Data Science Preparation Roadmap

MONTH 1:

Week 1:

- **SQL**: Student should complete **25%-30%** of the course content.
    - Learn fundamentals like SELECT, INSERT, UPDATE, DELETE
    - Data definition command like CREATE, ALTER, DROP
    - Advanced topics: Joins, subqueries, indexes

- **Quantitative Aptitude**: Student should complete **5%-10%** of the course content.
    - Learn speed math like Mental math tricks, shortcut methods
    - Percentage: Concepts and applications

    Targets:

        - Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 2:

- **SQL**: Student should complete **40%-60%** of the course content.
    - Advanced data manipulation, data definition techniques
    - Complex queries: Nested subqueries, CTEs, window functions
    - Database transactions, concurrency control, data integrity

- **Quantitative Aptitude**: Student should complete 10**%-15%** of the course content.
    - Profit and Loss: Cost price, selling price, profit percentage, loss percentage
    - Simple and Compound Interest: Formulas, problem-solving

    Targets:

        - Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 3:

- **SQL**: Student should complete >85% of the course content.
    - Master advanced SQL topics, complex queries, database optimization
    - Real-world applications and case studies

- **Quantitative Aptitude**: Student should complete nearly 20% of the course content.
    - Continue Profit and Loss and Simple and Compound Interest practice

      Targets:

        - Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 4:

- **Python**: Student should start Python in week 4 and complete 15%-20% of the course content.
    - Basics: Syntax, data types, control structures, functions, modules

      Targets:

        - Students should attempt 1 Sectional test weekly and score a minimum of 55% marks.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Month 1 Expectations and Remarks:

- **SQL**: It is expected that students should have completed > 85% of SQL course content by the end of Month 1.
    - **Achieved**: Give feedback like “Student has strong grasp of database concepts and query execution”.
    - **Not Achieved**: Give feedback, “Student should catch up on SQL course” and suggest him resources to ace the learning like “W3Schools SQL Tutorial”

- **Quantitative Aptitude**: It is expected that students would have completed nearly 20% of Quantitative Aptitude by the end of Month 1.
    - **Achieved**: Give feedback, “Good understanding of concepts of Quant”.
    - **Not Achieved**: Give feedback, “Student should increase efforts in Quant” and suggest him resources like "Quantitative Aptitude for Competitive Examinations" by R.S. Aggarwal.
- **Python**: It is expected that students should have completed nearly 15%-20% of Python by the end of Month 1.
    - **Achieved**: Give feedback, “Student has covered the basics of Python”.
    - **Not Achieved**: Give feedback, “Student should allocate more time to Python” and suggest resources like “Real Python Tutorials”
- **Overall Performance**: Student should have Weekly test scores above average marks.
    - **Achieved**: Give feedback, “Strong understanding of material”.
    - **Not Achieved**: Give feedback, “Improve test scores, revise and practice”.

Month 2:

Week 1:

- **Machine Learning:** Student should complete 15%-20% of the course content.
    - Topics: Introduction, linear regression, logistic regression.
- **Logical Reasoning:** Student should complete 5%-10% of the course content.
    - Topics: Patterns, sequences, logical puzzles.

      Targets:

        - Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 2:

- **Machine Learning:** Student should complete 30%-40% of the course content.

- Topics: Decision trees, SVM, k-NN
- **Logical Reasoning:** Student should complete 15%-20% of the course content.
  - Topics: Analytical reasoning, critical thinking

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 3:

- **Machine Learning:** Student should complete 50%-60% of the course content.
  - Topics: Clustering, PCA, model evaluation

- **Logical Reasoning:** Student should complete 20%-25% of the course content.
  - Topics: Logical deductions, syllogisms

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 4:

- **Deep Learning:** Student should complete 10%-15% of the course content.
  - Topics: Introduction, neural networks, activation functions

- **VARC (Verbal Ability and Reading Comprehension):** Student should complete 5%-10% of the course content.
  - Topics: Reading comprehension, grammar

