IoT Communication Protocols		Semester	VII
Course Code	BCO701	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	3hrs
Examination nature (SEE)	Theory/practical		

Course objectives:

Understand fundamentals of IoT architecture outline and standards.
Understand and analyze different architectural views.
Understand the importance of IoT Layer Protocols.
Understand the importance of architecture and Industrial Internet of Things.

Teaching-Learning Process (General Instructions)

These are sample Strategies; that teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.
2. Use of Video/Animation to explain functioning of various concepts.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Project Based-Learning (PBL), which fosters student's Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.

MODULE-1

Fundamentals of IoT :

Introduction: IoT Technology trends and future opportunities, IoT and Business scope Evolution, Business perspectives, Embedded systems Relationships, Challenges of IoT, Characteristics of IoT, Sensors and Actuators in IoT enabling Industrial Automation, Wireless sensor Networks in IoT, Connecting all the things in Internet of things ,IoT M2M, Software Define Networking. IoT System Management is Essential.

Text Book : **Ch1, 1.1-1.13**

MODULE-2

IoT protocols

Introduction IOT life cycle , Physical Design, IOT Conceptual architecture, IOT protocols, Levels of IOT, IOT networking Protocols , Networking standards and technologies in IOT

Text Book : **Ch.3 3.1-3.8**

MODULE-3

IoT protocols

Introduction of 5G networks in IoT, IoT Networking consideration and Challenges, Business case for the IoT, Network optimization for IoT devices,Transport Layer protocols, Network Layer Protocols, IoT communication Challenges, Application Protocols for IoT.

Text Book : Ch.3, 3.9-3.17.

MODULE-4

IIOT

Introduction, Evolution of IIOT, Advantages of IIOT, Drivers, Risk associated with IIOT, Businesses and Industries approach IIOT security , Applications of IIOT, Work flow of IIOT, Security considerations and challenges, IIOT : Use Cases

Text Book : ch.4, 4.1-4.11

MODULE-5

Architecture of IIOT

Introduction, IIOT layered Architecture ,Three tier IIOT, Security in IIOT, Service based Frameworks, Solutions against Intrusions in IIOT, Machine learning based solutions, Deep Learning based solutions

Text Book: Ch.5, 5.1-5.9

PRACTICAL COMPONENT OF IPCC *(May cover all / major modules)*

Sl.NO	Experiments
1	To study various IOT protocol- 6 LowPAN, IPv4/IPv6, Wifi, Bluetooth, MQTT.
2	Controlling the Light Emitting Diode (LED) with a push button.
3	Detection of the light using photo resistor.
4	Interfacing of temperature sensor LM35 with Arduino
5	Interfacing of the Relay with Arduino.
6	To develop an application to send and receive data with Arduino using HTTP request
7	To develop an application that measures the room temperature and posts the temperature value on the cloud platform
8	To develop an application that measures the moisture of soil and post the sensed data over Google firebase cloud platform.
9	Building Intrusion Detection System with Arduino and Ultrasonic Sensor **(Can be Demo experiments for CIE)**
10	Directional Control of the DC motor using Arduino **(Can be Demo experiments for CIE)**
11	To develop an application for measuring the distance using ultrasonic sensor and post distance value on Google cloud IoT platform (**Can be Demo experiments for CIE)**
12	To develop a Simple application based on sensors.(**Can be Demo experiments for CIE)**

Course outcomes (Course Skill Set):

At the end of the course, the student will be able to:

1. **Understand** fundamentals of IoT and Architecture.
2. **Illustrate** the different layers of IoT protocols.
3. **Explore** the importance of Industrial IoT.
4. **Demonstrate** Use cases of IIoT applications.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests,

each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.

- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks)**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test **(duration 02/03 hours)** after completion of all the experiments shall be conducted for 50 marks and scaled down to **10 marks.**
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scoredby the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

Suggested Learning Resources:

Books

Dr. Vijendra Pratap Singh, Mr. Neeraj Kumar.., "IoT Communication Protocols", ISBN: 978-81-961690-9-1,Deccan International Academic Publishers,2023.

Reference Books:

1. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer, 2016.

2. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.

