



Purpose: It is the intention of this Administrative-Master Syllabus to provide a general description of the course, outline the required elements of the course and to lay the foundation for course assessment for the improvement of student learning, as specified by the faculty of Wharton County Junior College, regardless of who teaches the course, the timeframe by which it is instructed, or the instructional method by which the course is delivered. It is not intended to restrict the manner by which an individual faculty member teaches the course but to be an administrative tool to aid in the improvement of instruction.

Course Title – Calculus II
Course Prefix and Number – MATH 2414
Department – MATH **Division** – Math and Science
Course Type: (check one)
 Academic General Education Course (from ACGM – but not in WCJC Core)
 Academic WCJC Core Course
 WECM course (This course is a Special Topics or Unique Needs Course: Y or N)

Semester Credit Hours # : Lecture hours # : Lab/other hours # **4:4:0**

Equated Pay hours for course - 4

Course Catalog Description – Differentiation and integration of transcendental functions; parametric equations and polar coordinates; techniques of integration; sequences and series; improper integrals.

Prerequisites/Co-requisites – TSI satisfied in math and MATH 2413; or consent of department head

List Lab/ Other Hours
Lab Hours 0
Clinical Hours 0
Practicum Hours 0
Other (list) 0

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Reviewed by department head Dale Neaderhouser *Date* 8-24-13
Accuracy verified by Division Chair Kevin Dees *Date* 8-24-13
Approved by Dean or Vice President of Instruction *ggkunt* *Date* 8-24-13



I. Topical Outline – Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, clinical or other non lecture instruction):

Week	Days	Sections:
1	1;2;3;4	Review sections 6.3, 6.4, 6.5 (overlap Calc I) Logarithmic Functions Derivatives of Logarithmic Functions Exponential Growth and Decay
2	5;6;7;8	6.6, 6.7, 6.8 Review Inverse Trigonometric Functions Hyperbolic Functions Indeterminate Forms and L'Hospital's Rule
3 9;	10;11;12	7.1, 7.2, 7.3 Integration by Parts Trig Integrals Trig Substitution
4	13;14;15;16	7.4, 7.5, 7.6 Integration by Partial Fractions Rationalizing Substitutions Strategy for Integration
5	17;18;19;20	7.7, 7.8, 7.9, Review Using Tables of Integrals Approximate Integration Improper Integrals
6	21;22;23;24	TEST#1, 8.1, 8.2 Differential Equations Arc Length
7	25;26;27;28	8.3, 8.4, 8.5 Area of a Surface of Revolution Moments and Center of Mass Hydrostatic Pressure and Force
8	29;30;31;32	8.6, 9.1, 9.2, 9.3 Applications to Economics and Biology Curves by Parametric Equations Tangents and Areas Arc Length and Surface Area
9	33;34;35;36	TEST#2, 9.4, 9.5, 9.6 Polar Coordinates Areas and Lengths in Polar Coordinates. Conic Sections
10	37;38;39;40	9.7, 10.1, 10.2, 10.3 Conic Sections in Polar Coordinates. Sequences Series The Integral Test
11	41;42;43;44	10.4, 10.5, 10.6, TEST#3 The Comparison Tests Alternating Series Absolute Convergence; Ration & Root Tests
12	45;46;47;48	10.7, 10.8, 10.9, 10.10 Strategy for Testing Series

		Power Series Taylor and MacLaurin Series The Binomial Series
13	49;50;51;52	10.11, TEST#4, 11.1, 11.2 Approximately by Taylor Polynomials Three-Dimensional Coordinate Systems Vectors
14	53;54;55;56	11.3, 11.4, 11.5, 11.6 The Dot Product The Cross Product Equations of Lines & Planes Quadratic Surfaces
15	57;58	11.7, 11.9 Vector Functions and Space Curves Motion in Space: Velocity and Acceleration

II. Course Learning Outcomes

Course Learning Outcomes	Assessment Methods
<p>Upon successful completion of this course, the students will:</p> <p>A. Use the concepts of definite integrals to solve problems involving area, volume, work, and other physical applications.</p> <p>B. Use substitution, integration by parts, trigonometric substitution, partial fractions, and tables of anti-derivatives to evaluate definite and indefinite integrals.</p> <p>C. Define an improper integral.</p> <p>D. Apply the concepts of limits, convergence, and divergence to evaluate some classes of improper integrals.</p> <p>E. Determine convergence or divergence of sequences and series.</p> <p>F. Use Taylor and MacLaurin series to represent functions.</p> <p>G. Use Taylor or MacLaurin series to integrate functions not integral by conventional methods.</p> <p>H. Use the concept of polar coordinates to find areas, lengths of curves, and representations of conic sections.</p> <p>I. Be able to perform integration pertaining to the trigonometric functions.</p> <p>J. Solve problems pertaining to the simple harmonic motion.</p> <p>K. Perform integration and differentiation</p> <p>L. Exhibit the ability to differentiate and integrate expressions involving the exponential and logarithmic function.</p> <p>M. Be able to solve problems involving exponential growth and decay.</p> <p>N. Demonstrate a sound background in the hyperbolic functions.</p> <p>O. Be familiar with the basic methods of integration.</p> <ol style="list-style-type: none"> 1. Know the fundamental formulas 2. Integration by substitution 3. Trigonometric integrals 4. Integration involving trigonometric substitutions 	<p><u>Hour exams and final.</u></p> <p>Outcomes assessed by:</p> <p>Hour exams Final Short Answer Discussion Board</p>

5. Integrals involving quadratics 6. Be familiar with integration by parts 7. Partial fractions 8. Acquire reasonable expertise in the use of miscellaneous substitutions. P. Develop reasonable expertise in the solution of sequences and series. 1. Comparison Tests 2. Ratio and integral tests 3. Series of functions 4. Taylor's series 5. Differentiation and integration of series	
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III. Required Text(s), Optional Text(s) and/or Materials to be Supplied by Student.

