Postgraduate Diploma in Data Science

Regulations and Curriculum

(Effective for the Batches admitted from the Academic Year 2021-2022)

PG AND RESEARCH DEPARTMENT OF COMPUTER APPLICATIONS SACRED HEART COLLEGE (AUTONOMOUS), TIRUPATTUR

TIRUPATTUR DT, TAMILNADU.

Postgraduate Diploma in Data Science (PGDDS)

1. Programme Objectives

The Diploma in Data Science (PGDDS) is designed to prepare the students for careers in data science. This course is designed to understand, and practice big data analytics and machine learning approaches, which include the study of modern computing big data technologies and scaling up machine learning techniques focusing on industry applications.

2. Eligibility for Admission

Any Bachelor's Degree with Mathematics/Statistics/Business Mathematics as an Allied Subject

/ Mathematics/Statistics in +2 Level.

3. Duration of the Programme

To fulfill the requirements for acquiring PGDDS, a student may clear all the courses in a minimum of one year and a maximum of 2 years.

4. Medium of Instruction

The medium of instruction is only in **English.**

5. Examination

The course will follow the Continuous Internal Assessment (CIA) and End semester examination.

6. Outcomes

i. Implement Data analytics in daily business operations.

ii. Develop proficiency in statistical analysis of data.

iii. Able to build and assess data based models.

iv. Execute Statistical analysis with professional statistical software.

v. Strengthen skills in data management.

vi. Apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively.

7. Programme Structure

Semester	Code	Title of the Subject	L	TCP	P	IM	SM	TM	CD
	CADD101	Optimization Techniques	4			50	50	100	4
	CADD102	Introduction to Data	4			50	50	100	4
	CADD103	Introduction to Data warehouse and Data	4			50	50	100	4
I	CADD104	Applied Probability and Statistics	4	1		50	50	100	4
			16	1		200	200	400	16
	CADD201	Introduction to Data	4			50	50	100	4
	CADD202	Machine Learning	3	1		50	50	100	4
	CADD203	Deep Learning	4			50	50	100	4
	CADD204	Technologies for Data Science	3	1		50	50	100	4
II	CADD205	Big Data in Internet of Things	3	1		50	50	100	4
	CADD206P	Internship			10	50	50	100	9
			17	3	10	300	300	600	29
Total Credits									45

List of Theory Combined Practical Papers

Semester	Code	Course Title
I	CADD104	Applied Probability and Statistics
II	CADD202	Machine Learning
II	CADD204	Technologies for Data Science
II	CADD205	Big Data in Internet of Things

7.1 Coding Scheme

PGD	X	X	X	X
Code	Number 1-2	Curriculum Revision Number	Number 0-9	Course Type*

Course Type: T–Theory, I – Internal Papers, J – Internship..

7.2. Conduct of Theory and Practical Courses

7.2.1. Theory Papers will follow the regular lecturing method.

7.2.2. Theory Combined Practical papers will follow lecturing and demonstrations and lab exercises fixed by the course teacher**., the practical exercises will be done as self-learning by the students outside the classes in their laptops and submitted to the faculty for evaluation**. **The regular lab shall not be used for the diploma programmes.** The practical exercises shall be assigned by the course teacher.

8 SYLLABI IN DETAIL

CADD101	OPTIMIZATION TECHNIQUES	4-0-0:100

OBJECTIVES

- To understand the basics of optimization.
  - To learn about linear programming, randomized optimization and genetic algorithms.

Unit I

Basics of optimization :Basics of optimization —how to formulate the problem, Maxima, minima, convex function, global solution

Unit II

Linear programming, simplex algorithm, Integer programming, Constraint programming, Knapsack problem

Unit III

Randomized optimization : Randomized optimization techniques — hill climbing, simulated annealing.

