



# DIRECTORATE OF DISTANCE EDUCATION

L.N. Mithila University, Kameshwaranagar, Darbhanga-846008 (BIHAR)  
Phone & Fax : 06272-246506 Website : [ddelnu.ac.in](http://ddelnu.ac.in), E-mail : [director@ddelnu.ac.in](mailto:director@ddelnu.ac.in)

## M.Sc. (Math) Assignment, December, 2021 Final Year

### COURSE CODE: MAT109

1. State and prove Bounded Convergence Theorem.
2. Let  $X$  be a set and let  $\mu$  be an outer measure on  $X$ . Then prove that:

$$\mu^* = \{A \in P(X), A \cap Y \in P(X), \mu^*(Y) = \mu(Y \cap A) + \mu^*(Y \cap A^c)\}$$

3. State and prove Fubini Theorem.

### COURSE CODE: MAT110

1. Prove that the function  $\{z\}^2$  is continuous everywhere but nowhere differentiable except at origin.
2. State and prove Cauchy's integral theorem.
3. State and prove Jordan's Lemma.

### COURSE CODE: MAT111

1. Find general and singular solutions of the equation  $xp^2 - 2yp + 4x = 0$ .
2. Solve :

$$\frac{d^3y}{dx^3} - \frac{d^2y}{dx^2} - \frac{6dy}{dx} = 1+x^2$$

3. Solve  $(y - z)(y+z - 2x)dx + (z - x)(z+x - 2y)dy + (x - y)(x+y - 2z)dz = 0$

### COURSE CODE: MAT112

1. Discuss the Background of Set Theory.
2. Prove that union of a non-empty set of Dedekind cuts is either itself a Dedekind cut or is the set  $Q$ .
3. Let  $f: T \rightarrow S$  be a one-to-one function mapping  $T$  on to  $S$ . If  $T$  is a well ordered set; then  $T$  induces a well ordering on  $S$ . Hence, every countable set can be well-ordered.

### COURSE CODE: MAT113

1. Briefly explain the feature of harddisk with a neat diagram.
2. What is an operator? Describe various types of operators available in C language.
3. What are the different categories of functions in C? Give examples.

### COURSE CODE: MAT114

1. How do you use # define to set values of constants in your program?
2. How do you invoke a base member function from a derived class in which you have overridden that function?
3. Is it legal in C++ to overload the operator ++ so that it decrements a value in your class?

### COURSE CODE: MAT115

1. If  $(A, \leq)$  and  $(B, \leq)$  are posets, then prove that  $(A \times B, \leq)$  is a poset, with partial order  $\leq$  defined by  $(a, b) \leq (a', b')$  if  $a \leq a'$  in  $A$  and  $b \leq b'$  in  $B$ .
2. Define Boolean function and prove that the number of fundamental functional form for a Boolean function of  $n$ -Variable is  $(2)^{2^n}$ .
3. From 7 boys and 4 girls a committee of 6 is to be formed; in how many ways can it be done when the committee contains (i) Exactly 2 girls and (ii) At least 2 girls?

---

**Note: Last date of Assignment submission (By Post only) - 30.12.2021**  
(Postal Address:- Director, Directorate of Distance Education, L.N. Mithila University, Denvi Road, Darbhanga- 846004)