# Course Outline Format

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| Program | BS Mathematics |
| Course code and Title | MA-105 Discrete Mathematics |
| Credit Hours | 3 |
| Duration | 1 Semester |
| Prerequisites | MA-104 |
| Resource Person |  |
| Counseling Timing |  |
| Contact |  |

**Chairman/Director Programme signature………………. Dean’s signature…………**

**Date………………………………….**

**Learning Objective**

Discrete Mathematics is study of distinct, un-related topics of mathematics; it embraces topics from early stages of mathematical development and recent additions to the discipline as well. The present course restricts only to counting methods, relations and graphs. The objective of the course is to inculcate in the students the skills that are necessary for decision making in non-continuous situations.

**Learning Methodology**

Basic methods: product, inclusion-exclusion formulae. Permutations and combinations. Recurrence relations and their solutions. Generating functions. Double counting. Applications. Pigeonhole principle, applications.

**Relations:** Binary relations, n-ary Relations. Closures of relations. Composition of relations, inverse relation.

**Graphs:** Graph terminology. Representation of graphs. Graphs isomorphism. Algebraic methods: the incidence matrix. Connectivity, Eulerian and Hamiltonian paths. Shortest path problem. Trees and spanning trees. Complete graphs and bivalent graphs.

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Qizzes 20

Assignments

Mid Term 30

Attendance & Class Participation

Term Project 10

Presentations

Final exam 40

Total 100

**Recommended Text Books**

1. B. Bollobas, *Graph Theory*, Springer Verlag, New York, 1979.

2. K.R. Parthasarathy, *Basic Graph Theory*, McGraw Hill, 1994

3. K.H. Rosen, *Discrete Mathematics and its Application*, McGraw-Hill, 6th edition, 2007.

4. B. Kolman, R.C. Busby, S.C. Ross, *Discrete Mathematical Structures*, Prentice-Hall of India, New Delhi, 5th edition, 2008.

5. A. Tucker, *Applied Combinatorics*, John Wiley and Sons, Inc New York, 2002.

6. R. Diestel, *Graph Theory*, 4th edition, Springer- Verlag, New York, 2010.

7. N.L. Brigs, *Discrete Mathematics*, Oxford University Press, 2003

8. K.A. Ross, C.R.B. Wright, *Discrete Mathematics*, Prentice Hall, New Jersey, 2003.

**Reference Books**