Unit IV

Introduction Genetic algorithms :Foundation of Evolutionary theory, Evolutionary Strategies, Evolutionary programming,Evolutionary Algorithms, Evolutionary Algorithm Case Study,

Genetic Algorithm, Genetic Representations, Initial Population, Fitness Function, Selection and Reproduction,

Unit V

Genetic Operators : Genetic Operators(Selection, Crossover, Mutation), Artificial Immune Systems, Other Algorithms Harmony Search, Honey-Bee Optimization, Memetic Algorithms, Co-evolution, Multi Objective Optimization, Artificial Life, Constraint Handling

TEXT

1. Chander Mohan, Kusum Deep‖Optimization Techniques Hardcover‖, New Age Science Ltd; First Edition, 2009.

2. David E. Goldberg, –Genetic Algorithms in Search, Optimization & Machine Learning‖, Pearson Education India; First Edition 2008

QUESTION PAPER PATTERN

CA Tests   **Max. Marks: 50**

The time duration for the examination is 2 Hrs. The question paper format
is:

Section A Answer **ALL** the Questions.

[Atleast four questions from each unit]   6 x 2 = 12

Section B Answer **ALL** the Questions

[Atleast three questions from each unit. Either or Type]   3 x 6 = 18

Section C Answer **ANY TWO** Questions out of THREE Questions.

[Atleast one question from each unit]   2 x 10 = 20

End-Semester Examinations   **Max. Marks: 100**

The time duration for the examination is 3 Hrs. The question paper format for
the end-semester examination is:

Section A Answer **ALL** the Questions.

[Atleast two questions from each unit]   10 x 2 = 20

Section B Answer **ALL** Questions.

[Either or Type, atleast one question from each unit]   5 x 7 = 35

Section C Answer **ANY THREE** Questions out of FIVE Questions.

[Atleast one question from each unit]   3 x 15 = 45

CADD102   **INTRODUCTION TO DATA SCIENCE**   4-0-0:100

OBJECTIVES

- To learning the founding principles of Datascience.

- To learn Artifical intelligence concepts, searching and learning algorithms.

Unit I

Foundation of Data science, Area and Scope of Data Science, Steps of Data Science Process: Data collection, Preprocessing, training, and testing. Use cases in various domain such Image, Natural Language, Audio and Video.

Unit II

Introduction to Artificial Intelligence : Introduction Artificial Intelligence, The Foundations of AI, AI Technique, Production system characteristics, Production systems: 8-puzzle problem. Searching: Uniformed search strategies – Breadth first search, depth first search.

Unit III

Searching Algorithms and Learning : Local Search Algorithms: Generate and Test, Hill climbing, simulated annealing search, Constraint satisfaction problems, Greedy best first search, A* search, AO* search.

Unit IV

Learning Algorithms : Propositional logic - syntax & semantics Game Playing: Overview, Minimax algorithm, Alpha-Beta pruning, Additional Refinements.

Unit V

Introduction to Data Mining and Machine Learning : Introduction to Data Mining and Machine Learning, Supervised, Unsupervised and Reinforcement learning. Prediction vs Classification v/s Clustering. Association Rule Mining, classification and regression techniques, clustering, Scalability and data management issues in data mining algorithms, measures of interestingness

TEXT

1. Rachel Schutt, Cathy O'Neil, "Doing Data Science: Straight Talk from the Frontiline", Schroff/O'Reilly, 2013.

2. S. Russell and P. Norvig, -Artificial Intelligence A Modern Approach‖, Second Edition. Pearson Education, 2007.

QUESTION PAPER PATTERN

CA Tests   **Max. Marks: 50**

The time duration for the examination is 2 Hrs. The question paper format
is:

Section A Answer **ALL** the Questions.

[Atleast four questions from each unit]   6 x 2 = 12

Section B Answer **ALL** the Questions

[Atleast three questions from each unit. Either or Type]   3 x 6 = 18

Section C Answer **ANY TWO** Questions out of THREE Questions.

[Atleast one question from each unit]   2 x 10 = 20

End-Semester Examinations   **Max. Marks: 100**

The time duration for the examination is 3 Hrs. The question paper format for
the end-semester examination is:

Section A Answer **ALL** the Questions.

[Atleast two questions from each unit]   10 x 2 = 20

Section B Answer **ALL** Questions.

[Either or Type, atleast one question from each unit]   5 x 7 = 35

Section C Answer **ANY THREE** Questions out of FIVE Questions.