Calculus, 7th Edition 2011; Stewart; Cengage (required)
Calculator (instructor's option)

IV. Suggested Course Maximum - 35

V. List any specific spatial or physical requirements beyond a typical classroom required to teach the course.

Students must have computer access to the WCJC website, their WCJC student email and online accounts. WCJC has open computer labs, with internet access, on all campuses for students to use.

VI. Course Requirements/Grading System – Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course

Grading System:

- a. Average of one hour exams 40-85%
- b. Daily participation, quizzes, extra credit 0-15%
- c. Homework grade 0-20%
- d. Comprehensive Final 15-30%

Or grading as specified by the instructor.

A= 90-100 B= 80-89 C= 70-79 D= 60-69 F= 59 and below

VII. Curriculum Checklist

- **Academic General Education Course** (from ACGM – but not in WCJC Core)
No additional documentation needed

- **Academic WCJC Core Course**
Attach the Core Curriculum Review Forms

- Critical Thinking
- Communication
- Empirical & Quantitative Skills
- Teamwork
- Social Responsibility
- Personal Responsibility

- **WECM Courses**
If needed, revise the Program SCANS Matrix & Competencies Checklist.



Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: **Math 2414**

Core Objective: **Critical Thinking Skills**—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information

Student Learning Outcome supporting core objective:

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
The SLO is:	Insert SLO (from Administrative Master Syllabi (AMS)) below	Provide a brief name and description of the sample learning activity:	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective:
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Use the concepts of definite integrals to solve problems involving area, volume, work, and other physical applications. (AMS SLO A)	A word problem (application) where the student must identify variables, assemble the correct formulas and solve for the desired result. Including a brief paragraph explaining what was done.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for critical thinking will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Use substitution, integration by parts, trigonometric substitution, partial fractions, and tables of anti-derivatives to evaluate definite and indefinite integrals. (AMS SLO B)	A written paragraph explaining the steps one takes to find the solution.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for critical thinking will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Determine convergence or divergence of sequences and series. (AMS SLO E)	Have the student grade an incorrect problem. The student should write a brief paragraph stating what was done incorrectly and what must be done to correct the solution.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for critical thinking will assess this.



Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: Math 2414

Core Objective: **Communication Skills**—to include effective development, interpretation and expression of ideas through written, oral and visual communication

Student Learning Outcome supporting core objective:

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
The SLO is:	Insert SLO (from Administrative Master Syllabi (AMS)) below	Provide a brief name and description of the sample learning activity:	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective:
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Use the concepts of definite integrals to solve problems involving area, volume, work, and other physical applications. (AMS SLO A)	A word problem (application) where the student must identify variables, assemble the correct formulas and solve for the desired result. Including a brief paragraph explaining what was done.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for communication will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Use substitution, integration by parts, trigonometric substitution, partial fractions, and tables of anti-derivatives to evaluate definite and indefinite integrals. (AMS SLO B)	A written paragraph explaining the steps one takes to find the solution.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for communication will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Determine convergence or divergence of sequences and series. (AMS SLO E)	Have the student grade an incorrect problem. The student should write a brief paragraph stating what was done incorrectly and what must be done to correct the solution.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for communication will assess this.

Core Curriculum Review Form

Foundational Component Area: **Mathematics**

Course Prefix & Suffix: Math 2414

Core Objective: **Empirical and Quantitative Skills**—to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

Student Learning Outcome supporting core objective:

For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
The SLO is:	Insert SLO (from Administrative Master Syllabi (AMS)) below	Provide a brief name and description of the sample learning activity:	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective:
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Use the concepts of definite integrals to solve problems involving area, volume, work, and other physical applications. (AMS SLO A)	A problem where the student computes the solution of a given problem to the required significant digits.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for EQS will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Determine convergence or divergence of sequences and series. (AMS SLO B)	The student shows the error analysis of convergence of a sequence or series and shows a numerical example.	A quiz, test or scanned artifact showing the student's written answer. Grading for correctness and the rubric for EQS will assess this.
<input checked="" type="checkbox"/> Existing <input type="checkbox"/> Revised <input type="checkbox"/> New <input checked="" type="checkbox"/> State Mandated	Use Taylor and MacLaurin series to represent functions. (AMS SLO F)	Have the student grade an incorrect problem involving error analysis and show the correct work to the required significant digits.	A quiz, test or discussion board artifact showing the student's written answer. Grading for correctness and the rubric for EQS will assess this.