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Month 2 Expectations and Remarks:

- **Machine Learning:** It is expected that students should have completed > 50% of the Machine Learning course content by the end of Month 2.
    - Achieved: Give feedback, "Student has a strong foundation in machine learning."
    - Not Achieved: Give feedback, "Student should catch up on machine learning topics" and suggest resources like "Andrew Ng's Machine Learning course on Coursera."
- **Logical Reasoning:** It is expected that students should have completed nearly 20% of Logical Reasoning by the end of Month 2.
    - Achieved: Give feedback, "Good understanding of logical reasoning concepts."
    - Not Achieved: give feedback, "Student should increase efforts in logical reasoning" and suggest resources like "Logical Reasoning by Arun Sharma" on YouTube.
- **Deep Learning:** It is expected that students should have completed 10%-15% of Deep Learning by the end of Month 2.
    - Achieved: Give feedback, "Basics of deep learning are covered."
    - Not Achieved: Give feedback, "Student should allocate more time to deep learning" and suggest resources like "Deep Learning Specialization by Andrew Ng on Coursera."
- **VARC:** It is expected that students should have completed 5%-10% of VARC by the end of Month 2.
    - Achieved: Give feedback, "Basics of VARC are covered."
    - Not Achieved: Give feedback, "Student should increase efforts in VARC" and suggest resources like "Word Power Made Easy by Norman Lewis."
- **Overall Performance:** Student should have Weekly test scores above average marks.
    - Achieved: Give feedback, "Strong understanding of material."
    - Not Achieved: Give feedback, "Improve test scores, revise and practice."

Month 3:

Week 1:

- **Deep Learning:** Student should complete 25%-30% of the course content.
    - Topics: Introduction to neural networks, activation functions.

- **SQL:** Student should complete 85%-90% of the advanced SQL content.
    - Topics: Indexes, stored procedures, triggers

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 2:

- **Deep Learning:** Student should complete 40%-50% of the course content.
  - Topics: Backpropagation, optimization techniques

- **SQL:** Student should complete 90%-95% of the SQL content.
  - Topics: Performance tuning, advanced joins

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 3:

- **Deep Learning:** Student should complete 60%-70% of the course content.
  - Topics: Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN)

- **SQL:** Student should complete almost 100% of the SQL content.
  - Topics: Transactions, concurrency control

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 4:

- **Deep Learning:** Student should complete 80%-90% of the course content.
    - Topics: LSTM, GRU, Autoencoders

- **Product Management:** Student should start Product Management and complete 5%-10% of the course content.
    - Topics: Introduction, product lifecycle, market research

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Month 3 Expectations and Remarks:

- **Deep Learning:** It is expected that students should have completed > 80% of the Deep Learning course content by the end of Month 3.
    - Achieved: Give feedback, "Student has a strong foundation in deep learning."
    - Not Achieved: Give feedback, "Student should catch up on deep learning topics" and suggest resources like "Deep Learning Specialization by Andrew Ng on Coursera."
- **SQL:** It is expected that students should have completed almost 100% of the SQL content by the end of Month 3.
    - Achieved: Give feedback, “Good understanding of advanced SQL concepts."
    - Not Achieved: Give feedback, "Student should increase efforts in advanced SQL" and suggest resources like "SQL Performance Explained by Markus Winand."
- **Product Management:** It is expected that students should have completed 5%-10% of Product Management by the end of Month 3.
    - Achieved: Give feedback, "Basics of product management are covered."
    - Not Achieved: Give feedback, "Student should allocate more time to product management" and suggest resources like "Inspired: How To Create Products Customers Love by Marty Cagan."

- **Overall Performance:** Student should have Weekly test scores above average marks.
    - Achieved: Give feedback, "Strong understanding of material."
    - Not Achieved: Give feedback, "Improve test scores, revise and practice."