[Atleast one question from each unit]   3 x 15 = 45

- To learn about the basics of Data warehouse and data mining.

- To understand clustering and web mining.

**Unit
I**

Data Warehouse Fundamentals : Introduction to Data Warehouse, OLTP Systems; Differences between OLTP Systems and Data Warehouse: Characteristics of Data Warehouse; Functionality of Data Warehouse: Advantages and Applications of Data Warehouse; Advantages, Applications: Top - Down and Bottom-Up Development Methodology: Tools for Data warehouse development: Data Warehouse Types:

Unit II

Introduction to Data Mining : Introduction: Scope of Data Mining: What is Data Mining; How does Data Mining Works, Predictive Modeling: Data Mining and Data Warehousing: Architecture for Data Mining: Profitable Applications: Data Mining Tools: - Data Pre-processing: Introduction, Data Preprocessing Overview, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Gene ration.

Unit III

Data Mining Techniques- An Overview : Introduction, Data Mining, Data Mining Versus Database Management System, Data Mining Techniques- Association rules, Classification, Regression, Clustering, Neural networks.

Unit IV

Clustering : Introduction, Clustering, Cluster Analysis, Clustering Methods- K means, Hierarchical clustering, Agglomerative clustering, Divisive clustering, clustering and segmentation software, evaluating clusters.

Unit V

Web Mining : Introduction, Terminologies, Categories of Web Mining – Web Content Mining, Web Structure Mining, Web Usage Mining, Applications of Web Mining, and Agent based and Data base approaches, Web mining Software. Applications of Data mining.

TEXT

1. Alex Berson and Stephen J.Smith, -Data Warehousing, Data Mining & OLAP‖, Tata McGraw – Hill Edition, 35th Reprint 2016.

2. K.P. Soman, Shyam Diwakar and V. Ajay, –Insight into Data Mining Theory and Practice‖, Eastern Economy Edition, Prentice Hall of India, 2006.

3. Ian H.Witten and Eibe Frank, ─Data Mining: Practical Machine Learning Tools and Techniques‖, Elsevier, Second Edition.

QUESTION PAPER PATTERN

CA Tests   **Max. Marks: 50**

The time duration for the examination is 2 Hrs. The question paper format
is:

Section A Answer **ALL** the Questions.

[Atleast four questions from each unit]   6 x 2 = 12

Section B Answer **ALL** the Questions

[Atleast three questions from each unit. Either or Type]   3 x 6 = 18

Section C Answer **ANY TWO** Questions out of THREE Questions.

[Atleast one question from each unit]   2 x 10 = 20

End-Semester Examinations   **Max. Marks: 100**

The time duration for the examination is 3 Hrs. The question paper format for
the end-semester examination is:

Section A Answer **ALL** the Questions.

[Atleast two questions from each unit]   10 x 2 = 20

Section B Answer **ALL** Questions.

[Either or Type, atleast one question from each unit]   5 x 7 = 35

Section C Answer **ANY THREE** Questions out of FIVE Questions.

[Atleast one question from each unit]   3 x 15 = 45

- To learn the basics of probability.

- To learn the basics of statistics.

**Uni
t I**

Basic Probability - Random Experiments - Sample Spaces Events - The Concept of Probability

-The Axioms of Probability - Some Important Theorems on Probability - Assignment of Probabilities -Conditional Probability -Theorems on Conditional Probability – Independent Events -Bayes' Theorem or Rule Combinatorial Analysis - Fundamental Principle of Counting

-      Tree   Diagrams   –
Permutations

**Unit
II**

Random Variables - Random Variables - Discrete Probability Distributions -Distribution Functions for Random Variables - Distribution Functions for Discrete Random Variables - Continuous Random Variables – Graphical Interpretations Joint Distributions Independent Random Variables - Change of Variables –

**Unit
III**

Probability Distributions - Probability Distributions of Functions of Random Variables –

Convolutions – Conditional Distributions Applications to Geometric
Probability

Unit IV

Mathematical Expectation - Definition of Mathematical Expectation - Functions of Random Variables - Theorems on Expectation - Variance & Standard Deviation - Theorems on Variance - Standardized Random Variables - Special Probability Distributions - Binomial Distribution - Normal Distribution - Poisson Distribution

