ख़्वाजा मुईनुद्दीन चिश्ती भाषा विश्वविद्यालय, लखनऊ, उत्तर प्रदेश (भारत)
Khwaja Moinuddin Chishti Language University, Lucknow, Uttar Pradesh (India)
U.P. State Government University
(Recognised Under Section 2(F) & 12(B) of the UGC Act 1956 & B.Tech Approved by AICTE)

BCA Semester VI
BCA 601: Information Security and Cyber-Law

Credit: 05, IA Marks: 25, ESE Marks: 75
Lectures: 60 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. To learn the basics of Information Security.
2. To understand the Anatomy of information Security Attacks and their countermeasures.
3. To understand the Fundamentals of Cyber Law.

UNIT-I **Lectures: 15**

Introduction to Information Security: Security Goals, Attacks, Security Services (Confidentiality, Integrity, Availability, Authentication) and Mechanisms.
Mathematical Background: Integer and Modular Arithmetic, Matrices, Linear Congruence. Groups, Rings, and Fields, GF(p), Euclidean and Extended Euclidean Algorithms, Polynomial Arithmetic, GF(2n). Random Number Generation, Prime Numbers, Fermat's and Euler's Theorems, Primality Testing Methods, Factorization, Chinese Remainder Theorem, Quadratic Congruence, Discrete Logarithms.

UNIT-II **Lectures: 15**

Traditional Encryption Methods: Symmetric Cipher Model, Substitution Ciphers, Transposition Ciphers, Block and Stream Ciphers, Rotor Cipher, Steganography.
Symmetric Key Ciphers: Data Encryption Standard, Advanced Encryption Standard. **Asymmetric Key Ciphers:** RSA Cryptosystem, El-Gamal Cryptosystem, Elliptic Curve Cryptosystem.

UNIT-III **Lectures: 15**

Message Integrity, Authentication: Message Integrity, Message Authentication, MAC Algorithms
Cryptographic Hash Functions: MD-Hash Family, Whirlpool, Secure Hash Algorithm.
Digital Signature and Authentication: Digital Signature Schemes, Variations and Applications, Entity Authentication. Key Management: Diffie-Hellman Key Exchange.

UNIT-IV **Lectures: 15**

Network and System Security: Security at the Application Layer: e-mail security, PGP and S/MIME. Security at the Transport Layer: Secure Socket Layer (SSL) and Transport Layer Security (TLS), Security at the Network Layer: IP Security.
Cyber Law & IT Act Overview: Cyberspace, Cyber security, Cybersecurity Policy, Cyber Crime, Nature of Threat, Information Technology Act 2000, Information Technology (Amendment) Act, 2008, Ethics and Etiquette in Cyber World,Intellectual Property Right, Intellectual Property in Cyber Space, Cyber Security Strategies, Policies To Mitigate Cyber Risk

Course Outcome: After successful completion of this course students will be able to:

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. To learn about how to maintain the Confidentiality, Integrity and Availability of a data. To understand basics of Cryptography, various security attacks.	K1, K2
2	CO2To learn how basic public and private key primitives can be defined based on the difficulty of mathematicalproblems such as the discrete logarithm problem or factoring and analyze variants of these systems	K2, K3
3	CO3. Apply the various roles of hash functions as parts of other cryptographic primitives and protocols and the requirements this place on hash functions	K2, K3
4	To examine the issues and structure of Authentication Service at various layers. Understand the cyber law, ethics and IT Act.	K1, K2

Suggested Readings:

1. B. A. Forouzan& D Mukhopadhyay,Cryptography and Network Security., McGraw Hill.
2. B. Menezes,Network Security and Cryptography., Cengage Learning.
3. Stallings,Cryptography and Network Security., PHI.
4. Information Systems Security Management by Nina S. Godbole (Wiley India Pvt.Ltd.)
5. Security Engineering by Ross Anderson
6. Information Security Management Handbook by Harold Tpton &Micki Krause (Auerbach Publications)
7. Network Security Essentials: Applications and Standards W. Stallings (Pearson Education)
8. Security Planning & Disaster Recovery by Eric Maiwald and William Sieglein (Tata McGraw-Hill)

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BCA Semester VI

Elective-II: BCAE61-BCA 602: Introduction to Client-Server Computing

Credit: 05, IA Marks: 25, ESE Marks: 75

Lectures: 60 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. To Gain Exposure on most commonly used servers.
2. To Understand the concept of client-server development and learn problem solving skills through design scenarios for network environment.
3. Develop a client-server-based application.