Web links and Video Lectures (e-Resources):

https://onlinecourses.nptel.ac.in/noc19_cs65/preview

https://archive.nptel.ac.in/courses/106/105/106105166/

https://onlinecourses.nptel.ac.in/noc21_ee85/preview

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Demonstration of IoT protocols using any simulation tools.

The students' team may of the size of 2 or 4. Students are expected to use any simulation tools to demonstrate some IoT protocols and then they have to prepare a report and then to be submitted to the concerned staff.

MACHINE LEARNING		Semester	7
Course Code	**BCO702**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	3
Examination nature (SEE)	Theory/Practical		

Course objectives:

- To understand the basic theory underlying machine learning, types, and the process.
- To become familiar with data and visualize univariate, bivariate, and multivariate data using statistical techniques and dimensionality reduction.
- To understand various machine learning algorithms such as similarity-based learning, regression, decision trees, and clustering.
- To familiarize with learning theories, probability-based models, and reinforcement learning, developing the skills required for decision-making in dynamic environments.

Teaching-Learning Process (General Instructions)
These are sample Strategies; that teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) needs not to be only traditional lecture method, can make use of digital tools to visually demonstrate key ideas that could be adopted to attain the outcomes.
2. Use think-pair-share strategies where students collaborate in pairs or groups to discuss concepts and solve small problems before sharing their understanding with the class.
3. Use case studies that apply machine learning in fields like finance, healthcare, and marketing to reinforce practical applications.
4. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information.
5. Utilize tools like TensorFlow Playground, Google Colab, and Jupyter Notebooks to visually demonstrate the impact of different machine learning models and hyperparameters on datasets.
6. Demonstrate ways to solve the same problem and encourage the students to come up with their own creative solutions.

MODULE-1 **8 Hours**

Introduction to Machine Learning: Need for Machine Learning, Machine Learning Explained, Machine Learning in Relation to Other Fields, Types of Machine Learning, Challenges of Machine Learning, Machine Learning Process, Machine Learning Application.
Understanding Data: Introduction, Big Data Analytics and Types of Analytics, Big Data Analysis Framework, Descriptive Statistics, Univariate Data Analysis and Visualization, Bivariate Data and Multivariate Data.

Textbook 1: Chapter – 1 (1.1-1.7), 2 (2.1-2.6)

MODULE-2 **8 Hours**

Understanding Data: Multivariate Statistics, Essential Mathematics for Multivariate Data, Overview of Hypothesis, Feature Engineering and Dimensionality Reduction Techniques.
Basics of Learning Theory: Introduction to Learning and its Types, Introduction to Computation Learning Theory, Design of a Learning System, Introduction to Concept Learning, Induction Biases, Modelling in Machine Learning.

Textbook 1: Chapter –2 (2.7-2.10), 3 (3.1 – 3.6)

MODULE-3 **8 Hours**

Similarity-based Learning: Introduction to Similarity or Instance-based Learning, Nearest-Neighbor Learning, Weighted K-Nearest-Neighbor Algorithm, Nearest Centroid Classifier, Locally Weighted Regression (LWR).
Regression Analysis: Introduction to Regression, Introduction to Linearity, Correlation, and Causation, Introduction to Linear Regression, Validation of Regression Methods, Multiple Linear Regression, Polynomial

Regression, Logistic Regression. **Textbook 1: Chapter – 4 (4.1 – 4.5), 5 (5.1 – 5.7)**
MODULE-4 **8 Hours**
Models Based on Decision Trees: Introduction to Decision Tree, Decision Tree for Classification, Impurity Measures for Decision Tree Construction, Properties of Decision Tree Classifier (DTC), Applications in Breast Cancer Data, Regression Based on Decision Tress. **Bayesian Learning:** Introduction to Probability-based Learning, Fundamentals of Bayes Theorem, Classification Using Bayes Model. **Textbook 2: Chapter – 3 (3.1 – 3.6), Textbook 1: Chapter –8 (8.1 – 8.3)**
MODULE-5 **8 Hours**
Clustering: Introduction to Clustering, Clustering of Patterns, Divisive Clustering, Agglomerative Clustering, Partitional Clustering. **Reinforcement Learning:** Overview and Scope of Reinforcement Learning, Components of Reinforcement Learning, Q-Learning. **Textbook 2: Chapter – 7 (7.1 – 7.5), Textbook 1: Chapter - 14 (14.1, 14.2, 14.4, 14.9)**