Unit V

Sampling Theory - Population and Sample - Statistical Inference- Sampling With and Without

Replacement Random Samples - Random Numbers - Population Parameters - Sample Statistics

-Sampling Distributions - Sample Mean - Sampling Distribution of Means - Sampling Distribution of Proportions - Sampling Distribution of Differences and Sums – Sample Variance - Sampling Distribution of Variances - Computation of Mean, Variance, and Moments for Grouped Data - The LeastSquares Parabola - Multiple Regression Standard Error of Estimate The Linear Correlation Coefficient Generalized Correlation Coefficient Rank Correlation**TEXT**

1. Murray R. Spiegel, John J. Schiller & R. Alu Srinivasan, –Probability and Statistics‖,

Schaum outlines, McGraw Hill, Third Edition, 2009.

2. S. C Gupta and V. K. Kapoor, –Fundamentals of Mathematical Statistics‖, 11th Edition, S.Chand and Sons.

QUESTION PAPER PATTERN

CA Tests   **Max. Marks: 50**

The time duration for the examination is 2 Hrs. The question paper format is:

Section A Answer **ALL** the Questions.

[Atleast four questions from each unit]   6 x 2 = 12

Section B Answer **ALL** the Questions

[Atleast three questions from each unit. Either or Type]   3 x 6 = 18

Section C Answer **ANY TWO** Questions out of THREE Questions.

[Atleast one question from each unit]   2 x 10 = 20

End-Semester Examinations   **Max. Marks: 100**

The time duration for the examination is 3 Hrs. The question paper format for the end-semester examination is:

Section A Answer **ALL** the Questions.

[Atleast two questions from each unit]   10 x 2 = 20

Section B Answer **ALL** Questions.

[Either or Type, atleast one question from each unit]   5 x 7 = 35

Section C Answer **ANY THREE** Questions out of FIVE Questions.

[Atleast one question from each unit]   3 x 15 = 45

CADD201   **INTRODUCTION TO DATA ANALYTICS**   **4-0-0:100**

OBJECTIVES

- To Learn the basics of Data Analytics.

- To understand the Data Analytics Techniques.

Unit I

Data Definitions and Analysis Techniques : Elements, Variables, and Data categorization, Levels of Measurement , Data management and indexing , Introduction to statistical learning.

Unit II

Basic analysis techniques: Statistical hypothesis generation and testing, Chi-Square test, t-Test.

Unit III

Analysis of variance, Correlation analysis, Maximum likelihood test.

Unit IV

Data analysis techniques: Regression analysis, Classification techniques, Clustering, Association rules analysis.

Unit V

Case studies Understanding business scenarios, Feature engineering and visualization, Scalable and parallel computing with Hadoop and Map-Reduce, Sensitivity Analysis.

TEXT

1. Larry Wasserman, ‒All of statistics: a concise course in statistical inference‖, Springer, 2004.

2. Hastie, Trevor, et al. ‒The elements of statistical learning. Vol. 2. No. 1‖,. New York: springer, 2009.

QUESTION PAPER PATTERN

CA Tests   **Max. Marks: 50**

The time duration for the examination is 2 Hrs. The question paper format is:

Section A Answer **ALL** the Questions.

[Atleast four questions from each unit]   6 x 2 = 12

Section B Answer **ALL** the Questions

[Atleast three questions from each unit. Either or Type]   3 x 6 = 18

Section C Answer **ANY TWO** Questions out of THREE Questions.

[Atleast one question from each unit]   2 x 10 = 20

End-Semester Examinations   **Max. Marks: 100**

The time duration for the examination is 3 Hrs. The question paper format for the end-semester examination is:

Section A Answer **ALL** the Questions.

[Atleast two questions from each unit]   10 x 2 = 20

Section B Answer **ALL** Questions.

[Either or Type, atleast one question from each unit]   5 x 7 = 35

Section C Answer **ANY THREE** Questions out of FIVE Questions.

