TEXAS COLLEGE
Division of Natural and Computational Sciences
Course Syllabus MATH 2330-01 – Discrete and Combinatorial Mathematics

College is a Historically Black College founded in 1894, by the Colored Methodist Episcopal Church, now the Christian Methodist Episcopal Church (CME). Our mission continues to embody the principles of the Christian Methodist Episcopal Church. The College shall prepare students with competencies in critical and creative thinking related to the knowledge, skills, and abilities as defined in areas of study. Additionally, the College shall provide an environment to inspire intellectual, spiritual, ethical, moral, and social development, which empowers graduates to engage in life-long learning, leadership, and service.

TEXAS COLLEGE OUTCOMES

MATH 2330 is aligned with the Texas College mission and ensures the following institutional objectives:

1. Enhance communicative skills (oral and written)
2. Enhance critical thinking and technology skills
3. Enhance leadership abilities and spiritual awareness
4. Create opportunities for professional and post-graduate pathways

STUDENT LEARNING OBJECTIVES

This semester online course will cover five major themes that students are expected to master concepts by:

1. Mathematical reasoning: Students are expected to discuss mathematical reasoning in order to read, comprehend, and construct mathematical arguments. Students will define basic concepts of mathematical logic and proof.

2. Combinatorial analysis: Students will recall or enumerate objects and combinatorial analysis.

3. Discrete structures: Students will construct the basic concepts of sets, permutations, relations, graphs, trees and finite state machines. Students will illustrate discrete

objects and relationships using abstract mathematical structures.

4. Algorithmic thinking: Students will examine whether an algorithm works and test analysis in terms of memory and time.

5. Applications and modeling: Discrete mathematics has been used in numerous applications. Students will formulate and model problems with the concepts and techniques of discrete mathematics.

Students are expected to adhere to the rubrics, instructions, and deadlines given for each assignment.

1) **Who** does **What** activity, **When**, **Where**, and **Why**?

2) How will you measure the action? What metrics or milestones are involved?

3) Does the activity connect with the overall course objective in a relevant manner?

4) When does the activity occur, and for how long?

COURSE DESCRIPTION

Bit strings, basic concepts of set theory, algebraic structures, Cartesian products and relations, mappings, Boolean algebra, Boolean functions, applications to circuits, lattices, combinatorial principles, groups, generating functions, and recursion.

MATHEMATICS DEPARTMENT OUTCOMES

The Department of Mathematics provides a broad liberal arts foundation in the area of mathematical study. Students are introduced to mathematical topics, principles and foundational preparation that will assist with graduate school entry and/or entry into professional fields. The curriculum emphasizes computing and mathematical modeling designed to give students a modest advantage in the job market. The Department of Mathematics programs leads to the Bachelor of Science degree and/or preparation of the Educator Preparation program.

OBJECTIVES

The course provides an overview of the branches of mathematics commonly known as discrete and combinatorics mathematics. Topics included are set theory, relations, induction, graphs, and algorithms. The student will be able to improve problem solving skills and logical reasoning, as well as to understand and use the language of mathematics to model and study real-world phenomena. Student should be able to understand key concepts in logic, set theory, combinatorics, and graph theory; be able to effectively communicate mathematics, both in writing and orally; be able to read and write proofs of mathematical statements; and be able to apply the ideas they have learned to different situations and a variety of problems.

State the definitions of binary relation, reflexive, symmetric, transitive, equivalence relation, equivalence class, class representative, and partition. Show that a binary relation on a set is an

equivalent relation. Solve counting problems involving the multiplication rule, permutations, and combinations.

This course will cover five major themes:
1. Mathematical reasoning: Students are expected to use use mathematical reasoning in order to read, comprehend, and construct mathematical arguments. Students will learn basic concepts of mathematical logic and proof.
2. Combinatorial analysis: Students will count or enumerate objects and perform combinatorial analysis.
3. Discrete structures: Students will learn the basic concepts of sets, permutations, relations, graphs, trees and finite state machines. Students will represent discrete objects and relationships using abstract mathematical structures.
4. Algorithmic thinking: Students will verify whether an algorithm works well and perform analysis in terms of memory and time.
5. Applications and modeling: Discrete mathematics has been used in numerous applications. Students will formulate and model problems with the concepts and techniques of discrete mathematics.

SOFTWARE AND SUPPLIES

Software and Programs:
1. Access to websites as referenced in class. *Students attempting to gain access through cell phones, Mac books, or outdated equipment may experience difficulties with certain websites or videos. It is the student's responsibility to locate a computer lab with viable equipment.*
2. Access to JICS or CANVAS online classroom. *It is the student's responsibility to become familiar with the online classroom and related components.*
3. Most documents in this course will be HTML or Word format. However, you will need the additional software (which can be downloaded free from the Internet): Adobe Reader, SKYPE, Windows Media Player, and Quicktime.
4. Web 2.0 tools will be available online without additional costs to students. *Students should be prepared to back up files on their own Flash Drive. Work should be saved more than once, as it is not the instructor's responsibility if technology issues suddenly occur and information is lost.*

COURSE POLICIES AND PROCEDURES

*MATH 2330 is an online course delivered primarily through the **JICS/E-Racer** learning platform. Prerequisite skills include a working knowledge of computer skills, as well as of basic applications software. Email and web skills are also essential. Microsoft Office programs and tutorials are provided for free in JICS in the **"Technology Help"** tab.*