PRACTICAL COMPONENT OF IPCC

Sl.NO	Experiments
1	Write a program to create histograms for all numerical features and analyze the distribution of each feature. Generate box plots for all numerical features and identify any outliers. Use California Housing dataset. **Textbook 1: Chapter 2**
2	Write a program to Compute the correlation matrix to understand the relationships between pairs of features. Visualize the correlation matrix using a heatmap to know which variables have strong positive/negative correlations. Create a pair plot to visualize pairwise relationships between features. Use California Housing dataset. **Textbook 1: Chapter 2**
3	Develop a program to implement Principal Component Analysis (PCA) for reducing the dimensionality of the Iris dataset from 4 features to 2. **Textbook 1: Chapter 2**
4	For a given set of training data examples stored in a .CSV file, implement and demonstrate the Find-S algorithm to output a description of the set of all hypotheses consistent with the training examples. **Textbook 1: Chapter 3.**
5	Write a program to implement k-Nearest Neighbour algorithm to classify the randomly generated 100 values of *x* in the range of [0,1]. Perform the following based on dataset generated. a. Label the first 50 points $\{x_1,\ldots\ldots,x_{50}\}$ as follows: if (xi ≤ 0.5), then $x_i \in \text{Class}_1$, else $x_i \in \text{Class}_1$ b. Classify the remaining points, $x_{51},\ldots\ldots,x_{100}$ using KNN. Perform this for *k=1,2,3,4,5,20,30* **Textbook 2: Chapter – 2**
6	Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs **Textbook 1: Chapter – 4**
7	Write a program to demonstrate the working of Linear Regression and Polynomial Regression. Use Boston Housing Dataset for Linear Regression and Auto MPG Dataset (for vehicle fuel efficiency prediction) for Polynomial Regression. **Textbook 1: Chapter – 5**
8	Write a program to demonstrate the working of the decision tree algorithm. Use Breast Cancer Data set for building the decision tree and apply this knowledge to classify a new sample. **Textbook 2: Chapter – 3**

9	Write a program to implement the Naive Bayesian classifier considering Olivetti Face Data set for training. Compute the accuracy of the classifier, considering a few test data sets. **Textbook 2: Chapter – 4**
10	Develop a program to implement k-means clustering using Wisconsin Breast Cancer data set and visualize the clustering result. **Textbook 2: Chapter – 4**

Course outcomes (Course Skill Set):

At the end of the course, the student will be able to:

- Demonstrate the need for machine learning, its relationship to other fields, and different types of machine learning
- Illustrate the fundamental principles of multivariate data and apply dimensionality reduction techniques.
- Apply similarity-based learning methods and perform linear, polynomial regression analysis
- Apply decision trees for classification and regression problems, and Bayesian models for probabilistic learning
- Analyze the clustering algorithms and reinforce their understanding by applying Q-learning for decision-making tasks

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks)**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test **(duration 02/03 hours)** after completion of all the experiments shall be

conducted for 50 marks and scaled down to **10 marks.**

- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored by the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

Suggested Learning Resources:

Textbooks

1. S Sridhar and M Vijayalakshmi, "Machine Learning", Oxford University Press, 2021.
2. M N Murty and Ananthanarayana V S, "Machine Learning: Theory and Practice", Universities Press (India) Pvt. Limited, 2024.

Reference Books:

1. Tom M. Mitchell, "Machine Learning", McGraw-Hill Education, 2013.
2. Miroslav Kubat, "An Introduction to Machine Learning", Springer, 2017.