[Atleast one question from each unit]   3 x 15 = 45

CADD202	MACHINE LEARNING	3-1-0:100

OBJECTIVES

- To learn the concepts of machine learning.

- To understand association rules, classification and prediction techniques.

Unit I

Introduction to Machine learning : Supervised and Unsupervised Learning. Getting and Cleaning Data : Obtaining data from the web, from APIs, from databases and from colleagues in various formats. basics of data cleaning and making data —tidy. Data pre-processing : Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation

Unit II

Association Rule : Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and a Road Map, Association Rules, the Apriori Algorithm Classification and Prediction

Unit III

Classification : Classification, Issues Regarding Classification, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Metrics for Evaluating Classifier Performance, Holdout Method and Random Sub sampling

Unit IV

Prediction : Prediction, Issues Regarding Prediction, Accuracy and Error Measures, Evaluating the Accuracy of a Classifier or Predictor. Clustering : Cluster Analysis, Agglomerative versus Divisive Hierarchical Clustering, Distance Measures in Algorithmic, Evaluation of Clustering.

Unit V

Tools and Frameworks : Scikit-learn, Weka and RStudio

TEXT

1.Shalev-Shwartz, Shai, and Shai Ben-David, –Understanding machine learning: From theory to algorithms‖, Cambridge university press, 2014.

2. Duda, Richard O., Peter E. Hart, and David G. Stork, –Pattern classification‖, John Wiley & Sons, 2012.

3. Witten, Ian H., et al, –Data Mining: Practical machine learning tools and techniques‖, Morgan   Kaufmann,   201

QUESTION PAPER PATTERN

CA Tests   **Max. Marks: 50**

The time duration for the examination is 2 Hrs. The question paper format
is:

Section A Answer **ALL** the Questions.

[Atleast four questions from each unit]   6 x 2 = 12

Section B Answer **ALL** the Questions

[Atleast three questions from each unit. Either or Type]   3 x 6 = 18

Section C Answer **ANY TWO** Questions out of THREE Questions.

[Atleast one question from each unit]   2 x 10 = 20

End-Semester Examinations   **Max. Marks: 100**

The time duration for the examination is 3 Hrs. The question paper format for
the end-semester examination is:

Section A Answer **ALL** the Questions.

[Atleast two questions from each unit]   10 x 2 = 20

Section B Answer **ALL** Questions.

[Either or Type, atleast one question from each unit]   5 x 7 = 35

Section C Answer **ANY THREE** Questions out of FIVE Questions.

[Atleast one question from each unit]   3 x 15 = 45

CADD203   **DEEP LEARNING**   **4-0-0:100**

OBJECTIVES

- To understand Linear Regression and Regularization.

- To learn the concepts of Deep Learning and its applications.

Unit I

Linear Regression : Prediction using Linear Regression, Gradient Descent, Linear Regression with one variable, Linear Regression with multiple variables, Polynomial Regression, Feature Scaling/Selection. Logistic Regression : Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one variable and with multiple variables.

Unit II

Regularization : Regularization and its utility: The problem of Overfitting, Application of

Regularization in Linear and Logistic Regression, Regularization and Bias/Variance.

Unit III

Neural Networks : Introduction, Model Representation, Gradient Descent vs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Backpropagation Algorithm.

Unit IV

 Deep Learning : History, Scope and specification, why deep learning now, building block of neural network, neural networks, Deep learning hardware. Feedforward neural networks, xor model, cost function estimation (maximum likelihood), units, activation functions, layers, ,

normalization, hyper-parameter tuning, Convolution neural networks, architecture, recurrent neural networks, architecture, types and overview, GAN (Generative Adversarial Networks).

Unit V

Deep learning applications : Computer vision, sentiment analysis, music generation, text generation, neural style transfer, image captioning

TEXT

1. Ethem Alpaydin, "Introduction to Machine Learning" Second Edition, The MIT Press, 2009.

2. Tom M. Mitchell, "Machine Learning", First Edition, Tata McGraw-Hill Education, 2013.

3. Christopher M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2007.

4. Mevin P. Murphy, "Machine Learning: A Probabilistic Perspective", The MIT Press, 2012.

QUESTION PAPER PATTERN

CA Tests   **Max. Marks: 50**

The time duration for the examination is 2 Hrs. The question paper format
is:

Section A Answer **ALL** the Questions.