SUBMISSION OF ASSIGNMENTS

*All assignments must be submitted on time **in JICS**. **Please do not submit work through emails.** Each day that an assignment is late, points will be deducted from the final grade of that assignment. In the event **extenuating circumstances** prevent you from turning in an assignment*

*please contact the instructor **before** the due date. Late work will be accepted without penalties only if emergencies are documented or technology outages prevail.*

ATTENDANCE POLICY

*Online participation is a requirement for a passing grade in this course. **Students are expected to post discussion comments twice each week for participation.** Respond to the weekly discussion question by each Sunday and reply to at least one classmate by Wednesday of each week. To receive credit for substantive participation, each posting should exceed 80 words in thoughtful, complete sentences. You will not receive credit for participation if you submit bullet points, texting language, slang, profanity, or plagiarized commentaries. Please be advised that poor online participation can be grounds for being administratively withdrawn from the course. Please check emails and classroom announcements on a daily basis to remain well-informed.*

ACADEMIC INTEGRITY

Texas College believes that strength of character is as important as academic achievement; therefore, the College expects everyone in the academic community to maintain personal integrity in academic matters and not to contribute or condone the dishonesty of others. Scholastic dishonesty (which includes any form of plagiarism, cheating, falsification of records, and collusion with others to defraud) is improper and will not be tolerated. Texas College reserves the right to apply disciplinary actions to a student who has committed scholastic dishonesty.

REMEDIATION PLAN

Students who have difficulty with the course will have the opportunity to:
- Meet with the professor for one-on-one support through fact-to-face meetings, telephone sessions, or web conferencing.
- Revise unsatisfactory work until it is satisfactory within a 7- day time limit.

GRADING RUBRIC

90-100	A	Transformative (and submitted on time)
80-89	B	Proficient
70-79	C	Developing
60-69	D	Beginning
Below 60	F	Not Submitted

Assignments (Point Value)	Percent of Grade

Discussion Participation (2 points weekly; Introductions, postings, and responses/ 2 points)	20
Unit 1: Syllabus Review (2); TEKS Self-Assessment (3)	5
Unit 2: TExES Preparation (10)	10
Unit 3: Literature Review (5); Web 2.0 Rubrics (5); Web 2.0 Research (5); Midterm Exam (10)	25
Unit 4: Lesson Plan (10)	5
Unit 5: Peer Editing --Collaborations through Google Drive (10)	5
Unit 6: Final Projects --Interactive Lesson Presentation with Assessment Instrument (15); Electronic Portfolio with Virtual Field (10); Excel Spreadsheet with Chart (5)	30
Total	**100**

DISABIITIES AND SPECIAL NEEDS

Texas College provides equal opportunity to qualified disabled persons in accordance with the requirements of the American with Disabilities Act (ADA). This Act ensures that individuals with current disabling conditions are provided reasonable accommodations to enable them to enjoy the programs, activities, services, and employment opportunities offered by the College. Texas College adheres to this provision once a student/employee self identifies. Students may contact the Office of Academic Affairs for information/assistance at: adasupport@texascollege.edu .

NOTICE OF NON-DISCRIMINATION

Texas College does not discriminate in any employment practice, education program, or educational activity on the basis of race, color, religion, national origin, sex, age, disability, sexual orientation, or veteran status. The Vice President for Academic Affairs has been designated to handle student inquiries regarding non-discrimination policies. Contact information is: Texas College, Attn: Vice President for Academic Affairs, Office of Academic Affairs/Martin Hall 1st floor, 2404 North Grand Avenue, Tyler, Texas 75702.

WEEKLY COURSE SCHEDULE

Week of	Topics and Readings	Activities and Due Dates	Contact Hours	Objectives
Week 1	Unit 1: Syllabus, Introductions	Syllabus Quiz TEKS Self-Assessment *Discussion Forum (Introductions)*	Total hours – 9	SLO 1

Week 2	Unit 1: Number Systems	Binary Number System	Total hours--9	SLO 1,2, 3 & 4
Week 3	Unit 2: Number Systems	Adding Binary Numbers	Total hours - 9	SLO 1,2, 3 & 4
Week 4	Unit 2: Number Systems	Subtracting Binary Numbers	Total hours - 9	SLO 1, 2, 3 & 4
Week 5	Unit 3: Number Systems	Multiplying Binary Numbers	Total hours - 9	SLO 1, 2. 3 & 4
Week 6	Unit 3 Number Systems	Dividing Binary Numbers	Total hours - 9	SLO 1, 2, 3 & 4
Week 7	**Midterm Exam**	Midterm Exam	Total hours - 9	
Week 8	Unit 4: Number Systems	Octal Number System	Total hours - 9	SLO 1,2, 3 & 4
Week 9	Unit 4: Number Systems	Hexadecimal Number Systems	Total hours - 9	SLO 1, 2, 3 & 4
Week 10	Unit 5: Permutations	Permutations and Combinations Formulas	Total hours - 9	SLO 1, 2, 3 & 4
Week 11	Unit 5: Pascal's Triangle	Pascal's Triangle	Total hours - 9	SLO 1, 2 & 3
Week 12	Unit 6: Binomial Theorem	Binomial Theorem	Total hours - 9	SLO 1, 2, 3 & 4
Week 13	Unit 6: Logic Gates	Logic Gates	Total hours - 9	SLO 1, 2, 3 & 4
Week 15	**Final Exam**	**Final Exam**	Total hours - 9	
	Total reading hours—45 (3 credit hour course)	**Total participation hours— 90 (3 credit hour course)**	**Total Student Contact Hours TOTAL— 135.0 (3 credit-hour course)**	