Web links and Video Lectures (e-Resources):

- https://www.drssridhar.com/?page_id=1053
- https://www.universitiespress.com/resources?id=9789393330697
- https://onlinecourses.nptel.ac.in/noc23_cs18/preview
- https://www.geeksforgeeks.org/machine-learning/
- https://www.w3schools.com/python/python_ml_getting_started.asp
- https://www.tutorialspoint.com/machine_learning/index.htm

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Course mini-project by taking suitable machine learning-based real-world application problem [10 Marks]

	CRYPTOGRAPHY & NETWORK SECURITY		Semester	7
	Course Code	**BCS703**	CIE Marks	50
	Teaching Hours/Week (L:T:P: S)	4:0:0:0	SEE Marks	50
	Total Hours of Pedagogy	50	Total Marks	100
	Credits	04	Exam Hours	3
	Examination type (SEE)	Theory		

Course objectives:

1. Understand the basics of Cryptography concepts, Security and its principle
2. To analyse different Cryptographic Algorithms
3. To illustrate public and private key cryptography
4. To understand the key distribution scenario and certification
5. To understand approaches and techniques to build protection mechanism in order to secure computer networks

Teaching-Learning Process

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) needs not to be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.
2. Use of Video/Animation to explain functioning of various concepts.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.
6. Introduce Topics in manifold representations.
7. Show the different ways to solve the same problem with different circuits/logic and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding
9. Use any of these methods: Chalk and board, Active Learning, Case Studies

Module-1 10 hours

A model for Network Security, Classical encryption techniques: Symmetric cipher model, Substitution ciphers-Caesar Cipher, Monoalphabetic Cipher, Playfair Cipher, Hill Cipher, Polyalphabetic Ciphers, One time pad, Steganography.

Block Ciphers and Data Encryption Standards: Traditional Block Cipher structures, data Encryption Standard (DES), A DES Example, The strength of DES, Block cipher design principles.

Chapter 1: 1.8 Chapter 3: 3.1, 3.2, 3.5 Chapter 4: 4.1, 4.2, 4.3, 4.4, 4.5

Module-2 10 hours

	Pseudorandom number Generators: Linear Congruential Generators, Blum Blum Shub Generator. Public key cryptography and RSA: Principles of public key cryptosystems-Public key cryptosystems, Applications for public key cryptosystems, Requirements for public key cryptography, Public key Cryptanalysis, The RSA algorithm: Description of the Algorithm, Computational aspects, The Security of RSA. Diffie-Hellman key exchange: The Algorithm, Key exchange Protocols, Man-in-the-middle Attack, Elliptic Curve Cryptography: Analog of Diffie-Hellman key Exchange, Elliptic Curve Encryption/Decryption, Security of Elliptic Curve Cryptography. Chapter 8: 8.2 Chapter 9: 9.1, 9.2 Chapter 10: 10.1, 10.4
	Module-3 10 hours
	Applications of Cryptographic Hash functions, Two simple Hash functions, Key management and distribution: Symmetric key distribution using symmetric encryption, Symmetric key distribution using asymmetric encryption, Distribution of public keys, X.509 Certificates, Public Key Infrastructures Chapter 11: 11.1, 11.2 Chapter 14: 14.1, 14.2, 14.3, 14.4, 14.5
	Module-4 10 hours
	User Authentication: Remote user authentication principles**,** Kerberos**,** Remote user authentication using asymmetric encryption. Web security consideration, Transport layer security. Email Threats and comprehensive email security, S/MIME, Pretty Good Privacy. Chapter 15: 15.1, 15.3, 15.4 Chapter 17: 17.1, 17.2 Chapter 19: 19.3, 19.4, 19.5
	Module-5 10 hours
	Domainkeys Identified Mail. IP Security: IP Security overview, IP Security Policy, Encapsulating Security Payload, Combining security associations, Internet key exchange. Chapter 19: 19.9 Chapter 20: 20.1, 20.2, 20.3, 20.4, 20.5

Course outcome

At the end of the course, the student will be able to :

CO1: Explain the basic concepts of Cryptography and Security aspects

CO2: Apply different Cryptographic Algorithms for different applications

CO**3:** Analyze different methods for authentication and access control.

CO4: Describe key management, key distribution and Certificates.

CO5: Explain about Electronic mail and IP Security.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours).**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored shall be proportionally reduced to 50 marks

Books

Text Books:

William stallings, "Cryptography and Network Security", Pearson Publication, Seventh Edition.

References:

1. Keith M Martin, "Everyday Cryptography", Oxford University Press
2. V.K Pachghare,"Cryptography and Network Security", PHI, 2nd Edition

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Group assignment (TWO) to implement Cryptographic Algorithms (15 + 10 marks)