[Atleast four questions from each unit]   6 x 2 = 12

Section B Answer **ALL** the Questions

[Atleast three questions from each unit. Either or Type]   3 x 6 = 18

Section C Answer **ANY TWO** Questions out of THREE Questions.

[Atleast one question from each unit]   2 x 10 = 20

End-Semester Examinations   **Max. Marks: 100**

The time duration for the examination is 3 Hrs. The question paper format for
the end-semester examination is:

Section A Answer **ALL** the Questions.

[Atleast two questions from each unit]   10 x 2 = 20

Section B Answer **ALL** Questions.

[Either or Type, atleast one question from each unit]   5 x 7 = 35

Section C Answer **ANY THREE** Questions out of FIVE Questions.

[Atleast one question from each unit]   3 x 15 = 45

CADD204   TECHNOLOGIES FOR DATA SCIENCE   3-1-0:100

OBJECTIVES

- To understand the technologies in data science.

- To learn the concetps of Hadoop, Map-Reduce, HIVE, SQOOP and PIG.

Unit I

Big Data and Hadoop : Hadoop architecture, Hadoop Versioning and configuration, Single node & Multi-node Hadoop, Hadoop commands, Models in Hadoop, Hadoop daemon, Task instance, illustrations.

Unit II

Map-Reduce : Framework, Developing Map-Reduce course, Life cycle method, Serialization, Running Map Reduce in local and pseudo-distributed mode, illustrations.

Unit III

HIVE : Installation, data types and commands, illustration.

Unit IV

SQOOP: Installation, importing data, Exporting data, Running, illustrations

Unit V

PIG : Installation, Schema, Commands, illustrations.

Text

1. Chuck Lam, ‒Hadoop in Action‖, 2010, ISBN: 9781935182191

2. Jimmy Lin and Chris Dyer, ‒Data- intensive Text Processing with Map Reduce‖, Morgan & Claypool Publishers, 2010.

QUESTION PAPER PATTERN

CA Tests   **Max. Marks: 50**

The time duration for the examination is 2 Hrs. The question paper format
is:

Section A Answer **ALL** the Questions.

[Atleast four questions from each unit]   6 x 2 = 12

Section B Answer **ALL** the Questions

[Atleast three questions from each unit. Either or Type]   3 x 6 = 18

Section C Answer **ANY TWO** Questions out of THREE Questions.

[Atleast one question from each unit]   2 x 10 = 20

End-Semester Examinations   **Max. Marks: 100**

The time duration for the examination is 3 Hrs. The question paper format for
the end-semester examination is:

Section A Answer **ALL** the Questions.

[Atleast two questions from each unit]   10 x 2 = 20

Section B Answer **ALL** Questions.

[Either or Type, atleast one question from each unit]   5 x 7 = 35

Section C Answer **ANY THREE** Questions out of FIVE Questions.

[Atleast one question from each unit]   3 x 15 = 45

CADD205   **BIG DATA IN INTERNET OF THINGS**   **3-1-0:100**

OBJECTIVES

- To Learn the role of Big Data in IoT.

- To understand the concepts of data in cloud and edge.

Unit I

Introduction to Big Data from the IoT : Develop an understanding of the data generated by IoT, and how it is collected; Recognise the problems involved with gathering data and some approaches for addressing these problems; Gain an overview of data storage

Unit II

Data at the Edge : Understand the process of data acquisition; Be able to analyse where to process data using Edge, Fog or Cloud; Understand how, when, and where to bundle and store IoT data

Unit III

Data in the Cloud : Understand the storage, analysis and cleaning of data; Understand why data is stored and processed in the Cloud; Appreciate the costs and benefits of live data versus stored data.

Unit IV

Obtaining, Visualising and Analysing Data : Understand some methods for cleaning, summarising and visualising a large dataset; Construct and use a simple predictive model for predicting the location of a device using signal strength and orientation.