Month 4:

Week 1:

- **Deep Learning:** Student should complete 25%-30% of the course content.
    - Topics: Backpropagation, optimization techniques

- **VARC:** Student should complete 10%-15% of the course content.
    - Topics: Vocabulary building, sentence correction

      Targets:

        - Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 2:

- **Deep Learning:** Student should complete 40%-50% of the course content.
    - Topics: Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN)

- **VARC:** Student should complete 15%-20% of the course content.
    - Topics: Critical reasoning, verbal logic

      Targets:

        - Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 3:

- **Deep Learning:** Student should complete 60%-70% of the course content.
    - Topics: LSTM, GRU, Autoencoders
- **VARC:** Student should complete 20%-25% of the course content.
    - Topics: Parajumbles, sentence completion

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 4:

- **Deep Learning:** Student should complete 80%-90% of the course content.
  - Topics: Generative Adversarial Networks (GANs), Reinforcement Learning

- **Python and SQL Integration:** Student should apply Python skills to SQL and complete integration tasks.
  - Topics: Data manipulation using Python, connecting Python to databases

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Month 4 Expectations and Remarks:

- **Deep Learning:** It is expected that students should have completed > 80% of the Deep Learning course content by the end of Month 4.
  - Achieved: "Student has a comprehensive understanding of deep learning."
  - Not Achieved: "Student should catch up on deep learning topics" and suggest resources like "Deep Learning with Python by François Chollet."
- **VARC:** It is expected that students should have completed ~25% of VARC in Month 4.
  - Achieved: "Good understanding of VARC concepts."
  - Not Achieved: "Student should increase efforts in VARC" and suggest resources like "The Official Guide to the GRE General Test."
- **Python and SQL Integration:** It is expected that students should have completed integration tasks in Month 4.
  - Achieved: "Student can effectively use Python with SQL."
  - Not Achieved: "Student should allocate more time to integration tasks" and suggest resources like "Automate the Boring Stuff with Python by Al Sweigart."

- **Overall Performance:** Student should have Weekly test scores above average marks.
    - Achieved: "Strong understanding of material."
    - Not Achieved: "Improve test scores, revise and practice."

Month 5:

Week 1:

- **Machine Learning:** Student should complete 75%-80% of the course content.
    - Topics: Ensemble learning, boosting, bagging

- **Data Interpretation:** Student should complete 5%-10% of the course content.
    - Topics: Graphs, charts, tables

      Targets:

        - Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 2:

- **Machine Learning:** Student should complete 85%-90% of the course content.
    - Topics: Model deployment, real-world applications

- **Data Interpretation:** Student should complete 10%-15% of the course content.
    - Topics: Data analysis, data visualization

      Targets:

        - Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 3:

- **Machine Learning:** Student should complete 95%-100% of the course content.
    - Topics: Advanced techniques, final project

- **Data Interpretation:** Student should complete 20%-25% of the course content.
    - Topics: Case studies, real-world scenarios

      Targets:

        - Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 4:

- **Project:** Student should start and complete the initial phase of the project.
    - Topics: Project planning, data collection

- **Revision and Practice:** Student should review all previous topics and practice extensively.
    - Topics: Review and practice tests

      Targets:

        - Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
        - Students should attempt 1 Weekly test and score a minimum of 60% marks.

Month 5 Expectations and Remarks:

- **Machine Learning:** It is expected that students should have completed > 95% of the Machine Learning course content in Month 5.
    - Achieved: "Student has a comprehensive understanding of machine learning."
    - Not Achieved: "Student should catch up on machine learning topics" and suggest resources like "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow by Aurélien Géron."
- **Data Interpretation:** It is expected that students should have completed ~25% of Data Interpretation in Month 5.

