Course Title: Aptitude and Reasoning Development – Advanced (ARDA)			
Course Code : P18HU510	**Semester : 5**	**L :T:P : 0:2:0**	**Credits: 1**
Contact Period: Theory: 32 Hr, Exam: 3 Hr		**Weightage: CIE:50%, SEE:50%**	

Prerequisites: Vocabulary builder, Concept of Percentage

Course Learning Objectives (CLOs)

This course aims to

1. Describe the importance of reading with comprehension.
2. Explain seven dimensions approach to better reading skills.
3. Explain the purpose, plan and the ways to identify specific details in a paragraph for better comprehension.
4. Formulate easier ways to solve problems of averages.
5. Explain the Application of the technique of alligation while solving weighted average and mixture problems.
6. Describe the concepts of profit, loss, discount, Marked price.
7. Explain the application of percentage in our daily life.
8. Discover different ways to identify the progressions and to compare between AP< GP and HP.
9. Explain the basic concepts in calculating simple interest and compound interest.
10. Differentiate between simple interest and compound interest and describes the importance of compound interest and its behaviour.

Course Content

Unit-1

Reading Comprehension:

Introduction: Read more and more, The process of writing and its relevance to the process of writing, how reading skills are important for aspects other than the reading comprehension questions, the daily reading scheme.

Seven dimension approach to better reading skills: Developing the ability of understanding vocabulary in context, Ability to identify and understand main ideas, Ability to predict and identify supporting details, Understanding the use of transition and idea organization patterns, Inferences, Identifying purpose and tone, Recognizing and evaluating arguments and their common structures.

Theory of reading comprehension : Solving RC passages is an exact science, tackling RC on the basis of evaluation of support, All passages have a topic, purpose and a plan, Other things to pick up while reading the passage– The tonality and other software related the author's viewpoint in the passage, specific details and their use in the passage, Types of questions asked in reading comprehension passage.

8 Hours

Unit-2

Averages and Alligations mixtures: Average: relevance of average, meaning of average, properties of average, deviation method, concept of weighted average. **Alligation method:** situation where allegation technique, general representation of alligations, the straight line approach, application of weighted average and alligation method in problems involving mixtures. Application of alligation on situation other than mixtures problems.

6 Hours

Unit-3

Permutation and Combination: Understanding the difference between the permutation and combination, Rules of Counting-rule of addition, rule of multiplication, factorial function, Concept of step arrangement, Permutation of things when some of them are identical, Concept of 2^n, Arrangement in a circle.

Probability: Single event probability, multi event probability, independent events and dependent events, mutually exclusive events, non-mutually exclusive events, combination method for finding the outcomes.

6 Hours

Unit-4

Progression:

Arithmetic Progression: sum of given number of terms in an A.P., arithmetic mean, to insert a given number of arithmetic means between two given quantities, nth term of an A.P., finding common difference of an A.P. given 2 terms of an A.P., types of A.P.s– increasing A.P.s and decreasing A.P. s

Geometric: to find, the geometric mean between two given quantities, to insert a given number of geometric means between two given quantities, sum of a number of terms in a G.P. Types of G.P.s— increasing G. P. s type one and two , decreasing G. P. s type one and two.

Harmonic Progression: to find the harmonic mean between two given quantities , theorems related with progressions, solved examples sample company questions

4 Hours

Unit-5

Coding Decoding: Letter Coding, Number Coding, symbol coding

Crypt arithmetic: Basic concepts , addition **,** subtraction, multiplication of coded alphabets, Types of cryptarithm

Data Interpretation: Approach to interpretation - simple arithmetic, rules for comparing fractions, Calculating (approximation) fractions, short cut ways to find the percentages, Classification of data– Tables, Bar graph, line graph, Cumulative bar graph, Pie graph, Combination of graphs. Combination of table and graphs

8 Hours

Reference books:

1. The Trachtenberg speed system of basic mathematics, published by Rupa publications.
2. CAT Mathematics by Abhijith Guha. published by PHI learning private limited.
3. Quantitative aptitude by Dr. R. S Agarwal, published by S.Chand private limited.
4. Verbal reasoning by Dr. R. S Agarwal , published by S. Chand private limited.
5. Quantitative aptitude for CAT by Arun Sharma, published by McGraw Hill publication.

