CLASS: BA/B.SC. (NM+CS)- II        PAPER: ADVANCED CALCULUS

SEM: 3rd        Session: 2020-21

| SR. NO. | MONTH | PERIOD | TOPICS |
|---|---|---|---|
| 1. | NOVEMBER | 1st week | 1. Indeterminate forms |
| | | 2nd week | 2. Limit and continuity of real valued functions of two variables. |
| | | 3rd week | 3. Partial differentiation. Total differentials. |
| | | Last week | 4. Darboux intermediate value theorem for derivatives, Composite functions and implicit functions. |
| 2. | DECEMBER | 1st week | 1. Change of variables, Homogeneous functions, Euler's theorem on homogeneous functions. |
| | | 2nd week | 2. Taylor's theorem for functions of two variables. |
| | | 3rd week | 3. Differentiability of real valued functions of two variables. **Class Test.** |
| | | Last week | 4. Schwarz and Young's theorem, Implicit function theorem. **Assignment 1.** |
| 3. | JANUARY | 1st week | 1. Maxima, Minima and saddle points of two variables. Lagrange's method of multipliers, **Group Discussion.** |
| | | 2nd week | 2. Continuity, Sequential continuity, properties of continuous functions, Uniform continuity, Taylor's theorem with various form of remainders. |
| | | 3rd week | 3. Chain rule of differentiability. Mean value theorems, **Written Test/Assignment 2.** |
| | | Last week | 4. Rolle's theorem and Lagrange's mean value theorem and their geometrical interpretations. |
| 4. | FEBRUARY | 1st week | 1. Taylor's theorem with various form of remainders. Darboux intermediate value theorem for derivatives. |
| | | 2nd week | 2. Jacobians, Beta and Gamma Functions |
| | | 3rd week | 3. Double and Triple Integral. |
| | | Last week | 4. Dirichlet's Integral and Change of order of Integration. |

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**CLASS: BA/B.SC. (NM+CS)- III**　　　**PAPER: Sequences and Series**

**SEM: 5th**　　　**Session: 2020-2021**

| SR. NO. | MONTH | PERIOD | TOPICS |
|---|---|---|---|
| 1. | NOV | 1st week | 1. Boundedness of the set of real numbers: least upper bound, greatest lower bound of a set, neighbourhoods, interior points, isolated points, limit points, open sets, closed set, interior of a set, closure of a set in real numbers and their properties. |
|  |  | 2nd week | 2. Bolzano-Weierstrass theorem, Open covers, Compact sets and Heine-Borel Theorem. |
|  |  | 3rd week | 3. Sequence: Real Sequences and their convergence, Theorem on limits of sequence, Bounded and monotonic sequences |
|  |  | Last week | 4. Cauchy's sequence, Cauchy general principle of convergence, Subsequences, Subsequential limits. |
| 2. | DEC | 1st week | 1. Infinite series: Convergence and divergence of Infinite Series, Comparison Tests of positive terms Infinite series, Cauchy's general principle of Convergence of series, Convergence and divergence of geometric series. |
|  |  | 2nd week | 2. Hyper Harmonic series or p-series.Infinite series: D-Alembert's ratio test, Raabe's test, Logarithmic test, de Morgan and Bertrand's test. |
|  |  | 3rd week | 3. Cauchy's Nth root test, Gauss Test, Cauchy's integral test, Cauchy's condensation test, **Class Test**. |
|  |  | Last week | 4. Alternating series, Leibnitz's test, absolute and conditional convergence, Arbitrary series: abel's lemma, Abel's test, Dirichlet's test, **Assignment 1.** |
| 3. | JAN | 1st week | 1. Fourier's series: Fourier expansion of piecewise monotonic functions, **Group Discussion.** |
|  |  | 2nd week | 2. Properties of Fourier Co-efficients, Dirichlet's conditions. |
|  |  | 3rd week | 3. Parseval's identity for Fourier series, **Written Test/Assignment 2.** |
|  |  | Last week | 4. Fourier series for even and odd functions, Half range series, Change of Intervals. |
| 4. | FEB | 1st week | 1. Riemann integral, Darboux's theorem, Integrabililty of continuous and monotonic functions. |
|  |  | 2nd week | 2. The Fundamental theorem of integral calculus. |
|  |  | 3rd week | 3. Mean value theorems of integral calculus. |
|  |  | Last week | 4. Revision |

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