    - Achieved: "Good understanding of data interpretation concepts."
    - Not Achieved: "Student should increase efforts in data interpretation" and suggest resources like "How to Lie with Statistics by Darrell Huff."
- **Project:** It is expected that students should have completed the initial phase of the project in Month 5.
    - Achieved: "Student is on track with the capstone project."
    - Not Achieved: "Student should allocate more time to the capstone project" and suggest resources like "Data Science Projects with Python by Packt."
- **Overall Performance:** Student should have Weekly test scores above average marks.
    - Achieved: "Strong understanding of material."
    - Not Achieved: "Improve test scores, revise and practice."

Month 6:

Week 1:

- **Project:** Student should complete 25%-30% of the project.
    - Topics: Data preprocessing, initial analysis
- **Deep Learning:** Student should complete 90%-100% of the course content.
    - Topics: Advanced techniques, project integration

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 2:

- **Project:** Student should complete 50%-60% of the project.
    - Topics: Model building, feature engineering

- **Deep Learning:** Student should complete and integrate the course content.
    - Topics: Final projects, deployment strategies

Targets:

- Students should attempt 2 Sectional tests weekly and score a minimum of 55% marks in each test.
- Students should attempt 1 Weekly test and score a minimum of 60% marks.

Week 3:

- **Project:** Student should complete 75%-80% of the project.
    - Topics: Model evaluation, result analysis

- **Final Review:** Student should review and finalize all coursework.
    - Topics: Comprehensive revision

Week 4:

- **Project:** Student should complete and submit the project.
    - Topics: Final touches, presentation preparation

- **Assessment and Feedback:** Student should undergo final assessments and feedback sessions.
    - Topics: Performance review, future recommendations

Month 6 Expectations and Remarks:

- **Project:** It is expected that students should have completed the project in Month 6.
    - Achieved: "Student has successfully completed the project."
    - Not Achieved: "Student should finalize the project" and suggest resources like "Capstone Projects for Graduate Students by David G. Smith."
- **Deep Learning:** It is expected that students should have completed 100% of the Deep Learning course content in Month 6.
    - Achieved: "Student has a comprehensive understanding of deep learning."
    - Not Achieved: "Student should finalize deep learning topics" and suggest resources like "Deep Learning by Ian Goodfellow, Yoshua Bengio, and Aaron Courville."
- **Overall Performance:** Student should have Weekly test scores above average marks.
    - Achieved: "Strong understanding of material."
    - Not Achieved: "Improve test scores, revise and practice."

Additional Resources:

- **SQL**:
  - W3Schools SQL Tutorial
  - SQLZoo
  - "SQL for Data Scientists" by Renee M. P. Teate
  - Mode Analytics SQL Tutorial
- **Python**:
  - Codecademy Python Course
  - Coursera Python for Everybody
  - "Automate the Boring Stuff with Python" by Al Sweigart
  - Real Python Tutorials
- **Machine Learning**:
  - Coursera Machine Learning by Andrew Ng
  - "Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron
  - Kaggle Datasets and Competitions
  - Fast.ai Practical Deep Learning for Coders
- **Deep Learning**:
  - Coursera Deep Learning Specialization by Andrew Ng
  - "Deep Learning" by Ian Goodfellow, Yoshua Bengio, and Aaron Courville
  - PyTorch Tutorials
  - TensorFlow Documentation
- **Quantitative Aptitude**:
  - "Quantitative Aptitude for Competitive Examinations" by R.S. Aggarwal
  - Khan Academy Math
- **Logical Reasoning**:
  - "A Modern Approach to Logical Reasoning" by R.S. Aggarwal
  - Khan Academy Logic
- **Data Interpretation**:
  - "Data Interpretation & Data Sufficiency" by Arihant Experts
  - GMAT Official Guide
- **VARC (Verbal Ability and Reading Comprehension)**:
  - "Word Power Made Easy" by Norman Lewis
  - "High School English Grammar & Composition" by Wren & Martin
- **Product Management**:
  - "Inspired: How to Create Products Customers Love" by Marty Cagan
  - Coursera Digital Product Management Specialization
  - Product School's Product Management Course