UNIT-I **Lectures: 15**

Client/Server Computing: DBMS concept and architecture, Single system image, Client Server architecture, mainframe-centric client server computing, downsizing and client server computing, preserving mainframe applications investment through porting, client server development tools, advantages of client server computing.

UNIT-II **Lectures: 15**

Component of Client/Server Computing: Networking, Types of networks, Basis of client / server computing components. Benefits, Evaluation of Client-server computing, Client / server computing approaches, applications development, cost implementation. TCP/IP Protocol suit.

UNIT-III **Lectures: 15**

Open System Standards for Client/Server Computing: Understanding Client / Server computing, Dispelling the Myths, Obstacles Upfront and Hidden Open system and standards, Factors for success. Socket programming and socket API.

Two Tier Computing: Introduction client Tier, Hardware and Software requirements operating system services, Types of Clients Server -Tier, Types of Server-Eight layers of Software.

UNIT-IV **Lectures: 15**

Three-Tier Computing: Introduction and comparison of two and three tier- Client side, server side and middleware side, Hardware and Software requirements, Transaction servers, TP lite Vs TP Heavy. CGI scripting.

Middleware: Hardware and Software requirements, Netware connectivity, Types of Middleware, Data Base middleware Standards.

Multi-Tier Computing: Overview, Benefits, Disadvantages, Components, Tier separations and interaction.

Course Outcome: After successful completion of this course students will be able to:

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. To Recognize and describe the working of Computer Networks, Client server computing.	K1, K2

2	CO2. To Illustrate reference models with layers, protocols and interfaces.	K1, K2
3	CO3. To Combine and distinguish functionalities of different Layers.	K2, K3
4	CO4. Model the Client- Server computing using different media.Apply client–server computing in real life application development.	K2, K3

Suggested Readings:

1. Dawana Travis Dewire, “Client/Server Computing”, Tata McGraw -Hill Publishing Company Limited, New Delhi.
2. Patrick Smith and Steve Guengesich, “Client/Server Computing”, Prentice Hall of India, New Delhi.
3. Robert Orfali, Dan Harkey and Jeri Edwards, “Essential Client/Server Survival Guide”, Galgotia Publications, New Delhi.
4. Joel P Kaster, “Understanding Thin Client/Server Computing”, Prentice Hall of India, New Delhi.

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BCA Semester VI
Elective-II: BCAE62-BCA 602: Mobile Computing

Credit: 05, IA Marks: 25, ESE Marks: 75
Lectures: 60 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. To understand mobile operating systems in developing mobile applications.
2. To understand Describe the functionality of Mobile IP and Transport Layer.
3. Classify different types of mobile telecommunication systems.

UNIT-I **Lectures: 15**

Issues and Challenges of Wireless Networks – Location Management, Resource Management, Power Management, Security, Wireless Media Access Techniques, Mobility Management and Handover Technologies
General Issues: Security, Performance and Dependability, Web Architectures: Local Networks, Store and Forward Multi-network Architectures.

UNIT-II **Lectures: 15**

Types of Wireless Networks: Mobile Networks, Ad-hoc Networks: Ad-hoc Routing, Sensor Networks and Peer-Peer Networks, Mobile Routing Protocols – DSR, AODV, Reactive routing, Location Aided Routing, Mobility Models – Entity Based, Group Mobility, Random Way-Point Mobility Model.

UNIT-III **Lectures: 15**

Databases and Software: Principles of Disconnected Operation- Caching, Hoarding, etc. Software Adaptation and OS Support. Resource-Sharing, OS for Embedded Devices: PalmOS, WindowsCE, Embedded LINUX, WAP/WML, J2ME, Windows Mobile and .Net Framework, BREW, Mobile Agents, Resource and Service Discovery, Mobile Java, Mobile Grid and Collaborative Processing with Jini.

UNIT-IV **Lectures: 15**

Protocols: Networking Protocols, Packet Switched Protocols, Routing Protocols for SensorNetworks, Data Centric Protocols, Hierarchical Protocols, Location-based protocols, Multimedia
Messaging Service (MMS) Protocols, Wireless Application Protocol (WAP).
Applications: Mobile Access to Patient Information in a Hospital, Sales Support, Retailing, Services Support, Tracking Applications, Designing for Small Screen Devices, Search Interfaces, Context-Awareness and Determining locality.

