**Course – 5 Title: Mathematics-I**

**Course Code: MAT 111 Credit: 3.00 Contact Hour: 3 per week Total marks: 100**

* 1. **Rationale:** To be a computer Engineer one has to have sound knowledge about limit, continuity, differentiability and integration of differential and integral calculus.

**11.2 Objectives:**

1. To Learn about various limit problems algebraically and graphically
2. To Examine and Apply the continuity and differentiability of various types of function
3. To gain knowledge about Integration and application of Integration.

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| **11.3** **Learning Outcomes** | **11.4** **Course Content** | **11.5** **Teaching/Learning Strategy** | **11.6 Assessment Strategy** |
| 1. Define limit and continuity.
2. Justify continuity and differentiability.
3. Explain Differentiability
4. Find the differential coefficient.
 | **Differential Calculus**Limit, continuity and differentiability, successive differentiation of various types of functions | LectureExercise | AssignmentEssayExerciseShort answer |
| 1. State and prove the Leibnitz’s theorem
2. Roll’s theorem and Mean Value theorem
 | Leibnitz's rule, Taylor's theorem in finite and infinite forms. Maclaurin's theorem in finite and infinite forms. Roll’s theorem, Mean Value theorem  | LectureExercise | AssignmentEssayExerciseShort answer |
| 1. DefinePartial Derivative
2. Derive Euler's theorem.
 | Partial differentiation, Euler's theorem.  | LectureExercise | AssignmentEssayExerciseShort answer |
| 1. Determine theEquations of Tangent and normal.
 | Equations of Tangent and normal. | LectureExercise | AssignmentEssayExerciseShort answer |
| 1. Determine themaximum and minimum.
2. Discuss the maximum and minimum.
3. Evaluate maximum and minimum of function
 | Determination of maximum and minimum values of functions and points of inflexion | LectureExercise | AssignmentEssayExerciseShort answer |
| 1. Explain Curvature, radius of curvature and center of curvature
 | Curvature, radius of curvature and center of curvature. | LectureExercise | AssignmentEssayExerciseShort answer |
| 1. Compute Integral of functions
 | **Integral Calculus**Integration by various methods | LectureExercise | AssignmentEssayExerciseShort answer |
| 1. List the properties ofDefinite Integrals
2. Define Gamma and Beta Function.
3. Find the relation between Gamma and Beta Function
 | Definite Integrals, Gamma Beta Function,  | LectureExercise | AssignmentEssayExerciseShort answer |
| 1. State and proveWalli’s formula
2. Deduce Reduction Formula
3. Explain improper integral
4. Derive area of various curves.
 | Walli’s formula, Reduction Formula, Improper integral, Determination of Area | LectureExercise | AssignmentEssayExerciseShort answer |

**RECOMMENDED BOOKS AND PERIODICALS**

 **Book References:**

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| 1. | S.P. Gordon  | : Calculus and the Computer. |
| 2. | L.I. Holder  | : Calculus and Analytic Geometry. |
| 3. |  J.F. Hurley  | : Calculus |
| 4. | Willard, Stephen | : Calculus and its Application |
| 5. | J. Stewart  | : Calculus. |