Course Outcomes (CO)

After learning all the units of the course, the student is able to:

1. Apply the approach of seven dimension to better reading skills. L2
2. Solve the questions under reading comprehension confidently with higher accuracy than random reading. L4
3. Apply the technique of alligation for effective problem solving. L2
4. Interpret the requirement of different methods of calculating average and apply the right method at right scenario. L4
5. Effectively solve problems of profit and loss and problems related to discount, simple interest and compound interest. L5

6. Formulate the equations for summation and other functions for all the kinds of progressions– AP, GP and HP. L1

After learning all the topics of Unit-1, the student is able to

1. Explain the importance of reading skills. L1
2. Interpret the importance of vocabulary in solving Reading comprehension questions. L4
3. Identify the main idea and supporting details in the paragraph. L2
4. Identify purpose and tone of the author.L2
5. Interpret the use of transition and idea organization pattern. L4
6. Recognize and evaluate arguments and their common structures. L1
7. Solve RC questions methodologically.L5
8. Classify types of questions asked in the RC passages. L2
9. Apply flow chart or mind map to solve RC questions. L4

After learning all the topics of Unit-2, the student is able to

1. Analyze the properties of average and apply them in the right scenarios.L5
2. Apply the mean deviation method in certain set of questions. L2
3. Distinguish between the usage of simple average and weighted average.L1
4. Apply weighted average concept and formula to solve the problems of mixtures.L2
5. Compare the weighted average method with the alligation method and understand their strengths and limitations. L4
6. Apply the technique of alligation to solve problems in very less duration of time. L2
7. Understand the concept of homogeneity and other properties of mixtures. L4
8. Apply the basic properties of mixtures while solving the problems under the concept of removal and replacement. L2
9. Extend the application of alligation technique to solve the problems of other topics such as Profit and loss, time speed and distance, ratio and comparison etc..L6

After learning all the topics of Unit-3, the student is able to

1. Apply the fundamental principle of counting to solve basic level problems and apply its logic in complex problems.L2
2. Distinguish between permutation and combination. L4
3. Combine the principles of counting with combination to solve the problems on permutation.L4
4. Select and arrange “r” objects out of “n” objects under different constraints.L4
5. Criticize the restricted use of ${}^{n}P_{r}$.L6
6. Analyze the concept of step arrangement and apply its principles in problem solving.L5
7. Analyze the permutation of things when some of them are identical.L5
8. Apply the concepts of combination.L2
9. Describe the applications of the concept of 2^{n}.L1
10. Solve the problems under division of things into groups.L3
11. Differentiate between linear arrangement and circular arrangement.L3
12. Recognize the importance of probability. L4
13. Use the conjunction AND tool and OR tool.L2
14. Define an event and solve it under specific constraints.L1
15. Develop the ability to apply the concepts of probability and its applications in real file scenarios.L6

After learning all the topics of Unit-4, the student is able to

1. Interpret the series of numbers in Arithmetic, Geometric & Harmonic Progression. L1
2. Summarize the basic concepts of progressions, i.e., arithmetic mean, nth term of a progression. L6

3. Predict the missing terms of the given progression. L5
4. Compare AM, HM and GM. L4
5. Compute the sum or product of n terms in the given progression. L4
6. Differentiate between increasing and decreasing progression and solve application based problems accordingly. L1
7. Understand the theorems governing progressions. L4
8. Identify the similarity and difference between AP, HP and GP. L1
9. Analyze application problems involving combination of concepts of AP, HP and GP or all the three. L5
10. Create own problems based on creative progressive patterns and it's combinations. L6
11. Solve problems based on average speed using concept of HP and AP. L6