Course Outcome: After successful completion of this course students will be able to:

S. No.	Course Outcome	Bloom's Taxonomy

1	CO1. To define mobile technologies in terms of hardware, software, and communications.	K1, K2
2	CO2. Explore the concept of Wireless Networking and Wireless LAN.	K1, K2
3	CO3. Analyse and comprehend Data management issues like data replication for mobile computers, adaptive clustering for mobile wireless networks and Disconnected operations.	K1, K2
4	CO4. Describe how mobile technology functions to enable other computing technologies.	K1, K2

Suggested Readings:

1. W. Stallings, Wireless Communications & Networks, Prentice Hall.
2. J. Schiller, “MobileCommunications", Addison Wesley.
3. F. Adelstein, S.K.S. Gupta, “Fundamentals of Mobile and Pervasive Computing”. The McGraw- Hill.
4. Reza B’Far, “Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML”, Cambridge University Press.
5. H.M. Deitel, P.J. Deitel, T.R. Nieto, and K. Steinbuhler, Wireless Internet & Mobile Business –How to Program, Prentice Hall.
6. Recent conference/journal papers.

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BCA Semester VI
Elective-II: BCAE63-BCA 602: Soft Computing

Credit: 05, IA Marks: 25, ESE Marks: 75
Lectures: 60 Hours, Tutorials: 15 Hours

OBJECTIVES OF THE COURSE:

1. Introduce and use the idea of Artificial Intelligence and Neural Networks, Fuzzy Logic and use of Heuristics based on human experience.
2. Understand the underlying principle of soft computing with its usage in various applications. .
3. Understand different soft computing tools to solve real life problems.
4. Introduce and use the concepts of Genetic algorithm and its applications to soft computing using some applications.

UNIT-I **Lectures: 15**

Artificial Intelligence: Artificial Intelligence: a Brief Review, Pitfalls of Traditional AI, Need for Computational Intelligence, Importance of Tolerance of Imprecision and Uncertainty, Constituent Techniques, Overview of Artificial Neural Networks, Fuzzy Logic and Evolutionary Computation.

UNIT–II **Lectures: 15**

Neural Network: Neural Network: Biological and Artificial Neuron, Neural Networks, Supervised and Unsupervised Learning. Single Layer Perceptron - Multilayer Perceptron – Backpropagation Learning.

UNIT-III **Lectures: 15**

Genetic Algorithm: Concept of GA, GA Operators: Encoding, Selection, Crossover, Mutation, Solving optimization problems using GA Algorithms

UNIT–IV **Lectures: 15**

Fuzzy Logic: Fuzzy Sets, Properties, Membership Functions, Fuzzy Operations, Fuzzy Logic and Fuzzy Inference System

Course Outcomes: After successful completion of this course students will be able to:

S. No.	Course Outcome	Bloom's Taxonomy
1	CO1. Understand theoretical and practical aspects of Artificial Intelligence	K1
2	CO2. Study and identify various issues related to the development of Artificial neural networks and its applications.	K2
3	CO3. Analyze the concept and significance of genetic algorithms and Solving optimization problems using GAs.	K3, K4
4	CO4. Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.	K3

Suggested Readings:

1. An Introduction to Genetic Algorithm,Melanic Mitchell (MIT Press).
2. Evolutionary Algorithm for Solving Multi-objective, Optimization Collelo, Lament, Veldhnizer (Springer).
3. Fuzzy Logic with Engineering Applications Timothy J. Ross (Wiley).
4. Neural Networks and Learning Machines Simon Haykin (PHI).
5. AmitKonar, “Artificial Intelligence and Soft Computing”, First Edition,CRC Press.
6. David E. Goldberg, Genetic Algorithms in Search, Optimization and Machine Learning”, Addison Wesley
7. George J. Klir and Bo Yuan, “Fuzzy Sets and Fuzzy Logic-Theory and Applications”, Prentice Hall
8. Simon Haykin, “Neural Networks: A Comprehensive Foundation”, Prentice Hall
9. Recent conference/journal papers.

BCA Semester VI
BCA 604: Project

Credit: 10, IA Marks: 50, ESE Marks: 150

OBJECTIVES OF THE COURSE:

• To help students develop openness to new ideas in computer science, develop the ability to draw reasonable inferences from observations and learn to formulate and solve new computer science problems using analytical and problem-solving skills;

• To help students develop the ability to synthesize and integrate information and ideas, develop the ability to think creatively, develop the ability to think holistically and develop the ability to distinguish between facts and opinion;

• To help students acquire the necessary competences to build a real-life software system by completing different software life cycle phases (like, specification, architecture, design, implementation, validation, documentation, etc.

BCA Semester VI
BCA 605: Industrial Training

Credit: 0, IA Marks: 25, ESE Marks: 75

After completing the fourth & fifth semester of the BCA Programme, each student shall undertake an Industrial Training (Qualifying). A student shall submit a written structured report on the basis of work done within four weeks of the commencement of the fifth/sixth semester.