| | |
|---|---|
| **COURSE TITLE** | **MATHEMATICAL FUNDAMENTALS FOR COMPUTER SCIENCE** |
| **COURSE CODE** | **01AL0101** |
| **COURSE CREDITS** | **5** |

**Objective:**

1 This subject aims to provide an essential background of central tendency, probability, sequence and series, basic derivative and integration to students of science and engineering courses at graduate level. A good science or engineering graduate is expected to have a sound knowledge of these some areas of mathematical foundation are essential tools for learning Technology, Engineering and Sciences.

**Course Outcomes:** After completion of this course, student will be able to:

1 Apply the concepts of measures of central tendency and dispersion
2 Identify the need of probability and will be able apply them to solve real life problems
3 Apply the form of sequence and series in various directions of mathematics.
4 Understand the concepts of derivatives and integrations
5 Learn about expansion of some basic functions and its related problems

**Pre-requisite of course:**NA

**Teaching and Examination Scheme**

| Theory Hours | Tutorial Hours | Practical Hours | ESE | IA | CSE | Viva | Term Work |
|---|---|---|---|---|---|---|---|
| 3 | 2 | 0 | 50 | 30 | 20 | 25 | 25 |

| Contents : Unit | Topics | Contact Hours |
|---|---|---|
| 1 | **Measures of Central Tendency and Dispersion** Introduction to Central tendency,, Mean, Median, Mode for group and ungroup data, Standard deviation, Variance and Skewness | 6 |
| 2 | **Introduction to Probability** Experiment, Outcomes, Sample space and Events, Some basic definitions of Probability, Properties of Probability, Fundamental principle of counting, Permutations and Combinations their connections, simple applications | 9 |
| 3 | **Sequence and Series** Types of sequences: Arithmetic, Geometric and Harmonic, General term of a Geometric Progression (G.P.), sum of n terms of a G.P., infinite Series and its sum, Alternating Series, Convergence and Divergence, Comparison test, D'Alembert ratio test, Cauchy's root test | 13 |

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| Contents : Unit | Topics | Contact Hours |
|---|---|---|
| 4 | **Basic Differentiation and Integration**<br>Limit, continuity and differentiability of a function, Derivatives of some basic functions, derivative of sum, difference, product and quotient of functions, Evaluation of simple integrals, Basic properties of definite integrals and evaluation of definite integrals | 12 |
| 5 | **Expansion of functions**<br>Concept of Expansion of functions, Taylor's series expansion, Maclaurin's series expansion | 5 |
| **Total Hours** | | **45** |

**Suggested List of Experiments:**

| Contents : Unit | Topics | Contact Hours |
|---|---|---|
| 1 | **Tutorial -1**<br>Tutorial 1 from Measures of Central Tendency and Dispersion | 2 |
| 2 | **Tutorial - 2**<br>Tutorial 2 from Measures of Central Tendency and Dispersion | 2 |
| 3 | **Tutorial - 3**<br>Tutorial 3 from Measures of Central Tendency and Dispersion | 2 |
| 4 | **Tutorial - 4**<br>Tutorial 4 from Introduction to Probability | 2 |
| 5 | **Tutorial - 5**<br>Tutorial 5 from Introduction to Probability | 2 |
| 6 | **Tutorial - 6**<br>Tutorial 6 from Introduction to Probability | 2 |
| 7 | **Tutorial - 7**<br>Tutorial 7 from Sequence and Series | 2 |
| 8 | **Tutorial - 8**<br>Tutorial 8 from Sequence and Series | 2 |
| 9 | **Tutorial - 9**<br>Tutorial 9 from Sequence and Series | 2 |
| 10 | **Tutorial - 10**<br>Tutorial 10 from Basic Differentiation and Integration | 2 |
| 11 | **Tutorial - 11**<br>Tutorial 11 from Basic Differentiation and Integration | 2 |
| 12 | **Tutorial - 12**<br>Tutorial 12 from Basic Differentiation and Integration | 2 |
| 13 | **Tutorial - 13**<br>Tutorial 13 from Expansion of functions | 2 |
| 14 | **Tutorial - 14**<br>Tutorial 14 from Expansion of functions | 2 |
| **Total Hours** | | **28** |

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**Textbook :**

1 Thomas' Calculus , M. D. Weir et al , Pearson Eduaction , 2008
2 Calculus Early Transcendental , Stewart James , Thomson India , 2017
3 Advanced Engineering Mathematics , Wylie & Barrett , Mc graw Hill publication , 2008
4 Advanced Engineering Mathematics , Greenberg MD , Greenberg MD , 1998

**Suggested Theory Distribution:**

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

| Distribution of Theory for course delivery | | | | | |
|---|---|---|---|---|---|
| **Remember / Knowledge** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Higher order Thinking / Creative** |
| 25.00 | 25.00 | 30.00 | 10.00 | 5.00 | 5.00 |

**Instructional Method:**

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

**Supplementary Resources:**

1 http://mathworld.wolfram.com
2 http://en.wikipedia.org/wiki/Math

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