Lower Division University Course Form

For help filling out the form press F1 or look at the bottom at the screen. For additional instructions, see Course Form Instructions.	
Type of Action	**Lower Division University Course - Request to offer a lower academic division course from a four-year state supported college or university.** See Rules of the Senate (Section III 2.5).
Notification to University	**According to Rules of the Senate (Section III, 2.5), the college will document notification to the appropriate university department of its intent to offer the course.** **Provide documentation of "notification to the appropriate university department of its intent to offer the course."** **Documentation is attached?** ☒ **Yes** ☐ **No**
General Education Status:	**Any university course or combination of university courses that can be used to satisfy the university requirements for a general education category will also satisfy the KCTCS requirements for that general education category.** **Does this course satisfy university requirements for general education status at the offering university?** ☐ **Yes** ☒ **No** **Documentation attached?** ☐ **Yes** ☐ **No** **If yes, what attribute (category) has been assigned?**

1. Name of institution and state that originally offers the course.

   University of Kentucky

2. Course Prefix and Number: **CS 275**

3. Course Title: **Discrete Mathematics**

4. Submitting Entity: Curriculum Committee:

   College: **Bluegrass Community and Technical College**

5. Justification for Course:

   This course serves BCTC students interested in computer science who are planning to transfer to The University of Kentucky.

6. Will this course be a part of approved curriculum/curricula? ☒ Yes ☐ No

   If yes, which curriculum/curricula?

   Computer & Information Technologies (fulfills requirement for the Computer Science Track)

7. Person(s) Primarily Responsible for Proposal **(Verify that members are still current and active prior to submission.)**:

Name	Teaching Area	College
Robert Chirwa	**Computer & Information Technologies**	**Bluegrass Community and Technical College**
Richard King	**Computer & Information Technologies**	**Bluegrass Community and Technical College**
James Kolasa	**Computer & Information Technologies**	**Bluegrass Community and Technical College**
Melanie Williamson	**Computer & Information Technologies**	**Bluegrass Community and Technical College**

8. Involvement of Others (Designate Individuals):

   a. System Office Staff:

   b. Others:

9. **PROPOSED EFFECTIVE DATE:** **Fall 2012**

10. Proposed Course Designations:

Credit / Contact Hours:	10a. Credit Hours:	**4**	Minimum	**4**	Maximum
	10b. Contact Hours:	**60**	If lab, etc., ratio of contact hours to credit hours. (See contact/ credit hour ratio chart)		

10c. Requisites:
Pre-requisites: ☒ Yes ☐ No

If yes, list:

MA 113 and CS 115

Co-requisites: ☐ Yes ☒ No If yes, list:

11. 11a. Grading Basis : ☒ Letter Grades ☐ Pass/Fail ☐ Letter Grades/NO GPA

11b. Repeat for additional credit: ☐ Yes ☒ No

If yes, how many times: Indicate total credit earned in course:

12. Course Components (check all that require scheduling)

☒ Lecture ☐ Lab ☐ Clinical ☐ Practicum ☐ On-line Course

13. Description:

Topics in discrete math aimed at applications in Computer Science. Fundamental principles: set theory, induction, relations, functions, Boolean algebra. Techniques of counting: permutations, combinations, recurrences, algorithms to generate them. Introduction to graphs and trees.

14. Course Competencies (**Begin statement with a capital letter and end with a period.**):

Students will develop knowledge of a variety of mathematical tools applicable in computer science. Specifically, students will be able to

1. Construct inductive proofs
2. Apply set algebra
3. Apply elementary logic
4. Enumerate combinatorial objects
5. Solve recurrence relations

15. Course outline (Two-level outline required):

I. Foundations of Discrete Mathematics
   A. Propositional logic statements and operators.
   B. Predicates and quantifiers
   C. Rules of inference
   D. Introduction to proofs
   E. Sets and set operations
   F. Functions, sequences, summations, products, and matrices
II. Algorithms and complexity
   A. Definition and desirable properties of algorithms
   B. The growth of functions
   C. Complexity of algorithms
III. Number theory
   A. Divisibility and modular arithmetic
   B. Primes and the Greatest Common Divisor
   C. The Euclidean algorithm
   D. Congruences
   E. RSA cryptosystem
IV. Induction and recursion
   A. Principle of mathematical induction
   B. The Well-Ordering principle

C. Exact formulas of recursive definitions
D. Program correctness

V. Counting
A. Basics of counting
B. The Pigeon-hole principle
C. Permutations and combinations
D. Binomial coefficients
E. Probability

VI. Relations, graphs and trees
A. Relations and their properties
B. Matrix representation of relations
C. Graph algorithms
D. Tree algorithms

16. List of experiments/activities (If laboratory or clinic is involved):

1.

17. Indicate suggested Learning Resources

Example:

Sorrentino, S. A. & Gorek, B. (2010). *Mosby's textbook for long-term care assistant* (6th ed.). St. Louis, MO: Mosby-Year Book, Inc. ISBN-10: 0323075835 ISBN-13: 978-0323075831

SUGGESTED LEARNING RESOURCES FOR THIS COURSE

Rosen, K. (2012), *Discrete Mathematics and Its Applications (seventh edition)*. McGraw-Hill. ISBN 978-0-07-735350-1.

Submit form, documentation of notification to the appropriate university department of its intent to offer the course, and signature page or minutes of local CRC meeting to Mary Kleber at Mary.Kleber@kctcs.edu.