DIRECTORATE OF DISTANCE EDUCATION

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M.Sc. (Math) Assignment, December, 2021 First Year

COURSE CODE: MAT101

1. Define maximal ideal with examples. Show that an ideal of the ring of integers Z is maximal if it is generated by some prime integers.
2. Define Euclidean domain and prove that every Euclidean ring is a principal ideal domain.
3. If W is a subspace o a vector space V(F), then the set V/W= (u+W : u€V) of all cosets of W in V is a vector space over F w.r to addition and scalar compositions defined by:
   (u+W)+(v+W) = (u+v)+W, u,v€V
   a(u+W) = au+W. Aa€ F, u € V

COURSE CODE: MAT102

1. Define Linear transformation. Let $T:R^n \rightarrow R^n$ be a Liner transformation of A €α_n and m_n (T(A))= m_n (A)
2. Define Idefinite Integral. If μ be a measure on (X.Σ) and $f:x \rightarrow \bar{C}$ be integrable with respect to μ. Then f|μ (A)= A f|d| μ.
3. Define Conjugate of p and also state and prove Minkowski's inequality.

COURSE CODE: MAT103

1. State and prove Tauber's Theorem and prove that the Cauchy product of the convergent series $\sum_{n-1} \frac{(-1)^{n-1}}{n}$ with itself is not convergent.
2. Suppose f is a real value function defined in an open set E R2. Suppose that D_1 f_1 D_2 and D_{21} f exist at every point of E_1 and D_{21} f is continuous at some point (a,b) and (D_{12} f) (a, b) and (D_{12} f) (a, b) = (D_{21} f) (a, b)

   If $f(x, y) = xy \frac{X^2 - y^2}{x^2 + y^2}$, (x y)#0

   = 0 ; (x, y) = (0, 0)

   Then prove that (D_{xy} f) (0,0)#(D_{yx} f) (0, 0)

3. State and prove inverse function theorem.

COURSE CODE: MAT104

1. A necessary and sufficient condition for a vector x in a convex set S to be an extreme point is that x is a basic feasible solution satisfying the system Ax = b, x ≥ 0
2. Solve the following integral LP Problem using Gomory's cutting plane method:
3. Manimize Z= $x_1 + x_2$
4. Use dynamic programming to solve the following problem:

   Manimize Z= $y_1^2 + y_2^2 + y_3^2$

   Subjected to constraint

   $Y_1+y_2+y_3 \geq 15$

   and $y_1, y_2, y_3 \geq 0$

COURSE CODE: MAT105

1. Define compact space with examples and prove that every closed and bounded interval on the real line is compact. Also prove that real line is not compact.
2. Define T_1 – space and T_2 – space with examples and prove that every T_2 – space is a T_1 – space is converse true?
3. Define Cauchy's sequence in a metric space and prove that every convergent sequence in a metric space is a Cauchy sequence.

COURSE CODE: MAT106

1. State and prove Uniform Boundedness Theorem.
2. Define positive, normal and unitary operators in a Hibert space. And operator T on a Hibert space H is unitary if it is an isometric isomorphism of H it self.
3. State and prove Derivative of a Composite mapping.

COURSE CODE: MAT107

1. Describe the classifications of Computers.
2. What do you mean by Software? Describe the various types of sopftware.
3. What is Network? Describe LAN, WAN and MAN.

Note: Last date of Assignment submission (By Post only) – 30.12.2021
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