students who have a cum. GPA of 3.5 or higher, have 12 or more college credits and have completed **all** developmental coursework, may qualify to take an Honors course at MCC. (Note: Those with a GPA of 3.25-3.49 may be eligible to take a *single* Honors course with a professor’s recommendation.)

MCC Honors courses do not involve more work, nor are they graded any differently than non-honors courses. Honors courses may include extra features, such as an Honors Student study lounge, field trips, guest speakers and social events. Honors courses encourage a higher level of learning but do not require additional work.

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Course Title: Analytic Geometry & Calculus I Course No. MAT 131

Class Hours: 4 Laboratory Hours: 0 Credit Hours: 4

**Prerequisite**:

MAT-129 or MAT-129A/129B or appropriate score on the college placement test.

**Catalog Course Description**:

Presents fundamental ideas of calculus including the derivative, integral, and their applications. Topics include fundamentals of analytic geometry and transcendental functions. The first course in a sequence of calculus courses intended for the student interested in mathematics, engineering, and the natural, physical and social sciences. *TI 83 plus calculator required.*

**Objectives of Course**:

1. Deal with abstract symbols, comprehend their use, and manipulate them in a variety of situations.
2. Develop strong conceptual foundations.
3. Analyze mathematical situations with ideas and problem solving techniques.
4. Develop ability to make decisions about complex problems.
5. Establish underlying mathematical models for conceptual understanding.

##### Course Outline

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| Chapters | Topics | Approximate Number  of Classes |
| P | Preparations for Calculus | 1 |
| 1 | Limits and Their Properties | 2 |
| 2 | Differentiation | 4 |
| 3 | Applications of Differentiation | 9 |
| 4 | Integration | 5 |
| 5 | Logarithmic, Exponential and Other Transcendental Functions | 3 |
| 7 | Applications of Integration | 1 |

Day-by-Day Outline

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| --- | --- | --- | --- |
| 1. | Review – Chapter P Graphs and Models, Linear Models and Rates of Change, Functions and Their Graphs, Fitting Models to Data | 15. | Catch up & review |
| 2. | * 1. A Preview of Calculus (Quickly)   2. Finding Limits Graphically and Numerically   3. Evaluating Limits Analytically | 16. | Test 2 |
| 3. | * 1. Continuity and One-Sided Limits   2. Infinite Limits | 17. | 4.1 Antiderivatives and Indefinite Integration |
| 4. | 2.1 The Derivative and the Tangent Line Problem | 18. | 4.2 Area |
| 5. | 2.2 Basic Differentiation Rules and Rates of Change  2.3 The Product and Quotient rules and Higher-Order Derivatives | 19. | 4.3 Reimann Sums and Definite Integrals  4.4 The Fundamental Theorem of Calculus |
| 6. | 2.4 The Chain Rule | 20. | 4.5 Integration by Substitution |
| 7. | 2.5 Implicit Differentiation  2.6 Related Rates | 21. | * 1. The Natural Logarithmic Function: Differentiation   2. The Natural Logarithmic Function: Integration |
| 8. | Catch up & review | 22. | * 1. Inverse Functions   2. Exponential Functions: Differentiation and Integration   3. Bases Other Than *e* and Applications |
| 9. | Test 1 | 23. | * 1. Differential Equations: Growth and Decay   6.3 Differential Equations: Separation of Variables |
| 10. | 3.1 Extrema on an Interval  3.2 Rolle’s Theorem and the Mean Value Theorem | 24. | 4.6 Numerical Integration  Review |
| 11. | 3.3 Increasing and Decreasing functions and the First Derivative Test  3.4 Concavity and the Second Derivative Test | 25. | Test 3 |
| 12. | 3.5 Limits at Infinity  3.6 A Summary of curve Sketching | 26. | 7.1 Area of a Region Between Two Curves |
| 13. | 3.7 Optimization Problems | 27. | Catch up & review |
| 14. | 3.9 Differentials | 28. | Review for Final Exam |

BASED ON TWO WEEK CLASS MEETINGS PER WEEK