After learning all the topics of Unit-5, the student is able to

1. Understand the concept of coding decoding and will be able to solve various types of examples. L1
2. Understand the concept of crypt arithmetic or verbal arithmetic and solve examplesof various types. L1
3. Demonstrate better interpretation and representation of data.L1
4. Discover various forms of data representation their advantages and disadvantages.L1
5. Analyze the data provided in the form of tabular column, pie graph, bar graph, line graph, combination of two or more. L5
6. Understand the concept of angles and area swept in a pie chart. L5
7. Apply simple arithmetic and shortcuts to solve problems based on given graph. L2
8. Identify percentage hacks and use shortcuts to find the actual value when percentage is given.L4
9. Convert ratios to percentages and vice versa. L4
10. Analyze case studies based on statistical data. L5
11. Identify the limitations of each data representation technique. L6
12. Choose better, the correct method to represent statistics in corporate presentations. L2

Lesson Plan

Unit-1

1. Importance of reading skills. L1
2. Importance of vocabulary in solving Reading comprehension questions. L4
3. Identifying the main idea and supporting details in the paragraph. L2
4. Purpose and tone of the author.L2
5. Use of transition and idea organization pattern. L4
6. Arguments and their common structures. L1
7. Solving RC questions. L5
8. Classification of types of questions asked in the RC passages. L2
9. Flow chart or mind map to solve RC questions. L4

Unit-2

1. Properties of average.
2. Mean deviation.
3. Simple average.
4. Weighted average concept and formula to solve the problems of mixtures.
5. Comparison of the weighted average method with the alligation method.
6. Application of the technique of alligation to solve problems in very less duration of time.
7. Homogeneity and other properties of mixtures.

8. Basic properties of mixtures while solving the problems under the concept of removal and replacement.
9. Application of alligation technique to solve the problems of other topics such as Profit and loss, time speed and distance, ratio and comparison etc..

Unit-3

1. Fundamental principle of counting to solve basic level problems.
2. Differences between permutation and combination.
3. Principles of counting with combination to solve the problems on permutation.
4. Selection and arrangement of "r" objects out of "n" objects under different constraints.
5. Restricted use of ${}^{n}P_{r}$.
6. Step arrangement and its principles in problem solving.
7. Permutation of things when some of them are identical.
8. Concepts of combination.
9. Applications of the concept of 2^{n}.
10. Problems under division of things into groups.
11. Differences between linear arrangement and circular arrangement.
12. Importance of probability.
13. Conjunction AND tool and OR tool.
14. Defining an event and solving it under specific constraints.
15. Concepts of probability and its applications in real file scenarios.

Unit-4

1. Arithmetic, Geometric and Harmonic Progression.
2. Arithmetic mean, nth term of a progression.
3. Predicting the missing terms of the given progression.
4. Comparison of AM, HM and GM.
5. Sum or product of n terms in the given progression.
6. Differences between increasing and decreasing progression and solve application based problems accordingly.
7. Theorems governing progressions.
8. Differences between AP, HP and GP.
9. Combination of concepts of AP, HP and GP or all the three.
10. Progressive patterns and it's combinations.
11. Average speed using concept of HP and AP.

Unit-5

1. Concepts of coding decoding
2. Types of questions in coding decoding
3. Concepts of crypt arithmetic
4. Methods to solve crypt arithmetic questions
5. Demonstrate better interpretation and representation of data.L1
6. Various forms of data representation and their advantages and disadvantages.
7. tabular column, pie graph, bar graph, line graph, combination of two or more.
8. Concept of angles and area swept in a pie chart.
9. Simple arithmetic and shortcuts to solve problems based on given graph.
10. Identification of percentage hacks and use shortcuts to find the actual value when percentage is given.
11. Conversion of ratios to percentages and vice versa.
12. Case studies based on statistical data.
13. Limitations of each data representation technique.
14. Correct methods to represent statistics in corporate presentations.