Unit V

Case Study : Application of Python, R and RStudio in the performance analysis of a largedataset

TEXT

1. Arshdeep Bahga and Vijay Madisetti, ‑Internet of Things – A Hands-on Approach‖, Universities Press, 2015, ISBN: 9788173719547.

2. Matt Richardson & Shawn Wallace, ‑Getting Started with Raspberry Pi‖, O'Reilly (SPD), 2014, ISBN: 9789350239759.

QUESTION PAPER PATTERN

CA Tests   **Max. Marks: 50**

The time duration for the examination is 2 Hrs. The question paper format
is:

Section A Answer **ALL** the Questions.

[Atleast four questions from each unit]   6 x 2 = 12

Section B Answer **ALL** the Questions

[Atleast three questions from each unit. Either or Type]   3 x 6 = 18

Section C Answer **ANY TWO** Questions out of THREE Questions.

[Atleast one question from each unit]   2 x 10 = 20

End-Semester Examinations   **Max. Marks: 100**

The time duration for the examination is 3 Hrs. The question paper format for
the end-semester examination is:

Section A Answer **ALL** the Questions.

[Atleast two questions from each unit]   10 x 2 = 20

Section B Answer **ALL** Questions.

[Either or Type, atleast one question from each unit]   5 x 7 = 35

Section C Answer **ANY THREE** Questions out of FIVE Questions.

[Atleast one question from each unit]   3 x 15 = 45

9 EVALUATION & CERTIFICATION

9.1 Continuous Assessment

S. No.	Course Type	Internal Components	Marks	Total
1	Theory	2 CA Tests	30	50
		Online Test / Quiz	5	
		*Other Components		
		Paper Work		
		Problem Solving / Group Discussion /		
		Technical reports	15	
		Application Development		
		Seminar		
		Demonstration		
		Open Book Assignment		
2	Theory Combined Practical	2 CA Tests	30	50
		Online Test / Quiz	5	
		Paper Work		
		Demonstration/Technical Report	5	
		Lab Exercises	10	

Note: *Other components can be fixed up by the course teacher with the endorsement of the HOD.*

9.2 CA Tests

The time duration for the examination is 2 Hrs. The question paper format is:

Max. Marks : 50	
Section A	
Answer ALL the Questions [atleast 3 questions from each unit]	6 X 2 = 12 Marks
Section B	
Answer ALL the Questions [atleast 3 questions from each unit, Either or Type]	3 X 6 = 18 Marks
Section C	
Answer ANY TWO Questions out of Three Questions [atleast 1 question from each unit]	2 X 10 = 20 Marks

9.3 End-Semester Examinations

9.3.1 Theory

The time duration for the examination is 3 Hrs. The question paper format for the end-semester examination is:

Max. Marks : 100	
Section A	
Answer ALL the Questions [atleast 2 questions from each unit]	10 X 2 = 20 Marks
Section B	
Answer ALL the Questions [Either or Type, atleast 1 question from each unit]	5 X 7 = 35 Marks
Section C	
Answer ANY THREE Questions out of FIVE Questions [atleast 1 question from each unit]	3 X 15 = 45 Marks

9.3.2 Internship :: CADD206P

- Internship will be carried out during the summer vacation after the Ist Semester.

- The total duration for the internship will be three weeks.

- Preparatory work for the internship will be one week, followed by two weeks of internship in a IT/Non-IT Companies where network Security is applied / to be applied.

- During the preparatory work, the students has to work with their respective supervisors allotted by the Department.

- At the end of the preparatory work, the student has to submit a technical report not less than 20 pages, describing the knowledge acquired by the student in the respective field of study.

- After the completion of the Internship in the respective company, the student has to produce the intership completion certificate issued by the company to the Department.

- The student's internship will be evaluated through a review and a viva will be

conducted through external members,.

Internal Assessment (Internship Guide)   **Total - 50 Marks**

- Industry, Domain and Problem Study   - 10 Marks
- Technical Report   - 25 Marks
- Presentation of the Technical Report   - 15 Marks

External Assessment   **Total - 50 Marks**

- Review of the internhip   - 30 Marks
- Viva Voce   - 20 Marks