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| Blue print for ISA/ESA  **SEM I (2022-23)** | | | | | | | | |
| Course : **Single Variable Calculus** | | | Course Code : 18EMAB101 | | | | | |
| Total Duration (H:M):3hr : 00 | | | Maximum Marks :100 | | | | | |
| Note :Answer Five Questions: Any two full questions from each Unit I & Unit II and one full question from Unit III | | | | | | | | |
| **UNIT - I** | | | | | | | | |
| Syllabus | Q | **Questions** | | Marks | CO | BL | PO | PI Code |
| **1:Introduction to Mathematical Modeling**  **2: Functions and Graphs**    **3: Calculus of functions and models** | 1a | Mathematical Modeling. | | 6 | 1 | L2 | 1 | 1.1.2 |
| 1b | Limit of a function, infinite limits-graph/ Horizontal and Vertical Asymptotes/Continuity and discontinuity. | | 7 | 2 | L3 | 1 | 1.1.1 |
| 1c | Radius of curvature | | 7 | 2 | L3 | 1 | 1.1.1 |
| 2a | Examples on models (Linear, exponential, trigonometric functions) | | 6 | 1 | L3 | 1 | 1.1.2 |
| 2b | Local maxima and local minima / Absolute maxima and minima/Optimization Problems | | 7 | 2 | L3 | 1 | 1.1.1 |
| 2c | Roots of an equation by Bisection method /N R Method. | | 7 | 2 | L3 | 1 | 1.1.1 |
| 3a | Transformations of functions with domain and range | | 6 | 1 | L3 | 1 | 1.1.3 |
| 3b | Sketch graph from conditions( **Derivatives** ) | | 7 | 2 | L2 | 1 | 1.1.1 |
| 3c | L-Hospital’s rule. | | 7 | 2 | L3 | 1 | 1.1.1 |

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| **UNIT – II** | | | | | | | |
| **4: Infinite Series**  **5: Integral calculus** | 4a | Beta and Gamma functions | 6 | 4 | L3 | 1 | 1.1.3 |
| 4b | Power series representation / Taylor series /Maclaurin’s Series | 7 | 3 | L2 | 1 | 1.1.3 |
| 4c | Tracing of Cartesian/parametric/polar curves | 7 | 4 | L2 | 1 | 1.1.1 |
| 5a | Test for convergence: Geometric Series Test/Limit Comparison Test/Ratio Test | 6 | 3 | L3 | 1 | 1.1.3 |
| 5b | Area using integration | 7 | 4 | L3 | 1 | 1.1.3 |
| 5c | Trapezoidal rule /Simpsons Rule | 7 | 4 | L3 | 1 | 1.1.1 |
| 6a | Perimeter using integration | 6 | 4 | L3 | 1 | 1.1.3 |
| 6b | Radius of convergence and interval of convergence of Power series | 7 | 3 | L3 | 1 | 1.1.1 |
| 6c | Surface area /Volume using Integration | 7 | 4 | L3 | 1 | 1.1.3 |
| **UNIT – III** | | | | | | | |
| **6: Ordinary differential Equations of first order** | 7a | Linear Differential Equation | 6 | 5 | L3 | 1 | 1.1.1 |
| 7b | Exact Differential Equation | 7 | 5 | L3 | 1 | 1.1.1 |
| 7c | R-K Method/Euler’s Method/Euler’s Modifed Method. | 7 | 5 | L3 | 1 | 1.1.1 |
| 8a | Orthogonal Trajectories | 6 | 5 | L3 | 1 | 1.1.1 |
| 8b | Population growth/Newton Law of Cooling | 7 | 5 | L3 | 1 | 1.1.2 |
| 8c | RL Circuit | 7 | 5 | L3 | 1 | 1.1.2 |