**1. COURSE TITLE\*:** Precalculus

**2**. **CATALOG – PREFIX/COURSE NUMBER/COURSE SECTION\*: MATH 1150**

**3. PREREQUISITES\*:**

A student must meet one of the following criteria to register for this course:

- ACT Math score of 24 or higher.

- SAT Math score of 570 or higher.

- Accuplacer AAF score of 263 or higher.

- Four High School Math courses with grades of A, A, B, B or higher.

- A in Math 1118.

- Students with a B in Math 1118 must speak to an advisor before registering.

**COREQUISITE(S)\*: None**

**4. COURSE TIME/LOCATION/MODALITY: (*Course Syllabus – Individual Instructor Specific*)**

**5. CREDIT HOURS\*:** 5 **LECTURE HOURS\*:** 5

**LABORATORY HOURS\*:** 0 **OBSERVATION HOURS\*:** 0

**6. FACULTY CONTACT INFORMATION: *(Course Syllabus – Individual Instructor Specific)***

**7. COURSE DESCRIPTION\*:**

This is an accelerated course designed to prepare students for calculus. It includes a study of polynomial, rational, exponential, logarithmic, and trigonometric functions, systems of linear equations, trigonometric identities, non-right triangles, vectors, conic sections, an introduction to sequences and series, and an introduction to calculus. This course emphasizes the use of algebra and trigonometry in problem solving and modeling. Appropriate use of technology is emphasized.

**8. LEARNING OUTCOMES\*:**

At the completion of this course the student will be able to:

1. Analyze functions.
2. Convert between different representations of a function.
3. Perform operations with functions.
4. Analyze angles.
5. Analyze right triangles.
6. Analyze general triangles.
7. Recognize function families as they appear in equations and inequalities, choose an appropriate solution methodology for a particular equation or inequality, and communicate reasons for that choice.
8. Use correct, consistent, and coherent notation throughout the solution process.
9. Distinguish between exact and approximate solutions.
10. Demonstrate an understanding of the algebraic, functional, and geometric views of equation solutions.
11. Solve for one variable in terms of another.
12. Solve systems of equations using substitution and elimination.
13. Cite domain restrictions resulting from solution decisions and situation restrictions.
14. Purposefully create equivalences and indicate where they are valid.
15. Recognize opportunities to create equivalencies to simplify workflow.
16. Become fluent with conversions using traditional equivalency families.
17. Interpret the function correspondence and behavior of a given model in terms of the context of the model.
18. Create linear and periodic models from data and interpret slope as a rate of change.
19. Determine parameters of a model given the form of the model and data.
20. Determine a reasonable applied domain for the model, and articulate the model’s limitations.
21. Anticipate the output from a graphing utility and make adjustments as needed.
22. Use technology to verify solutions to equations and inequalities obtained algebraically.
23. Use technology to obtain solutions to equations and inequalities which are difficult to obtain algebraically.
24. Use technology and algebra in concert to locate and identify exact solutions.
25. Recognize when a result (theorem) is applicable and use the result to make sound logical conclusions and provide counter-examples to conjectures.
26. Represent sequences verbally, graphically, and algebraically, including both the general term and recursively.

**9. ADOPTED TEXT\*:**

Precalculus 2e

OpenStax - Open Resource Textbook

Jay Abramson

Download for free at <https://openstax.org/details/books/precalculus-2e>

**9a: SUPPLEMENTAL TEXTS APPROVED BY FULL TIME DEPARTMENTAL FACULTY (INSTRUCTOR MUST NOTIFY THE BOOKSTORE BEFORE THE TEXTBOOK ORDERING DEADLINE DATE PRIOR TO ADOPTION) \*\*\*.**

**10. OTHER REQUIRED MATERIALS: (SEE APPENDIX C FOR TECHNOLOGY REQUEST FORM.)\*\***

Students must have a graphing calculator, but they may not use any calculator that is classified as a symbolic manipulator.

**11. GRADING SCALE\*\*\*:**

Grading will follow the policy in the catalog. The scale is as follows:

A: 90 – 100

B: 80 – 89

C: 70 – 79

D: 60 – 69

F: 0 – 59

**12. GRADING PROCEDURES OR ASSESSMENTS: (*Course Syllabus – Individual Instructor Specific)***

|  |  |  |
| --- | --- | --- |
| *Example 1* | | |
| *Category* | *By Total Points* | *% of Grade* |
| Homework (20x10) | 200 | 10% |
| Quizzes/Tests  (5x360) | 1800 | 90% |
| Total | 2000 | 100% |

|  |  |  |
| --- | --- | --- |
| *Example 2* | | |
| *Category* | *By Total Points* | *% of Grade* |
| Online Quizzes | 400 | 100% |
| Online Tests  (6x100) | 600 | 15% |
| Notebook  (2x500) | 1000 | 25% |
| Midterm | 1000 | 25% |
| Final | 1000 | 25% |
| Total | 4000 | 100% |

**13. COURSE METHODOLOGY: *(Course Syllabus – Individual Instructor Specific)***

The course design provides instruction and materials to support the course objectives. Classes may consist of a variety of means to accomplish this including but not limiting to: lectures, class discussions, small group projects, supplemental materials, and outside assignments. Practice is an important part of the learning process. For every one hour of class time, two to three additional hours of study time should be expected.

