**LSU Dual Enrollment Program for Math**

 **COURSE PROFILE**

**Content Revised June 2024**

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| **COURSE NAME** | **LSU Math 1022 Plane Trigonometry** |
| **COMMON COURSE NUMBER** | **CMAT 1223 Trigonometry** |
| **PRIMARY ONLINE CONTENT SOURCE** | ***Algebra and Trigonometry, 4e,* *MyMathLab***Kirk Trigsted |
| **COURSE/UNIT CREDIT** | **3 credit hours, 1 Carnegie Unit** |
| **GRADE(S)** | **10, 11, or 12** |

**CHAPTERS FOR MATH 1022 TRIGONOMETRY**

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| **6 - An Introduction to Trigonometric Functions** | **9 - Applications of Trigonometry** |
| **7 - The Graphs of Trigonometric Functions** | **10 - Polar Equations, Complex Numbers, and Vectors** |
| **8 - Trigonometric Identities, Formulas, and Equations** |  |

**SECTION NAMES (NUMBER OF EXERCISES) AND LEARNING OBJECTIVES FOR MATH 1022 TRIGONOMETRY**

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| **CHAPTER 6: An Introduction to Trigonometric Functions** |
| **6.1 An Introduction to Angles: Degree and Radian Measure (48)**Understand degree measureUnderstand radian measureConvert between degree measure and radian measureFind coterminal angles using degree measureFind coterminal angles using radian measure |
| **6.2 Applications of Radian Measure (18)**Determine the area of a sector of a circleDetermine the arc length of a sector of a circle |
| **6.3 Triangles (18)**Classify trianglesUse the Pythagorean TheoremUnderstand similar trianglesUnderstand the special right triangles |
| **6.4 Right Triangle Trigonometry (44)**Understand the right triangle definitions of the trigonometric functionsUse the special right trianglesUnderstand the fundamental trigonometric identitiesUnderstand cofunctionsEvaluate trigonometric functions using a calculator |

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| **6.5 Trigonometric Functions of General Angles (73)**Understand the four families of special anglesUnderstand the definitions of the trigonometric functions of general anglesFind the values of the trigonometric functions of quadrantal anglesUnderstand the signs of the trigonometric functionsDetermine reference anglesEvaluate trigonometric functions of angles belonging to *π/3*, *π/4*, and *π/6* families |
| **6.6 The Unit Circle (12)**Understand the definition of the unit circleUnderstand the unit circle definitions of the trigonometric functions |
| **CHAPTER 7: The Graphs of Trigonometric Functions** |
| **7.1 Graphs of Sine and Cosine Functions (45)**Understand the graph of the sine function and its propertiesUnderstand the graph of the cosine function and its propertiesDetermine properties and sketch graphs of the form *y=Asinx* and *y=Acosx*Determine properties and sketch graphs of the form *y=sinBx* and *y=cosBx*Determine properties and sketch graphs of the form *y=AsinBx* and *y=AcosBx*Determine the equation of a function of the form *y=AsinBx* and *y=AcosBx* given its graph |
| **7.2a More on the Graphs of Sine and Cosine: Phase Shift (21)**Determine properties and sketch graphs of the form *y=sin(x-C)* and *y=cos(x-C)*Determine properties and sketch graphs of the form *y=Asin(Bx-C)* and *y=Acos(Bx-C)* |
| **7.2b More on the Graphs of Sine and Cosine: Vertical Shift (15)**Determine properties and sketch graphs of the form *y=Asin(Bx-C)+D* and *y=Acos(Bx-C)+D* |
| **7.3 The Graphs of Tangent, Cotangent, Cosecant, and Secant Functions (34)**Understand the graph of the tangent function and its propertiesDetermine properties and sketch graphs of the form *y=Atan(Bx-C)+D*Understand the graph of the cotangent function and its propertiesDetermine properties and sketch graphs of the form *y=Acot(Bx-C)+D*Understand the graphs of the cosecant and secant functions and their properties |
| **7.4 Inverse Trigonometric Functions I (35)**Understand and find the exact and approximate values of the inverse sine functionUnderstand and find the exact and approximate values of the inverse cosine functionUnderstand and find the exact and approximate values of the inverse tangent function |
| **7.5 Inverse Trigonometric Functions II (38)**Evaluate composite inverse trigonometric functions of the form $f(f^{-1}\left(x\right))$ and $f^{-1}(f\left(x\right))$Evaluate composite inverse trigonometric functions of the form $f(g^{-1}\left(x\right))$ and $f^{-1}(g\left(x\right))$ |
| **CHAPTER 8: Trigonometric Identities, Formulas, and Equations** |
| **8.1 Trigonometric Identities (33)**Review and use the fundamental identitiesVerify trigonometric identities |
| **8.2 The Sum and Difference Formulas (35)**Use the sum and difference formulas for the cosine functionUse the sum and difference formulas for the sine functionUse the sum and difference formulas for the tangent functionUse sum and difference formulas to evaluate expressions involving inverse trig functions |
| **8.3 The Double-Angle and Half-Angle Formulas (46)** Use the double-angle formulasUse the half-angle formulasUse the double-angle and half-angle formulas to evaluate expressions involving inverse trig functions |
| **8.5 Trigonometric Equations (43)** Solve trigonometric equations that are linear in formSolve trigonometric equations that are quadratic in formSolve trigonometric equations using identitiesSolve trigonometric equations using a calculator |
| **CHAPTER 9: Applications of Trigonometry** |
| **9.1 Right Triangle Applications (16)**Solve right trianglesSolve applied problems using right triangles |
| **9.2 The Law of Sines (29)** Determine if the Law of Sines can be used to solve an oblique triangleUse the Law of Sines to solve the SAA case or the ASA caseUse the Law of Sines to solve the SSA (ambiguous) caseUse the Law of Sines to solve applied problems involving oblique triangles |
| **9.3 The Law of Cosines (22)** Determine whether Law of Sines or Cosines should be used to solve an oblique triangleUse the Law of Cosines to solve the SAS caseUse the Law of Cosines to solve the SSS caseUse the Law of Cosines to solve applied problems involving oblique triangles |
| **9.4 Area of Triangles (19)** Determine the area of oblique trianglesUse Heron’s Formula to determine the area of an SSS triangleSolve applied problems involving the area of triangles |
| **CHAPTER 10: Polar Equations, Complex Numbers, and Vectors** |
| **10.1 Polar Coordinates and Equations (62)**Plot points using polar coordinatesDetermine different representations of a point *(r, θ)*Convert from polar to rectangular coordinatesConvert from rectangular to polar coordinatesConvert equations from rectangular to polar formConvert equations from polar to rectangular form |
| **10.2 Graphs of Polar Equations (67)** Sketch equations of the form *rcosθ = a*, *rsinθ = a*, *arcosθ + brsinθ = c*, and *θ = α*Sketch equations of the form *r = a*, *r = asinθ*, and *r = acosθ*Sketch equations of the form *r = a + bsinθ* and *r = a + bcosθ*Sketch equations of the form *r = asin(nθ)* and *r = acos(nθ)*Sketch equations of the form *r2 = a2sin(2θ)* and *r2 = a2cos(2θ)*  |
| **10.4 Vectors (31)** Determine magnitudes of vectors that are represented geometricallyPerform operations on vectors that are represented geometricallyDetermine components and magnitudes of vectorsWrite vectors in terms of *i* and *j*Perform operations on vectors written in *ai+bj* form and find magnitudesFind unit vectorsDetermine direction angles of vectorsWrite vectors in the form *v=ai+bj* given magnitudes and direction anglesSolve applied problems involving velocity using vectors |