**14. COURSE OUTLINE: *(Course Syllabus – Individual Instructor Specific)***

**Chapter 1. Functions – LO1, 2, 3**

* 1. Functions and Function Notation
  2. Domain and Range
  3. Rates of Change and Behavior of Graphs
  4. Composition of Functions
  5. Transformation of Functions
  6. Absolute Value Functions
  7. Inverse Functions

**Chapter 3. Polynomial and Rational Functions** **– LO1, 7, 8, 10, 13, 14, 17, 20, 21, 22**

3.1 Complex Numbers

3.2 Quadratic Functions

3.3 Power Functions and Polynomial Functions

3.4 Graphs of Polynomial Functions

3.5 Dividing Polynomials

3.6 Zeros of Polynomial Functions

3.7 Rational Functions

3.8 Inverses and Radical Functions

**Chapter 4. Exponential and Logarithmic Functions – LO1, 7, 9, 17, 19, 21, 23, 24, 25**

4.1 Exponential Functions

4.2 Graphs of Exponential Functions

4.3 Logarithmic Functions

4.4 Graphs of Logarithmic Functions

4.5 Logarithmic Properties

4.6 Exponential and Logarithmic Equations

4.7 Exponential and Logarithmic Models

**Chapter 5. Trigonometric Functions – LO1, 4, 5**

5.1 Angles

5.2 Unit Circle: Sine and Cosine Functions

5.3 The Other Trigonometric Functions

5.4 Right Triangle Trigonometry

**Chapter 6. Periodic Functions – LO1, 13, 19, 21**

6.1 Graphs of the Sine and Cosine Functions

6.2 Graphs of the Other Trigonometric Functions

6.3 Inverse Trigonometric Functions

**Chapter 7. Trigonometric Equations with Identities** **– LO15, 16, 18, 23**

7.1. Solving Trigonometric Equations with Identities

7.2 Sum and Difference Identities

7.3 Double-Angle, Half-Angle, and Reduction Formulas

7.4 Sum-to-Product and Product-to-Sum Formulas

7.5 Solving Trigonometric Equations

**Chapter 8. Further Applications of Trigonometry – LO6**

8.1 Non-right Triangles: Law of Sines

8.2 Non-right Triangles: Law of Cosines

8.8 Vectors

**Chapter 9. Systems of Equations and Inequalities – LO11, 12**

9.1 Systems of Linear Equations: Two Variables

**Chapter 10. Analytic Geometry – LO11**

10.1 The Ellipse

10.2 The Hyperbola

10.3 The Parabola

**Chapter 11. Sequences, Probability, and Counting Theory - LO26**

11.1 Sequences and Their Notations

**Chapter 12. Introduction to Calculus**

12.1 Finding Limits: Numerical and Graphical Approaches

**Recommended course calendar:**

Week 1: Chapter 1

Week 2: Chapter 1

Week 3: Chapter 3

Week 4: Chapter 3

Week 5: Chapter 3, 4

Week 6: Chapter 4

Week 7: Chapter 4

Week 8: Chapter 5

Week 9: Chapter 6

Week 10: Chapter 7

Week 11: Chapter 7

Week 12: Chapter 8

Week 13: Chapter 9, 10

Week 14: Chapter 10, 11

Week 15: Chapter 12

**15. SPECIFIC MANAGEMENT REQUIREMENTS\*\*\*:**

**16. FERPA: \***

Students need to understand that their work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**17.** **ACCOMMODATIONS:\***

Students requesting accommodations may contact Ryan Hall, Accessibility Coordinator at [rhall21@sscc.edu](mailto:rhall21@sscc.edu) or 937-393-3431 X 2604.

Students seeking a religious accommodation for absences permitted under Ohio’s Testing Your Faith Act must provide the instructor and the Academic Affairs office with written notice of the specific dates for which the student requires accommodation and must do so no later than fourteen (14) days after the first day of instruction or fourteen (14) days before the dates of absence, whichever comes first. For more information about Religious Accommodations, contact Ryan Hall, Accessibility Coordinator at [rhall21@sscc.edu](mailto:rhall21@sscc.edu) or 937-393-3431 X 2604.

**18. OTHER INFORMATION\*\*\*:**

**SYLLABUS TEMPLATE KEY**

**\*** Item cannot be altered from that which is included in the master syllabus approved by the Curriculum Committee.

**\*\*** Any alteration or addition must be approved by the Curriculum Committee

**\*\*\*** Item should begin with language as approved in the master syllabus but may be added to at the discretion of the faculty member.